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DOCTOR OF PHILOSOPHY

Use of Human Reliability Analysis to evaluate surgical technique for rectal cancer

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Peter John Wilson

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# **Appendix 3**

## **Expert Group Meeting**

# Task Analysis

## Expert Group Meeting

Date 24 Feb 2004

Chair Professor Sir A Cuschieri, Professor of Surgery, Dundee (AC)

Present Professor RJC Steele, Professor of Surgery & Departmental Head, Dundee (RS)

Professor RJ Heald, Professor of Surgery, Basingstoke (BH)

Professor A Munro, Professor of Surgery, Inverness (AM)

Professor P Quirke, Professor of Pathology, Leeds (PQ)

Mr RH Diament, Consultant Surgeon, Kilmarnock (BD)

Mr GB Hanna, Consultant Surgeon and Ergonomist, London (GH)

Dr PJ Wilson, Clinical Research Fellow, Dundee (PW)

## Introduction

RS Thanks very much for coming. Alfred has very kindly agreed to chair this meeting, and Alfred and I and George put together this research a number of years ago and applied to the CSO for funding. Alfred is going to chair the meeting and is going to chair the meeting and introduce...

AC Thank you for coming, and I do apologise for my voice – not intentional. I want to very briefly put you in the picture. What we are about to do today is a Task Analysis of this specific operation – anterior resection. The task analysis was developed a long time ago by industry, and basically what industry did say was that if I have a complex task, and I want to ensure maximal performance by all, I will break this task into component parts, find out what may go wrong, ... and introduce depend systems to reduce these errors. The whole process is known as Human reliability analysis, and underlines all high-risk industry work. What George, Paul Joice and myself did some 10 years ago was to adapt this technology for use in the medical field. And the big change is in using video capture as an observational data analysis to find out when an operation is done, what does go wrong, and how it can be improved. In doing this the proposal is that it is very important to set standards. Now you have been picked because you are considered by your peers to be well above average in colorectal surgery. And there are some things that would appear to you as obvious and unnecessary. But I have to tell you that in the Pre-Calman days, the period of time in hours from SHO to consultant, for one to become an independent proficient operator was 30,000 hours. With the EWTD directive this has come down to 8,000 hours. If the CMO has his way, it will come down to 6,000 hours. That equals 233 days in my

calculation. So the exposure that you had and I had to our masters will no longer apply. So it is becoming an age where it is very important to become very prescriptive. ... So this operation which carries immediate risks, not only of anastomotic dehiscence, but compromised survival because of whatever, LR. And basically this is the object of HRA. We take one operation, we study it, we devise a task analysis, we find out – in a consensus way – how best to do this operation well. Bearing in mind the endpoints that we consider to be important, related to patient outcome. That is the point of this exercise, alright. And therefore we have to define what are the essential steps of this operation. That is really what we are about, OK? So, George do you want to introduce in some detail Task analysis, and then RS will take over.

GH I just have only 4 slides, just a few points to introduction to Task Analysis (TA). TA in ergonomic terms is what is required in terms of actions or cognitive process to achieve the systems goal (Slide 1). If you apply it in surgery, actions is the execution of the exercise; cognitive process intra-operative decision making process ... to achieve system goals, which in our case is complete resection of the cancer. Before doing any task analysis, we need to define what is the gold standard, or what is the .... This is in general terms; in our case, it will be TME of rectum, and the problem which we would like to avoid is leaving anything behind, to improve better survival. So this is the goal of the TA. And we use in general terms TA for 2 main reasons – either to assist in Human factors study, or for Human reliability analysis. Human Factors Study is the best example of it is post-operative care. In post-operative care we can analyse people involved medical staff, nursing staff, ward rounds, interactions, interfaces, patient care. This is HFS, and in terms of surgical process, we

do this for training and .... This is Human Factors Study, but this is not the aim of our meeting. The aim of our meeting is a pre-cursor to HRA, as an introduction to HRA. The reason for that we need to define how the task should be carried out, and if we know how the task should be carried out then any deviation from the task will be considered an error. So we do the TA so that we will have a template against which we are going to allocate errors. This is why we will do the TA before we .... There are 30 techniques of TA, but what we will model here are 2 of them. HTA is divides an operation into component parts. So if this is the operation, we get component parts. And these tasks could be done parallel, or in sequence, but the key is point is that each procedure is little small operations. And there are 2 important structure points that we need to (take care of). One is the plan which means when to move from one task to another, when to move from one task to another. We can have fixed sequence, we can have flexibility sequence, we can have action, given cues if something happens we need to act one it, But the key point is when to move from one task to another. The second point is stopping rules. You can see Peter provided 2 version of the Task analysis. One of them is very detailed, and one of them is the outline. So when do we stop, and which level of errors we need to analyse, but the general plan is that we do a general analysis, and after that we trim the trees. This is the .... This is the last slide. The 2<sup>nd</sup> way of task analysis, which is complementary to the other one, is called decision-action diagrams. And the best way for it is the decision algorithms for treatment. We usually a lot of if a patient has an US, has liver mets... it presents the decisions which will otherwise complicate the HTA. So we can have a HTA, in a standard forward operation, but if there is lateral extension, you may need to identify the ureter and go down; if you have anterior involvement of the vagina / uterus you

need to do a hysterectomy. So the diagram will show in unusual situations, how you will need to decide what to do about it. It is essentially algorithmic – if something happens, what you need to do about it. And the last point – it describes decision-making scenarios, but it also describes the criteria required to make this decision. So just to summarise: TA there are component tasks. We need to look to the action and to the intra-operative decision process. It is a hierarchical task, we need to do 2 things: when to move from one thing to another, and do a detailed analysis, and we will trim the trees later on. And the last point is if unusual situations we can do decision-action diagrams in a separate sheet, rather than the TA, and we will keep the TA tidy.

AC Are we agreed on that. I mean, are there any queries on what GH has outlined? Is it all absolutely clear. Right, right, OK.

AM Can I maybe ask if this is going to be done in abstract, or is it going to be done in relation to visual images.

RS Well, what we had planned; what I had planned to do is just very briefly introduce why we want to do this in rectal cancer surgery. I think we all to a certain extent all know. And then Peter the plan is to work through the TA. And you do have visual images, right.

PW What I was hoping to do was work through this first so that we could define what the key aspects are from this overview, and then those that are considered most important we would concentrate on in more detail in the detailed TA.

RS I think just to introduce the situation, to me this is a very exciting time, because when I came to Dundee I think that in Scotland there was a problem with rectal cancer



surgery, and probably after I came to Dundee and Bill and Phil ran a workshop which actually I believe had a profound effect on the management of rectal cancer throughout Scotland, and one of the things that has occurred to me is that a lot of people say they do TME, but there seems to be a very wide range of results, both in terms of outcomes and in terms of the pathological resection specimen. So no matter you know how much TME is promulgated, and no matter how many people accept the principle, we are still faced with this very wide range of outcome, and I think that the Dutch trial is probably quite a good example. It is quite a big trial where everyone is having TME's but it is clear that everyone was not exactly having the same operation. So when I came here and I found that AC and PJ were involved in this TA, and HRA research it seemed to me that rectal cancer surgery must be an ideal subject for this approach. If we could actually define what needs to be done, then it would be a very important tool for improving outcomes in rectal cancer surgery. So what PW, myself AC and GH over the past few months is trying to develop a draft TA and PW has been coming to Theatre, and has been working on the visual side of the research and we have identified a whole series of steps of this operation. And BH, you sent an e-mail this morning, where you pointed out that a lot of it is not relevant to the core of rectal cancer surgery, and that is probably true, because as Alfred said, bits of it will be relevant in the generic sense to trainees in the future. But what we need to do today is to sort of focus down on the areas that are really important, and focus on them in some detail. ...What we have done if you look at the Brief version of the TA, we have divided into abdominal access which of course is very generic... Has everyone got a copy – (to PW) if you could hand round the .... Access to the abdomen, which we would probably deal with fairly quickly. There is the issue of

assessing the disease process within the abdomen. There is the issue of optimising access, which I think will be highly individual. People use various types of retractors. Then there's the issue of mobilisation, and identifying the correct structures that we mustn't damage, and identifying the correct planes for mobilisation. And the degree of mobilisation – if we are going to get a safe anastomosis we must have enough mobilisation so that there is no tension. When we dissect the splenic flexure there is potential for damage to the spleen, and we need to think about strategies for minimising the risk of splenic damage. The rest of it should be fairly straightforward until we reach mobilisation of the rectum and in terms of cancer recurrence of course this is the absolute core of the operation. And you will see that under 8 we have made just very superficial comments, but if you turn later to the detailed TA this is I think probably one of the areas that we would want to concentrate on in terms of the actual steps of the proc and what we want to try to achieve. And I think it is this area which is most variable, and I have seen lots of TME in very different ways. Excising the rectum, again, there may be a number of different ways of doing this, and the issue of colopouches, how to create a colopouch, if its required, when it's required. The anastomotic technique, and the choice of whether the defunction or not, and the type of defunction. We tend to use Ileostomy, but I know there is still some debate about .... And then we get back to more generic issues .... So what I would .. because we have limited time I would imagine we would skim over some of these generic areas more quickly, and then focus on the areas that are really important. And I don't want to say any more than this. I had thought about showing some slides, I mean some pictures, but the pictures I was going to show would be fairly familiar to you all, so I

don't think that that is really necessary. I don't want to say any more at this stage, so Peter do you want to move into the actual business.

PW Yes. Just I think we want to go over the overview from steps 1-14, and then decide from those...

AC Could we have it on screen? Is that possible?

PW Yes.

AC In this type of work. There are some definitions. And the most important are the 'hazard zones' of an operation, the tasks of the operation that determine the outcome, and where mistakes can have serious consequences. I suggest that as we go down the various texts, we would agree as to whether this is a hazard zone or not...OK

### **Incision of Abdomen**

AC So Task 1 – any views on the nature of the incision, how it is done, its size in relation to the thickness of the abdominal wall of the patient and does it matter?

BH I suppose my argument with the choice of things to list there is that I don't think anybody should be doing an operation on the extra-peritoneal pelvis, if you like, until they have done many abdominal incisions. So the only thing I would feel worthy of discussion, and therefore of putting up as a list of things to put off a young man, and assuming that he has been in and out of 50 or 100 abdomens before he starts operating on a rectum, it would seem to me that under 'Incision' we should be considering the precise length of the incision: how high up it would go, how easy it is and how common it is not to go right down to the symphysis pubis...

AC So incision placement?

BH Yes, I mean, these are the sort of things I would take as granted, the things I see there, and instead discuss the feasibility of taking on board a woman who insists on having a suprapubic transverse incision for cosmetic reasons, and so on, the disadvantages thereof. I did one such yesterday, and em, what I am trying to say, I don't know whether we have to go back to lesson 1 on an operation which really isn't lesson 1. It's lesson 5 or 6 really to approach on the rectum.

AC Do I have the impression that the vast majority, if not all of you would prefer a vertical midline to a Pfannenstiel? Is that the consensus.

AM Certainly that is what I have always been...

AC (To PW) Can you just.. That is number one. Do I, From what BH has said, is it a very important practical point that the incision *is* extended to the symphysis.

BH I believe it is downwards, yes, certainly how far up is..

AC Beyond *how* down? Beyond *how* further down the symphysis? When you do your incision... you see the system of HRA is not saying 'down the way'; you have to specify. When you do your incision, how do..

BH To the bone.. Downwards.

AC To the bone. OK. Are we all agreed?

(YES)

BH I think we would agree that the incision is very important.

AC This is the point HRA brings. The other practical point I think in relation to the incision. We agreed on the placement and the lower end, expose the symphysis. What

about the size of the incision in relation to the thickness of the abdominal wall of the patient. Have you got any suggestions there, collectively?

AM My practice has always been to make the lower part first, then use judgement, to see how far one is to take it proximally. I always have a wee peek in and have a look at where the splenic flexure is. Cause I think that's going to determine how high you are going to need to make the incision.

AC In 10 patients you do with your technique, with your incision, how often would you extend your incision well above the umbilicus?

AM Almost all of them above the umbilicus

AC Why don't you tell me 'all of them'

AM No, there's quite a long way between the xiphisternum and the umbilicus. It depends on a number of factors, in addition to the height of the splenic flexure, and also the build of the patient, if you have a very deep patient, the chances are that you will have to go higher.

AC Right. OK. Any further points on this

BD One of the things to do about making in the incision is to do it in a stepwise fashion. Through the skin, through the fat, through the muscles, long before you go into the peritoneal cavity, because I find that once the peritoneum is open, you don't get the same definition that will .... So I always make a point of not going into the cavity until the muscles have been divided right down onto bone, which allows that bladder to fall back ... into the space behind the pubis, whatever it is called...

AM Space of Retzius

- BD And after that opening the peritoneum once I have fully opened the ... all the way, and I make a huge incision. I don't stint on the incision.
- AC Does the incision length matter?
- BH I think you (AC) made the point that the length of the incision is proportional to the thickness of the abdominal wall, so that it does require a degree of judgement...
- AC But you know it has never been studied, it is all intuitive. An experienced surgeon, seeing a fat... , knows what size his incision is going to end up, but it's actually never been .... The relationship between incisional length, abdominal wall thickness, and good exposure has never been studied. And that is why I am pressing you all to tell me. You see I learnt that surgeons know before they start the incision, know the size of the incision that patient is going to need.
- RS The only thing that I would say about that, is because the splenic flexure is so variable, I would agree with AM that you wouldn't necessarily take it right up to the xiphisternum in everyone, because you may well find that with an incision above the umbilicus, perhaps halfway to the xiphisternum might enable you to get at the splenic flexure, but having said that...
- AM I think another point is that certainly in my practice, what I found that – not infrequently – I made an incision which was 5-6cm below the xiphisternum (the upper end was that level) and then having got into the operation and started taking down the splenic flexure, you then find that you have difficulty, and what you do then is go back and extend the incision, like most people who are in difficulty, the first thing they do is to extend the incision. But that would be a later part, as a later thing. I

think that it's ... certainly in my practice I didn't always determine the length of the incision initially. Sometimes I would extend the incision at a later date.

BH I would just agree with RS – I think that the initial incision probably should be halfway between the umbilicus and the symphysis, because if the splenic flexure will come down easily then it packs away to the right more easily if you have not opened the whole abdomen from stern to stern. It tends to bulge out, you need to pack it away, and it packs better without the full length incision. So I agree with you, I think that extension to the xiphisternum is a minority group which is done because one is experiencing difficulty with the splenic flexure.

AC And when would you define as encountering difficulty?

AM The ultimate difficulty is when the spleen starts bleeding

AC That's not my question

BD There's predicting difficulty, and there's encountering difficulty, and they are slightly different.

AM You have got to be able to see.

AC Does it ever worry you when your retractor is stretching the skin to such a degree that it becomes white? Is it something we should consider. These self-retaining retractors.

BH I think it is when you are not seeing adequately to be certain that no traction is being placed which might tear the spleen.

AC So, lack of exposure?

BH Really, Yes.

AC Before we leave access of the abdomen. Would you consider this step to be a key step of the operation?

AM The incision? Absolutely. Critical.

AC In other words, it would be given an important weighting in the overall...

AM It can make the operation easy, or it can make the operation difficult, depending on...

## **Laparotomy**

AC I am just being the devil's advocate. Now, number 2, we come to the identification of advanced disease or complicating factor. Not so certain what a complicating factor is here. Can you enlighten me.

BH CO-existing morbidity such as a AAA.

AC So you mean any co-morbidity.

PW And also any complications on entry, so if bleeding has occurred or splenic damage during the course of entry, that needs to be dealt with before moving on to the next stage.

BD Gastro-enterostomy causes me problems. Not so common these days.

AC But we are talking about co-morbid pathology.

BD Previous surgery.

BH Things that change the way we .... Because things are changing so much, that nearly everyone will have had a colonoscopy. A brief review of .... Whether you trust the guy that did it, or whether you did it yourself. That is in the century replaces that careful palpation that we used to do once upon a time. So that is one thing. Other



things like spiral CT's and MRI's can give us information which is superior to what we can get with our hands in palpating the liver. I think it is jolly difficult not to put in a review of the pre-operative as there is a danger for senior surgeons particularly without actually having examined the patient perhaps while they were awake, and that has its dangers with a low tumour. What I am trying to say is that I think pre-operative investigations should be briefly reviewed, whilst the abdomen is being reviewed.

AC And the X-rays and scans should be in the OR displayed, not in a folder

BH Exactly

RS That is an important point, because it is a bad error to not look at the colonoscopy report and see if there is a caecal cancer as well as a rectal cancer.

AC I think that is something we should add

BH Or there is one, and the SHO thought he saw the ileo-caecal valve, and perhaps he didn't.

BD This is about the operation, but you need to do another TA about the investigations and pre-operative phase, so once you have done this...

AM Visualising the reports in theatre, having the X-rays available or displayed...

RS But where that goes in the actual, maybe that should be right at the beginning

AM What about positioning the patient on the table. Are you going to do anything about that, or is it considered irrelevant? Because the position of the patient is quite critical.

RS Perhaps that is something we should discuss just now. We started at the point of gaining access to the abdomen, but that is a very good point.

AM Because there are huge problems regarding the position of the legs, compartment syndrome post-operatively, and so on. Which is a real issue at the moment,

AC I think that is a very valid point, actually, which has been completely overlooked. The problem is the great variability of operating tables, stirrups, leggings, and so on.

AM There are some principles I think which you could put forward

AC Is there any documentation evidence as to what is good and what is bad practice in having that patient in LAR, particularly if you are doing stapling. I do not know of any. Is this an area that we should highlight?

BH There probably is evidence to show that compartment syndrome is rather more common after this kind of surgery than many other types of surgery

AM And also it would be of interest to...

AC And how do you prevent it? Unless you know the optimal positioning, I am not aware

BD There are lots of isolated case reports of problems in rectal surgery, and there are probably more problems associate with pouch surgery and colitis than in rectal cancer. Many surgeons are now altering the position of the patient during the course of the operation. Rather than having a pouch patient in modified lithotomy for the duration of the operation, you do the colectomy first, and then putting the legs up when it comes to the rectal dissection.

AM And does intermittent compression for DVT prophylaxis during the operation make any difference? That is the case, I think

AC Tell me what is your practice (to AM) to make sure that patients in the lithotomy type position or stirrups are kept in the best possible position as far as their circulation is concerned during the operation?

AM Well I must say that for this kind of surgery my position has changed over the years, we used to put them in fairly steep head-down position. I am much more wary about doing that these days. Just a few months ago, what we tended to do was to level out the patient much more, or keep the legs lower than we previously did. You can still get adequate exposure and access between the legs, so we tend not to put the legs steeply up as we previously did, and we use intermittent pneumatic compression, but I keep the pressures relatively low.

AC What about the others?

BH We do the same, but I wonder about... just recently... we are not doing AP now, but we have been talking about what we call the Berlin position in which that steep, steep, steep Trendelenburg to facilitate the anterior dissection in the AP and with shoulder support and so on. I think most of us tend to keep legs out at a modest angle for AR, cause all we need to do is put a stapler through there probably. But do we have any evidence that that's of benefit?

RS I don't think there is any. We would certainly have patients in what we call the extended Lloyd-Davies, in which we have the legs almost flat out

BH 15° flexed

AM I think that is an important point, because if one is going to be prescriptive about these things, then one has got to be prescriptive.

AC One has to be

AM In a very safe sense

AC So if you talk about angles of joints, the hip joint: what sort of flexion should there be? In your practice, and in the knee joint

AM 10° at hip, and maybe 10° flexion at the knee (10-20, something like that)

BH I think 20; a little more at the hip, and

AC How much at the hip then?

BH 25° at the hip, probably. I was thinking maybe 25° at the hip and 15° at the knee

AC (To PW) Could you measure what RS does? I would be very surprised if these figures tally. But it is very important, actually. We are talking about 20-25.

AM It would be very interesting to hear from BH and your very extensive audit of huge numbers, hundreds of cases, has compartment syndrome been an issue?

BH No, not, but I am aware of it having happened, but I am aware of it having happened – it's a great thing to say – to some of my colleagues. But I am aware of there being a compartment syndrome within the last few years.

AM It is a devastating complication.

BH Exactly

AC (To BD) Have you encountered it?

BD Not personally, but one of my colleagues, and it was a result of malfunction of intermittent compression, where the pressures had been – well we think it was – the pressures had been set at 40mmHg, but there was a malfunction in the system, and at

the end of the operation the patient had compartment syndrome. Now whether that was due to the legs ...

AM I think perhaps if you are going to be very prescriptive, then perhaps we ought to put a pressure for pneumatic compression down on paper. I mean people may deviate marginally from that, and we kept ours somewhat below that, perhaps 30, 25, 30 was the sort of pressure we tended to use, but it was very arbitrary, I have to say.

RS It's not ... to use pneumatic compression

AM (To BH) Do you use pneumatic compression?

BH Yes

AM And pressures

BH I can't tell you the pressures

BD 40 is what it says on the box, and that is the recommended pressure on the instructions

BH Is that right? If it is puffing away I'm happy

AM I must say, compartment syndrome is something I thought a lot about, because it is such a devastating thing, and we just dropped the pressures a little, but there's no evidence base for that.

BD There are a lot more factors than just compression affecting compartment syndrome ... perfusion ... it can be a reflection of what is going on with the patient as well.  
Complex issue

AC OK, so we shall add that – position of the patient, and perhaps do some reading about the any published work on angles, position, whatever, and whether it impacts on

morbidity including compartment syndrome. We now come back to you now, Task 2-1: explore (digitally, obviously, or by hand) all quadrants systematically for advanced disease. Do you all do that, all the time, every time?

BH I wouldn't take down a lot of adhesions to do it, not with modern pre-operative work-up.

AC So you would do it, except in the presence of dense adhesions

AC Assess mobility of sigmoid and rectum. My question to you all is how?

BD Or why?

AM Well, for a rectal tumour, I would certainly put a hand down and feel it, and get some rough idea of how mobile it is. You can move it around

RS For a low rectal tumour you know that already, but for a high one...

AM Yes, but for a mid-rectal tumour there can be some merit to that.

BH You see there's another thing we've – I don't know where it goes, but certainly before anyone puts a knife in. I think it's very wrong for anyone to operate on a female patient without having done both vaginal and rectal examinations to establish the relationship of the tumour to the posterior rectal [sic] wall. And I think that is a sine qua none for operating on a female, and it ought to go somewhere in the task analysis.

AC That is in your clinical assessment, not in the operating theatre.

BD In the operating theatre

BH In the operating theatre, and often you do something which I wouldn't normally do in the outpatient rooms which is to have a finger in both the vagina and the rectum at the same time. I think women would prefer that to be...

AC Do you do that always?

BH Always, yes, in a female.

BD At the risk of opening the gate of a hobby horse, we also are now trying to get surgeons in the West of Scotland to do a rigid sigmoidoscopy in all patients before they start the operation, in order to try and get some idea of what is and what isn't a rectal cancer. Asking them as part of a network, asking them if they would do a rigid siggy, and measure the distance from the anal verge before they start the operation, and you often pick up little nuances which are, ...?not critical to the operation... but at least as part of quality control, so that we can agree what is and what isn't rectal cancer, so we have built that into our protocols

BH You are comparing that with the pre-operative colonoscopic heights, or digital heights, or simoidoscopic heights, or MRI heights, or

BD We are doing it really to try and tighten down on – surgeons are very good at claiming they are doing rectal cancer surgery, when in fact what they are doing is sigmoid colon cancer surgery

BH Especially if the patient is on BUPA

BD Especially

AM Does that go into the TA?

AC I am going to – are you telling me therefore that a RS in theatre is an essential task

- BD It is not an essential task in the way that they operation is to be done. I think it is a very useful and important task in QC and definition in rectal cancer surgery. But that is something we have really only been working on for the last 12 months. The difference in height on rigid sigmoidoscopy and flexible sigmoidoscopy is quite dramatic. You can get any answer you want with a flexible sigmoidoscope
- BH I do believe the vaginal examination in the female is essential. I don't believe that sigmoidoscopy is essential,
- AC And that, even for posterior tumours
- AM I think you get that little bit of information which is often useful in decision-making when you are inside the belly, I mean if you do it beforehand
- RS One of the issues about mobility of the sigmoid colon I suppose would be 'do people believe there is ever a situation where you can do a LAR without mobilising the splenic flexure', in other words if you have a long and redundant sigmoid colon, and I suppose that is the issue in assessing the sigmoid colon
- AM If you are doing a TA with a view to being prescriptive for people who are starting out, then it might give the wrong message.
- BH I think one can say in exceptional circumstances, when the sigmoid is long and healthy, there is a definite feature in this. I suspect that most Scottish sigmoids are quite short and stubby, and a bit worn, but if you go to Africa you will often come across sigmoids which are quite wide and healthy, and I suspect the balance of risk to the patient would be in favour of not mobilising the splenic flexure in such a case. It is not that in Africa you get an awful lot of rectal cancer, but I do think there are



maybe 5-10% of rectal patients in whom it is reasonable not to mobilise the splenic flexure, but my colleague disagrees with me – he’s Irish. So, one colleague anyway

AM It used to be always taught by the St Marks’ group 20 years ago that the blood supply at the junction between descending colon and sigmoid was better than at sigmoid. Is there any evidence for that, BH?

BH I don’t think.. we keep asking the question, ‘is there any evidence’, and I don’t think there is really. In such a case I personally would divide the IMA distal to the ALCA if I was going to.. I am saying it is a minority situation but you (RS) sort of asked as ‘is there ever’ case, and I think sometimes there is. We all know if these people have only done 6,000 hours, or whatever it is, there’s going to be quite a lot of spleens damaged in the process of mobilising the spleen, and if it really isn’t necessary, perhaps it shouldn’t be done in those occasional cases. That would be my personal opinion, but I would be prepared to be shot down.

BD I make as few decisions during the course of an operation as I have to, and when I started I decided I was always going to mobilise the splenic flexure, rather than think about it.

AC OK, leads me to my next question: How often in fact can you do a safe anastomosis without tension without having to mobilise the splenic flexure

RS About 10% (BH nods)

AC The vast majority of cases you need to, in terms of TA.

AM Most thickset Highland people..

AC Recommendation *has* to be that you mobilise the splenic flexure always

BH Always except in that 10%,... if you have to have one rule, then yes, then I agree

AM But you have to have a let-out clause

BH That's all I would put there is a ...let-out clause

AC There's a colorectal surgeon here who disagrees with you, says he does it always.

BD No, that is a decision I made for my practice, and I feel comfortable with that.

AM I would have to say that in very thin old ladies not too fit, particularly with a long sigmoid, I would always be inclined to use the sigmoid, however, I have said what I have said because over the years I guess I have compromised on dictates which were instilled very deep in my cerebral cortex, and took a long time to release. But... one of the other issues, I know we are going to come to it in a minute, but I know it is very relevant to this issue about splenic flexure, that is whether one advises 'defusing', so-called defusing of the spleen. We have recently done a review of the lit. on iatrogenic splenic injury, and there's not a lot of good, hard evidence in the literature except one fairly major study which suggests that you can actually reduce the incidence of iatrogenic splenic damage very considerably by defusing the spleen (taking the adhesions down). Whether one should advocate that if you are going to do this kind of TA.

RS That is one of the things that are specified later on

AM If you are going to do that, it would have be done at a very early stage, almost as soon as you are in the abdomen, because it's too late...

AC By the time you have pulled on it

AM Yes.

BH You have to have a let-out clause for that too, because if there's a mass of adhesions above the spleen, then it is probably again, you have to take the balance of risks and say, in this particular case, I had better not do that.

AM But it should be a question which we should prospectively mention, because I think it is a big issue.

### **Set Up Retraction**

AC Absolutely. Good, we'll go to Task 3: Optimise access & exposure. (Reads 1-2). To expose obviously and descending and sigmoid colon adequately. Can I ask is there a particular retractor you all use, or do you all use the omnitract or equivalent?

RS We use the omnitract

AM Omnitract or equivalent

AC Self-retaining, multiple blades, whatever

AM Yes

AC BH?

BH (Nods ambivalently) Well we use two Finno-Kieter chest retractors, so I would rather not introduce that.

RS You must have seen a lot of forms of retraction

BH I have seen most forms of retraction, and I am very happy with the omnitract, and therefore don't wish to... I seem to be complicating it quite enough already.

AC You are all advocating self-retaining retracting systems, rather than hand-held bodies?

BH Yes (General assent)

BD We use a Finno-Schettler as well. I looked at buying a new OT, a flyer came round, and it's £10,000 for an OT system

BH Plenty of money in Scotland

BD £9,800 to be exact

AC Right, OK, but you are recommending self-retaining retracting systems

BD I would have a little bit of difficulty... OT is actually a trade name

AC Self-retaining

AM Fixed-retention, or table-fixed

### **Dissect Around Sigmoid & Descending Colon**

AC OK, That's fairly straightforward. Task 4: Dissect around Sigmoid and descending Colon. This has 5 steps to it. Not necessarily sequential. Can I first ask, there's 1 to 4 – is that the order you would agree to do things, because sequence is important (Reads 1-4). Is that the order you would all agree to do?

BH I would repeat my general criticism of the process, in the sense that it is a little facile to put those in.. I mean that is the right order, but we have this whole section which doesn't mention either the gonadal vessels, or the ureter, or the retro-peritoneal autonomic nerves, all of which need to be identified and the plane in front of them and safely secured, and that to me would be more important ...that this goes... to put the order in which you do it, because I don't know that the order matters hugely. I mean we all do it by habit and I guess training we tend to start there, don't we?

AM I would say that visualising the white line or perinephric fascia is the key to it all, and that it would be very important to put that down on paper so that people know exactly which plane they are in, because all these structures that BH mentioned are all safe provided that you go in front of the white line.

AC White line of Toltz

RS Identification of that embryonic plane is the most important thing. The way that we do it is to identify the white line and make a slight incision just a couple of mm below it, and then with retraction of the sigmoid colon and counter-traction, either with a pair of forceps, or with a swab (to AM: you know this, because you taught me), and identifying separation of the tissues with loose areolar tissue

AM I think it is very important to be very prescriptive about that, because it is a step of the operation which is a.. you can be very prescriptive...

AC So what we're saying you must identify the white line of Toltz

BD Can you get round it by saying mobilisation of the sigmoid colon by division of the white line, with clear identification, and then list the things that you need to have clear identification of

BH I believe that.. Sorry... the word I would like to see is the gentle lifting forward by the assistant of the sigmoid colon in order to open up the visceroparietal plane between those structures I mentioned already – the retro-peritoneal structures – and the back of the visceral structures, most particularly as you work medially, what I like to call the 'pedicle package', the root of the mesorectum and the IM vessels, in their little package.

- BD That comes down to who stands on what side and holds what.
- RS That would be interesting as a consensus. What we do is to have the operating surgeon standing on the patient's left hand side, and the 1<sup>st</sup> assist who is commonly the more senior, on the patients right.
- AM And I think holding the sigmoid colon with 2 hands, and not sticking your fingers into the mesocolon of the sigmoid which bleeds.
- BH Protecting that piece of bowel with a large swab, because I agree, fingers do dig into mesentery, particularly if there is a sigmoid adhesion you get a gash in it terribly easily
- BD You might have some difficulty getting consensus on this
- AC At the moment I work in Italy, one habit they have which I think is wonderful and I have never seen before: over the rubber gloves they wear woollen knitted sterile gloves, so they have like a swab, and it is so much more gentle. Like swabs. After they soak through, the scrub nurse takes it out, and they use another one.
- BH I think it is an excellent routine to try to introduce, and with it, similar socks for the St. Mark's retractors and so on, because as you go down lower, they can be much more gentle, and much more inclined to get a Quirke grade 1 or whatever it is, grade 3.
- AC Actually I spent a lot of time in the OR
- RS I think we've got a crucial point here, because when I was first taught mobilisation of the splenic flexure / sigmoid, the operator stood on the patient's right hand side,

pulled the sigmoid towards himself, pushed them up towards the splenic flexure, and the whole thing fell apart.

BH Well the whole thing had to be over in an hour anyway.

RS It completely changed that, but it's still clear that some surgeons still stand on the patient's right hand side and do mobilisation that way.

BD I still do that.

PQ What about the handedness of the surgeon? Because when I worked in S Africa, you could predict what the handedness was of the surgeon from the deficits on the specimen. And you need to take into account a right-handed and a left-handed surgeon.

AC So I have to ask you, how vital is it for you to stand on the right or left, or is it a question of habit?

BD The key is adequate exposure of structures at risk, and then subsequent pathological assessment

AC So we are dropping from what side, or the majority should be on the left side...?

BD There is another factor, and that is the number of assistants you have got. If you have unlimited numbers of assistants, it may be easier to stand on the right. Perhaps, because I am not usually doing the operation, I stand on the right, and the registrar on the left. I think you have only got 2 assistants, which is the minimum, I find it easier to....

BH I think you need 2 colorectal surgeons, one of whom is an SpR, perhaps quite senior, so in a way it is difficult to prescribe a side for the surgeon, because you actually

need two of them, and either of them ought to be able to do the whole operation, preferably and if not, the SpR is well on his way to learning to do the whole operation.

RS Let's not get bogged down with what side the surgeon stands on

AC I would advise that. Can I come back to you (BD) – you said 2 assistants in addition to the surgeon.

BD Yes.

AC (To RS, then AM) Do you agree with that?

RS Yes

AM Generally, but sometimes we have to...

AC How feasible is that nationally?

BD It is becoming very difficult because of shift patterns

AM I would say preferably

AC I would buy preferably

BD You must have 2 people who are familiar with the procedure as a bare minimum, and you need a 3<sup>rd</sup> person for pelvic retraction once you get down into the pelvis

AC In my opinion, the days of the 2<sup>nd</sup> assistant are numbered

BD Well it doesn't have to be a surgeon

AM I think you are right, absolutely right. I think the future will be for a trained assistant.

AC Whatever, technical assistant.

BH Further to reduce the 6,000 hours



- AM One further point about this is that it should be stipulated that mobilisation of the left colon will be done from one place to another place. You are going from Dan to Beersheba. You know, here there isn't any stipulation about how far distally you go at this stage, and how far proximally you go at this stage, and I think that is quite important.
- GH Can I just... I am not a colorectal surgeon. From a TA point of view, it would be very nice to have landmarks for the crucial steps, like when you said, "I would find the white line" is a landmark. And the SP is a landmark. We are going to tidy this up at the end, but for each step if we have a landmark and borders, to identify them. A landmark is seeing the white line, identifying all these structures; and 2<sup>nd</sup> point is borders – where to start, where to stop. So if any point you this – a landmark or a border to mention – then would be nice to say.
- BH You have also to include planes, because those are what surgeons make progress along. So that the step we are talking about is the lifting out of the integral visceral sigmoid with the mesentery with the hindgut behind it, the ureters the gonadal vessels, the autonomic nerves, and you have a point where they all cross the left common iliac artery, and you have some points: the IMA, the IMV, but basically, the progress occurs in the planes, even more so in laparoscopic surgery.
- GH When you go into the right plane do you have landmarks that you know you are in the right plane, other than 'bleeding happens', from experience.
- AM I think there are some specific planes. This is your road, your way, so if there are specific points you need to identify them, for example this section of the mesocolon, you see the landmark is the white line, all these structures at the back, going into an

avascular plane. We could mention this in the TA, do you think this would be appropriate?

AM Well I think you have a rectangular space behind the left colon, and there is the left margin which is the point of division of the peritoneum, and there is the right margin which is the mesocolon of the left colon. The superior margin is the splenic flexure, and the distal margin is the sacral promontory. That's how I see it. Is that correct?

AC What about the iliacs and the ureter?

AM Well, yes

BH And the aorta, and the pre-aortic nerves

BD There is an issue

AC How much do you expose, how much should you expose?

AM Well you always see the iliac vessels

AC Do you always see the aortic bifurcation, for example?

BD If I see the psoas muscle I know I am too deep.

AC Do you always see the aortic bifurcation?

AM If you want to look for it, you will always see it

AC No, no, no

BH In the course of going very precisely of the right plane in front, so that the aortic bifurcation to some extent is covered by tissue, particularly pre-aortic sympathetic tissue...

AC So you don't see it?

BH ...you are desperately close to it.

AC Do you see the psoas?

All You shouldn't

BD If I see it, it means I am in the wrong plane

AC But you see the ureter?

BH Oh, absolutely

AC But do you see the common iliacs?

All Yes

AC Perhaps these are the landmarks you see, and the sympathetic nerves, and the hypogastrics

BD You have to get the mesocolon vertical off the front of the aorta, because there is a danger if you don't bring it medially enough, then it comes to vascular pedicle

BH That is where the word 'lift' I find, lifting the whole visceral package off the retro-peritoneal structures which are in a substantial square, as you have described. The right hand side of the square is actually the peritoneum of the right leaf of the sigmoid colon, isn't it.

BD The medial extent of the dissection is...

BH (To AC) Your laparoscopic colleagues frequently prefer to do this part from the right to the left

AC Well I do that, I prefer it from right to left, laparoscopically, certainly.

RS (To AM) So you talked about an inferior and superior point, is that...?

AM Well, I mean you need to know when you are finished the dissection, or that stage of the dissection.

AC So recap again what you said, so we have it absolutely clear.

AM Well I have in my mind the...

AC I agree it is a square

AM Well I thought it was a rectangle, but I wouldn't argue about that

BH Bound to be a rectangle, you're right.

AM It's usually longer than it is broad. The medial limit is where the mesocolon comes off the aorta, right at the back of the inferior mesenteric artery. And the inferior limit will be the iliac vessels, or the sacral promontory, somewhere around that area, and proximally it will be at the level of the splenic flexure. It won't be the splenic flexure itself, but it will be at the level of the splenic flexure.

BD Is it not the pancreas?

BH Well I was going to say curving along the inferior margin of the pancreas, to the 4<sup>th</sup> part of the duodenum

AM I don't usually see the pancreas as such, I mean you can see it sometimes in thin patients, I

BH You will see the duodenum though, won't you

AM Yes, yes. You can see the fat around the pancreas, for sure.

BD When I do part of the way you have done it here, I go for the IMV first, and mobilise the DJ flexure and come down onto the vein. Then I go from there in the pre-aortic

plane in front of the nerves down to the artery, I don't go for the artery first, I go to the vein first. I always – almost always – would see the lower border of the pancreas. It is a straight square...

RS At which stage would divide the mesenteric vein, and where?

BD Having opened the lesser sac, inside the mesentery, taken the splenic flexure down, fully mobilised it, as much as I am going to do, and having done that I would then bring the DJ flexure forward, and that always takes you straight onto the IMV, even in fat people, it's always in the right place, and then divide the vein first...

AC Below the pancreas?

BD At the lower border of the pancreas, then take – lift, when you are lifting it forward – and you can see the sympathetic nerves at that stage, and you could come down the front, and then we could spend the rest of the day discussing where you divide the IMA.

AC Alasdair?

AM Because I would have thought that one way of defining all of this is actually to use a colour diagram, and draw it as a rectangle..

AC We have the intention to have that

AM ...because I think it would lend itself to that, because it's almost like opening a door. We have the left colon as the door, and the aorta as the hinge.

AC I must say as a general surgeon, not as a colorectal surgeon, because I was never a colorectal surgeon, I agree with you (BD) that you are mobilising this to the right of the IM. But you are the exception, not the rule.

RS Yes, well, I think we all divide the IMV but most of us would go for the artery first. I don't think there's any reason why not.

BD It was the way I was taught and continue to do.

RS But you would always do that after you have mobilised the splenic flexure. It's not something you would do right away?

BD It opens up beautifully, because as soon as the air enters behind the DJ flexure, the whole plane just opens up.

RS I'll do it next time. Sounds like a very good idea.

BD And it immediately brings you into the plane in front of the nerves, so that you can come down in front and get to the artery.

AC OK, so what are we recommending. It is optional.

GH There are some optional steps, yes.

AC Optional steps. Artery before vein, or vein before artery.

BD I don't think you can be prescriptive about that.

RS We're not really at that stage yet, we're still looking at mobilisation. I think we've all agreed that we would identify the white line, divide it, identify the plane by traction

AC The point I am trying to make, however, which is not clear, is do you – when you do the mobilisation of the colon, that we have spent the last half hour on – also tie the vein. (To BD) Because that is what you are saying, isn't it?

BH I think that is the end of this phase, as well.

AC (To BH) You do that as well?

BH At the end, and I take that vein high up, near the inferior margin of the pancreas, in the interests of mobility...

AC At the end of this stage?

BH At the end of the...

AM ..mobilisation

BH But I am intrigued, but (to AC) you as a top laparoscopic surgeon, we've given great importance to this white line, but you've done the job by the time you reach the white line, which you don't even look at.

AC No, no, I... I disagree, I think the fascial planes and white lines are better seen laparoscopically.

BH Oh, yes, I said, they are beautifully done, the plane is beautifully done, but you start on the right, don't you?

AC I start on the right.

BH So that the Toltz line is not really so important to you?

AC I agree, I agree.

BH And we want to try and make these prescriptions so that they would apply to laparoscopic surgery, so that people really understand it. This lines just a just a thing that's there that generations of surgeons have taken as a starting point.

AC The laparoscopic surgery is really from the right, and you go from behind, from the right. But very often then you have to go along, up, to mobilise the splenic flexure. But this step is done from the right. No question. It's easier done from the right.

BH There seem to be at least 3 very good ways of mobilising the splenic flexure laparoscopically, which are different from what we do.

### **Mobilise splenic flexure**

AC OK. .We go to 5 now – This is quite an important step, because it is a ‘hazard zone’, which I would call, or George would call it. Because this is a lot of mistakes can be done, yes? Some of which may necessitate splenectomy. We have to go through it in some detail, and be very prescriptive. What we have here is broken down into 4 steps, with 1-2-3 done in series, and these consist of (reads 1<sup>st</sup> step – divide adhesion between omentum and splenic capsule). Now can I just ask: it seems to me that there is a confusion in anatomical nomenclature and also ligaments, eponymous names, and adhesions in this area. And it would make a lot of sense to really mean what we say we are doing. A lot of so-called adhesions are not adhesions at all, they are ... Can you be more specific, what do you mean by “Divide adhesions between omentum and splenic capsule”. What about the lateral – what used to be called the suspensory – ligament, peritoneal fold. There are some adhesion – can be some adhesions. What are we talking about here?

RS To me this means that in some patients you get a fibrous connection between the omentum and the splenic wall, which if you put retraction on it tears of part of the splenic capsule. It’s not very, it’s not uniform. In some patients the omentum doesn’t touch the spleen.

AC Some of those – I will take issue – some of those adhesions are feeding vessels from the left gastro-epiploic to the lower polar vessels of the spleen, and when you divide



and cut them, they bleed and you see a black bit of spleen. What are adhesions? Do you know what I mean?

BH I think there's both peritoneal folds which are clearly – have clearly been there all the patient's life – and also sometimes acquired adhesions following some inflammatory process, so I think one has got to allow for both, and divide all connections with the spleen which are relevant to the mobilisation of the splenic flexure, and do so very carefully.

AC Can I then ask, where do you start division? On the peritoneal side?

AM You mean for mobilising the splenic flexure? I would generally start on the descending colon side, then go up to the splenic flexure, towards the splenic flexure, then I would go up, across the top. And often moving from one to the other, depending how things are going.

AC So if I was Alice in Wonderland going up the gutter there, we would start the incision on the peritoneum of the para-colic gutter on the left side, and then you skirt round the top of the colon, at the splenic flexure. Is that what you are saying?

AM No, I would tend to go towards the spleen from the left para-colic gutter, initially, then I would come across the top and dissect the greater omentum off the transverse colon, and sometimes move from one to the other, so that the splenic flexure bit is left to the last. That's what I would tend to do, but...

AC Can I ask the other

BD I would consider a happy operation one where I had never *seen* the spleen, because I start from the mid-point of the transverse colon as a nice way of getting settled down

in the operation, and open the lesser sac from about the level of the middle colic artery, and then take the dissection along the lesser sac, and then clearly find the back wall of the stomach, as there's often adhesions between the back wall of the stomach and the spleen which are to mesocolon, which will restrict getting that down, so once this lesser sac opened up, there are bloodless adhesions which I divide, as far as I can, with ease, and then on the left side go up the para-colic gutter with ease, and just work at it, as you say from both sides. But I don't look at ... before I start.

AC Bill

BH Well I try to lift the omentum forwards and get – if I am going to teach the mobilisation of the splenic flexure which I think is quite a difficult thing to do (I mean to teach) – I would come up the left para-colic gutter, but basically try to get across the idea that all the time one is carefully dissecting the colon out from behind the greater omentum. And of course if you're lucky this might happen without getting anywhere near the spleen, without having to divide anything with a blood vessel in it, even. It is possible – I think if one thinks of the dissection of the colon out from behind the greater omentum, and careful early division of any congenital or acquired band going to the splenic capsule surface, very carefully before putting any traction on it. Those would be the sort of principles I would try to get in our TA. It's not easy to describe.

AC Bob?

RS I mean I would agree with BD that I often would start at the mid-point of the transverse colon and get into the plane between the O and the TC...

BD Which can be quite difficult

RS Yes it can be, but once you get into that loose areolar plane, follow that down as far as it's possible. The other point I would make is that we always make a point of mobilising under the descending colon as far up and as far medially as possible

AC I think that's a crucial...

RS So that you're at the midline beneath it.

AC I think that is actually – failure to do that in my view a common cause of splenic injury.

AM I think one of the very important things about doing the mobilisation of the TC from the omentum is recognition of the fat that belongs to the omentum from the fat that belongs to the appendices epiploicae. You get these fern-like App epiploicae from the colon, whereas you get a much more blobby sort of fat in the omentum, and it's actually dissecting that rather beautiful plane which you can open up, and you see these loose areolar bands which you can get into, and I think that's very critical. And when it comes to the splenic flexure, itself, or just before the SF, what we often find in our patients is the fact that the omentum has sort of rolled itself round the TC at that stage, and sometimes going towards or into the mesocolon of the SF you have to unfurl it, you have to unroll it, and that's quite a skilled task, because what you want to avoid like the plague is damaging the vessels in the mesocolon. So I think recognition of the kind of fat that belongs to the colon from the kind of fat that belongs to the omentum is critical

AC It's a different colour, isn't it?

AM Different colour, different shape

- AC Consistency too – more granular. OK what happens if you have bleeding from the spleen? What do you do?
- BD I'll go first, because of course it's never happened to them. Usually it's a capsular tear, some omentum or something that has pulled off the surface, and it's fairly early on in the course of the operation, and I pack it off and leave it. I pack it off and leave it, and do nothing to it until the end of the operation.
- AC In your experience if you do that, what sort of blood loss does that procedure entail?
- BD If you had asked me in November 2003 I could say it has never happened to me as a consultant. In my last year as an SR I took 3 spleens out. My first spleen came out last .... How much you bleed is proportional to how much you fiddle about with it.
- AC So you pack it off?
- BD The less you do to it, the less blood loss you get.
- AC Right. Alasdair?
- AM If I can come back to the spleen, in our studies of doing this paper on iatrogenic splenic damage, it appeared – the literature would suggest that there are two congenital adhesions to the spleen: one is the lower pole of the spleen, with an adhesion between the lower pole of the spleen and the tissue around the SF. And when you pull on the left colon, basically the SF that's where that one goes. Now the other one is the one that attaches from the greater curvature of the stomach or the posterior wall of the stomach to the spleen, and that one is higher up. And I think that these are obviously not rigid demarcations, but they do guide one a little. When it comes to this tearing...

AC Have you got a reference to this paper? Can you give it to us?

AM Yes. (1:28:41) Ed Coll J about a year ago – Hasar & Munro. We've got some nice diagrams. When it comes to the capsular tear of the spleen, that I think is a devil, and I must say it distresses me. The reason why we wrote the paper, because I find that a distressing thing to happen, and I don't think we've got an answer to it, but what I do... My worry about just packing and leaving it is that you can get a huge blood loss, and can incur a huge blood loss in the next hour or so while you do the operation

AC I think that is a fair criticism

AM My personal view is that now – having done a fair number of these splenic injuries, mainly myself, and having helped other people to deal with them, I think it's a real issue, and I would now tend to go and deal with that at a relatively early stage. I mean, as soon as I see it, deal with it.

AC How?

AM Well, OK. Next step would be to make sure the bit that is bleeding out the way, and that takes a little while. Really adequately exposed: use a sucker, try not to traumatise, don't suck on the spleen itself – quite important. Suck just that little bit away from the spleen. Sometimes what you can do is put a little bit of Surgicel on that – cut it very precisely – Surgicel just hold the forceps on the Surgicel, and if you wait for 5 or 10 minutes, you sometimes get the bleeding to stop. I would sometimes diathermy it.

AC That would make it bleed more.

AM Well, with a big wide forceps – big, wide packing forceps, that's sometimes helpful. And occasionally I put a very tiny 5/0 stitch into it, putting the capsule back.

AC Have you ever used sealant?

AM No. Don't have them available. I am sure you could

AC Has anyone ever used argon plasma?

GH No

BD I have used ordinary spray diathermy, but it tends to make it worse.

AC I must say I find diathermy on the spleen not good.

AM Well I tend to use a very wide pair of forceps. At the end of the day splenectomy if you can't do anything else, but I think you should do that early rather than late.

AC So when would you consider... What would you do, Bob (RS)

RS I would tend to... if I get bleeding, it tends to be – I am glad to say it doesn't happen very often, but we did have a case fairly recently – if you get bleeding during the process of mobilising the splenic flexure, if possible it's good to make sure that the critical part of mobilisation is finished, and then suck up all the blood, lay Surgicel on it, and then place a swab over it and leave it, then come back and look at it another time later.

GH Can I just ask a question. What about mobilising the spleen and... from my little experience, when you get a bleeding in the hilum of the spleen, the problem is to see it. If you see it you can deal with it. Putting a sucker tends to make it bleed a bit more. What about mobilising the spleen, get it up and deal with it...

AM I don't think seeing it is the issue. You can see it, it helps, sure, but it doesn't solve the problem.

GH You know whether you are going to put a clip, or do an Argon beamer

AM I don't think clips are any good at all

BD It's a de-gloving injury, it's not a laceration.

AC It really takes the capsule out, and there is raw, splenic parenchyma which is bleeding. And the reason why diathermy doesn't work is because it has no capsule. You've got tissue which is very soft and is injured further. When would you decide to remove the spleen?

AM I think that if there is no sign that the bleeding is stopping, and that there is considerable blood loss.

AC What is considerable blood loss?

AM Well, there is evidence for this, because in fact we looked at it, and in fact the evidence is if you incur blood loss, I think that it's either 1.5 to 2 litres, the morbidity increases.

AC That is a lot. So you would not remove the spleen unless the patient has lost 1.5 litres?

AM Well? That's not a hard figure, but the evidence would suggest that there is a cut-off at that figure, between lower morbidity and much higher morbidity.

RS (To AM) So you wouldn't want to lose more than a litre, basically?

AM Yeah, I would certainly... at about a litre

BD It's difficult to make absolute cut-off figures, you have to look at the patient themselves. Some patients will tolerate blood loss better than others. ...

AM But there is also the collateral issue of whether you are going to have to transfuse this patient with a colon cancer. I think that is an important issue.

AC I think that is a highly-debatable

AM Oh, sure, but it's still very much in people's minds

AC Oh, I agree, but what I am trying to get from you for the purpose of the HRA – and you can never be totally prescriptive – but at what level of blood loss, on average would you say this has to come out. You said 1.5 litres, I think that's too much.

AM No, I didn't say that, what I said is the evidence is that the morbidity increases considerably, beyond a litre and a half...

AC Sorry, I misunderstood you

AM I don't know if it's exactly a litre and a half, but it's in that article, I can't remember the precise figure. Bob suggested a litre, and I would say, yes, I would agree with that.

BD That's an upper limit.

AC So between half and a litre?

BD I think it's very hard to pin us down.

RS I think if you are anticipating above a loss of a litre, how about that?

BD It has to be absolutely bone dry by the end of the operation, is another way of looking at it, but perhaps by then the damage is done...

PW To clarify, are we talking about a litre from that episode, or from the whole operation?

AC No, a litre blood loss from the damage to the spleen.

AM Up until that time there would be no blood loss.



AC I should hope not.

BD If you're talking about evidence, that's sort of level X we've been discussing, it's a very hard issue.

AC Now, can I just recap, so there's two schools of thought amongst three surgeons. One is to say they would put a piece of Surgicel and pack and then review the situation. If the bleeding continues and they anticipate blood loss that may reach a litre, in other words I think they are making a decision after 500mls in my view, then they may have to take it out. The other view is that they would expose the bleeding denuded area, and try to actively try to achieve haemostasis with Surgicel +/- diathermy +/- surgery. Am I interpreting correctly?

AM Suture would be a very unlikely

AC But you mentioned it.

AM I mentioned it, but I...

AC You wouldn't. So we drop the suture.

AM Well, as a last resort, might be a reasonable thing to try.

AC How many spleens have you saved by your suture?

AM Oh, a few...

AC He's honest I believe him. If it works one in a hundred, it's good enough.

AM I have done two sutures of spleen for trauma relatively recently.

AC No, I've sutured spleen, after partial splenectomy, sort of transverse sutures with thick tapes, but I've never sutured a splenic laceration, never. But that doesn't mean...

AM It's a good thing to do. I've done several recently, over the last couple of years. But if you're going to do it, the secret is to use very fine suture material. Vascular stitches, 5/0 type stitches.

AC I am surprised none of you use sealants. Very surprised, because I think it's ideal.

AM And if you put a sealant on, do you then have to pack on top of that?

AC No, you get co-stasis or whatever, Surgicel, whatever you want, put it in, put fibrin glue on top of it, and it stops. Glues are coming in, a tremendous, the technology of glues. I think we ought to review if people have used glues for splenic injuries. Right. How do you know that the splenic flexure is full mobilised.

RS I think this is this issue of the midline structures, isn't it. So you actually have the colon all over at least to the midline, every part of the colon is at least to the midline or to the ... I think would be ...

AM I think what you do basically, I think what I do with my eye, is to take the line from where the TC is mobilised from the omentum, perhaps from midway along the TC, and take a straight line from there down, it's not going that way it's going straight down.

AC Would you agree with that, BD?

- BD I think that's reasonable. There are occasions when it doesn't come straight, because there's another white line in front of the kidney. I don't know if it's part of the same if it's a continuation...
- AC It is the same plane, actually.
- BD When you get that nice bloodless white line going up the front of the Gerota's fascia, and that takes you right to the root of the mesocolon, and sometimes even when I've done that it still has a curve in it.
- AC BH what would you do in the very rare circumstance when you have bleeding from a denuded spleen area?
- BH Well, we, we've tried various things, there's the argon beamer is our first resort, and sometimes that will turn the bleeding area into a nice dry thing, and then we, Merv my liver colleague has some wonderful glue, the name of which I can't remember. Very expensive. But in the first instance I would pack it gently, preferably with a little of the stuff, what's it called?
- RS Surgicel
- BH That's the one. Surgicel and a little gentle packing whilst I get on with the operation, and then back to those other things if you're still in trouble at the end. What do other people say?
- AC What you have said. There is agreement. I was surprised that colorectal surgeons don't use glues for this situation routinely, which I think are very good.
- BH It is pretty magical when you do use it.
- RS We'll get some glue.

AC You get a piece of Surgicel, impregnate in this co-stasis glue, on the spleen and it stops.

RS You mix it up?

AC Oh yes, Co-stasis is sold by Tyco. But Scotland has its own fibrin glue.

RS From the blood transfusion service.

AC Free. You don't have to pay for it. (Inter) So it's 1 o'clock, shall we stop for lunch?

RS The next two section should be pretty quick...

### **Divide Inferior Mesenteric Vessels**

AC OK. Now Task 6 – Divide vessels in sigmoid mesocolon. Again there's 5 component steps, done in series, starting from 1. Can I have comments on "Divide peritoneum to the right of sigmoid colon, up to origin of IMA"

BH Do you think the main title is correct? To me the sigmoid mesocolon is the rather narrow item with peritoneum on both sides, and behind it is what I would call the hindgut pedicle. And I am not.. and the idea that these vessels are *in* the sigmoid colon might give a young chap the idea that he might be dividing little vessels...

RS I think it's 'to'

AC I think Bill is right.

AM IM vessels.

AC I think no. 6 heading should be redone. Very good point. Ligate and divide IMA...

BH Sorry, could I also say that '1' should be to identify the fascial-covered pedicle of the rectum and sigmoid around its posterior aspect, because I think that leads you up to

the right thing, and without it you're going to go rummaging into the lymphatic field, perhaps.

AM And certainly in the thinner patient you can actually see once you've done your mobilisation of the sigmoid mesocolon, immediately underneath the artery, and you can see the artery quite often, maybe surrounded by some fat, but you can see this rather nice plane if you would, an extension, basically of the mesorectum.

BH And that is the key to preserving the pre-aortic nerves. It is something which the laparoscopic surgeons do very beautifully, from the right. And I think finding that plane behind – I like to call it the pedicle package, but the pedicle anyway must be a proper name – hindgut pedicle. And should we not mention the preservation of the nerves as well?

AC We come to that in relation to 2, because now I want to ask you about ligation and division of the IMA. Does anybody practice flush ligation of the aorta, and is that a good or a bad thing?

BH Well I think that you may have to do it, there are certain circumstances where you might have to do it, when you are, when the only plane you can get in a recurrence for instance is the pre-aortic, but as the standard AR which we are now discussing, I would always try to go 1-2cm further down in order to preserve the nerves, the pre-aortic nerves...

AC To leave the areolar tissue covering the aorta and the nerves behind.

AM I think in practice the stump of the artery would be about 1-2cm long. (BH nods)

BD One of the advantage of doing the vein first is that you can then see the nerves in front of the aorta, and can come down, because the colonic mesentery is open from above down, and that does allow you to come down and see the nerves. I've had difficulty sometimes when there is an early bifurcation, when the IMA splits, and it can split very quickly, and sometimes I've divided what I think is the IMA, 1-2cm from the Aorta, when what in fact I've done is taken one of the left colic branches ... I think your (BH) pedicle package which is what you look for avoids doing that, then you *have* to get the whole trunk...

AC Can I just come back to you, because I think this is an important point. 2cm is nearly an inch. 1cm... (holds up fingers)

BH I always say 1.5 personally; 1 is not quite enough

AC You know, that is 1cm (shows tip of index); 2cm is that (2x depth of index tip). Is that what you (AM) really mean?

BH I think it is 1 to 1.5

RS Basically what we are trying to do is divide the IMA without disturbing the pre-aortic fascia.

AC And there's a layer of tissue where the nerves are. In my view...

BH Yes, which split around the origin...

AC Now can I ask: sometimes you find at this juncture that the IMA at this level (1 to 1.5) has a bunch of lymph nodes around it. What do you do now?

BH Well then I would sacrifice the nerves.

AC Are we agreed on that?

AM Take the nodes with me.

AC OK. Would you for example, tease the nodes down the artery? Is that bad oncologically?

BH I don't think anyone can prove one way or the other, if they were rolled gently down without appearing to disturb...

AM But if these nodes are involved then the patient has C2...

AC He's had it. Well, not had it, but.... OK, so you would.. if there are nodes, you would go further up?

AM I would tend to take the nodes down, it's a question of just dislocating the nodes

BH Funnily enough that's not a place where you often get it. It's either hopeless, and they're all over the place, or where we want to go – I would say – was all right.

RS (To PQ) DO you often find lymph nodes at the apex of the dissection?

PQ But you should – if you've got a good MRI – you should know whether there's extensive nodal involvement, and you've got sort of 4 or 6 nodes involved. If you've got 4 or 6 nodes the likelihood of having C2 involved is much higher; if you've got 1 or 2 lymph nodes you're unlikely to have a C2 node, so a good MRI pre-operatively would help you to make that decision, as to whether they are likely to be involved nodes or not. I suppose the question is: how much damage do you do by taking those nerves and damaging those nerves? I mean, what's the patient effect of doing a very high ligation versus a 1.5cm...

AC Depends on the sex I would say. Males probably much more than women.

BD I'm not sure about that. It's much easier to demonstrate changes in a man, but I am not sure that you can make that statement...

AC I plead ignorance. In a man it's obvious, let's put it that way.

BH You need an in-depth study on females.

BD You need to be careful about making a statement...

AC No, OK, I withdraw it. So, the aim is to tie the artery at a safe distance from its origin at the aorta, but above obvious enlarged lymph nodes. Is that what you are saying?

BH And generally above the take-off point of the ascending left colic artery.

AC Yes

AM I just wonder whether it's worthwhile making some kind of statement about the ideal way of doing this, because I think some people run into difficulties with this. I mean, dissecting up the IMA. What I do – and it would be interesting to know what others do – but I'm standing on the patient's left side, what I do is to make sure I can see that nice sheath of tissue around the artery from behind (I'm doing my dissection from behind) and then you look on the right side, and having pulled up the sigmoid colon, what you find is that you can see the sort of pinkish appearance of just the little bit of blood on the right side, behind the artery, and all you have to do is just put your finger on that, and of course you open it, because you've done all the work from behind. You can lift up the artery then with my index finger on my left hand, and then you can do the dissection very precisely of the artery, taking it up, and watching out for these nerves, because you can see them all, because you're not only lifting it forward, you're also lifting it a little bit to the left. So you've got a very nice view,



and I think that's difficult sometimes. So, whether it's worth making something of that.

BD I'm kind of wary of using my finger to do that sort of dissection.

AM No, I'm not doing the dissection with my finger, just using it as a retractor, and using the bipolar scissors for the retraction. [Dissection?]

AC (To BH) What to you ligate with?

BH I personally, being very old-fashioned, use 2/0 silk at this point. I use a silk suture.

BD (RS & AM also) Vicryl

BD Single, rather than double.

AC 2/0?

BD 0 (Also RS).

AC That's a rope!

BD (To PQ) Do you want to make a point about pathological marking of the specimen at this stage?

PQ I mean a good pathologist will have no problem, but the trouble is that most pathologists – if they're not specialists – won't necessarily find it, so I think it wouldn't do any harm. Some of use would like a black silk suture on the high-tie.

BD Or just leave the length...

AC Or leave the high-tie very long.

- PQ Yes, so that they can find something. One of the problems is that a lot of people are going to be in DGH's and haven't specialised in the area, so you've got to make it simple for the pathologist as well as the surgeon.
- AC OK. Step 4 – Ligate and divide the IMV. Now we have one surgeon amongst you who has already done this, but you all do it now. There's three of you who would do it now. Is there any landmark to where you divide it, ligating the IMV from *this* side?
- AM Just below the pancreas
- AC Same level, then.
- RS Yes
- BH I think the important thing if – it's probably not that important – is to divide it above its last tributary, because only thus will you get the full mobilisation effect that the high ligation gives you for reaching down from above...
- AC That's at the inferior border of the pancreas
- BH It's above its highest tributary
- AM ALC?
- BH Well, there's no doubt that tributary... I suppose that is the ascending left colic vein. Yes. It's not ascending quite so much like the artery, because it's a tributary, it's descending into the vein – the blood flow – isn't it. But I just think above the last tributary.
- AM There's often a couple of cm there of free vein, below the pancreas, and that tributary you're talking about, so you've got a nice easy ligation.

- BD I don't necessarily remove the vein. I ligate it and divide it, but it may well still be in the patient by the end of the operation.
- BH Well then you've got to divide some other veins, haven't you?
- BD The reason that I divide it high at the beginning is for mobility, it's not for oncology. It may be that once you've later on decided where you will divide the descending colon that in order to preserve the stump, the vein may still be left in the patient, and I'm not sure if I should be doing that or not.
- AM That means you must be dividing it again.
- RS You're leaving a bit of redundant blood in it with vein (hold up 2 index fingers to indicate finite segment)
- BD No, if you've got... What you're left with is you've got the colon going down, and the stump of the vein and the stump of artery. Now the artery will come out as part of the radicality, that's inevitable. But it may be that for example if division is about there, depending on that, you can take that out like that, but sometimes I find that once I divide it there I am left with the cut end of the stump of the vein in the colon in order to get me plenty of floppy length down into the pelvis, and I worry about that. Perhaps I shouldn't do it, but is something that sometimes happens.
- BH I can't see your diagram, but to me it seems to me that if you're doing full splenic flexure mobilisation, you have to divide the vein twice, and you do leave – I don't think there's any harm in it, as I think it's just a way round for the venous blood, but on your mobilised left colon will be a bit of the origin of the... that's a consequence of taking it above the last tributary. Because then this bit, you've got to take it again here, and so it all goes down as a little venous collateral; a big venous collateral.

BD And is the arterial branch which comes up the side of the middle colic – which I don't know the name of – which if you are tight...

BH The marginal artery of Reolitz

BD If you divide that, it suddenly gives you an extra 6 inches. And I always worry about the vascularity in doing that. I mean it's so dependent on the marginal artery. And there are times when you have fully mobilised it, but there's still a little...

BH You try to avoid doing that if you can

BD To get it really nice and floppy

BH That's not always there, anyway

### **Divide Colon at Optimal Site**

AC OK, Task 7 – Divide colon at optimal site. I'd like you to define for me what is the optimal site.

AM Generally that will be the junction of the descending colon and sigmoid.

BH Provided you've done a full mobilisation

AC Does it take into consideration the exact location of the tumour in the rectum? If it's an upper third, near the peritoneal reflection?

BD I don't think that necessarily... as long as the package with the mesenteric artery is coming out with the specimen, it doesn't *really* matter where the tumour is.

AC So you are all agreed that it is always at the junction of the descending and the sigmoid

AM Generally

BD The critical thing is that it's alive.

BH I think that we should specify that when we've chosen a spot that will reach, and we're confident that it will reach,

AC And how do you do that?

AM Visible pulsation of vessels

BH I was going to say, when you've reached that you should actually have pulsatile blood flow at that point.

AC What about the colour of the bowel?

BH I think it's important.

AC Is it easy to feel the pulsations? Through the fat?

AM See it usually.

BH We actually cut it and watch it squirt

AM If you shine the theatre light on it, and a little vessel, and see a little flicker.

AC Right, so what we are stressing here is the appropriate site, bearing in mind that the vascularity is fine.

AM Are we going to recommend headlamps. That's the other thing. Because if you're wearing a headlamp and looking at these vessels, you get this wonderful highlight on the vessel which just gives a beautiful flick of the artery. (To BH) Do you wear a headlamp?

BH Sometimes.

BD I change sides an awful lot during the course of an operation, and find a headlamp really restrictive.

AC You don't like them?

BD I like the headlamp, but in the pelvic dissection, I tend to change sides quite a lot, and find it difficult when I've got my...

RS If you're the only operating surgeon, then you have to change sides, really don't you, for the pelvic dissection. It used to be said that if the piece of colon that you were intending to anastomose to the rectal stump should reach below the SP. (To BH) Do you believe that?

BH Oh, at least.

RS Is that a safe...?

BH It still might not reach to the pelvic floor for a very low anastomosis and a pouch.

AC So how do you gauge that?

BH With some difficulty, really.

AC What sort of guidelines would you give?

BH I would say well beyond the pubic symphysis. Several centimetres beyond.

AC OK, now what if you've done this and you're not quite happy with the blood supply? Despite your headlamps and what have you, you know it's dusky and the patient is a bit elderly, and perhaps atherosclerotic vessels?

- BH I think you gently pack it away in the upper abdomen and offer up special prayers to the Almighty, leave it in a nice warm place where it won't be under any tension or twist, and get on with the rest of the operation.
- AM Can I make a statement at this point, because I think this is a very critical issue, and I think it's where some of us go wrong from time to time. I think the first thing I would do was to ask the anaesthetist whether the patient was properly saturating or not. I think that's very critical. It may be that at this time the anaesthetist is having a torrid time up top, and I think it's a good thing to check that. There are some studies in the literature – mostly animal studies – but there have been one or two studies of colonic perfusion...
- AC Tissue perfusion
- AM Yes, tissue perfusion, and the partial oxygen tension drops in the end of bowel that is to be anastomosed...
- AC But in a surgeon in a DGH hospital
- AM No, no, I'm just making a point, I'm not saying you should do this, but what I am saying is that there is a very clear discriminant of whether that will leak or not is whether the partial oxygen tension is below 20mmHg.
- AC You made one practical point which I think we should take very seriously, that is ... check the oxygenation with the anaesthetist. Bill says pack and warm and whatever. Any other, Bob?
- BD I think it's very difficult. I would put it away and come back to it. You'd check for any further mobilisation that was feasible. I've found myself in situations

occasionally with a sort of die-back syndrome, where you've gone as far as you think you should do, it's not long enough, and then you start mobilising, bringing the hepatic flexure down, and when I've done that I don't think I've ever actually achieved anything: I've got myself into trouble, and with progressive deterioration. So I think you should put it away and come back to it, and not be afraid to say it's not feasible.

AC So at what point would you say – I want the opinion of all of you, one after the other – this reconstruction, this AR anastomosis is not on?

BH I think you can usually do it. I think it's unusual not to be able to mobilise some part of the colon to come down for the anastomosis.

RS Would you ever use the right side?

BH Yes, if necessary, and that can always be brought down; nearly always. I think you've just got to invest another significant amount of time in mobilising and hope you can bring it down on the left branch of the middle colic, and if you can't you've got to look at the possibility of using right colon – right branch.

AM I think there should be a government warning at this stage – because my experience has been that if you really struggle, and really fight with it, and you are dubiously happy about the vascularity of the bowel at this stage, and you've tried all sorts of things, if you're really toiling there, you should stop, go and have a cup of coffee, and think about whether you're going to anastomose the bowel or not, because I think that if you are doing something which you are unhappy about, the answer is always “No, don't do it”. Because I really think that that's a – I mean it's very unusual – but what



I'm saying is if the vibrations are strongly negative, for goodness sake, don't take a chance.

AC How often is it possible to actually mobilise the right and then down with a reasonably good, well-perfused anastomosis. I've never seen that done in my entirely life.

BH What is it you're saying – that you've never seen the right colon used?

AC You have this problem, and then you go to the right, and...

BH Fully mobilise the right colon on the ileo-colic, and..

AC Turn it upside-down

BH Yes, I've seen that several times, I think you *can* do that.

AM I've done it, but I think you've got to be very happy that you've got a good blood supply...

AC But is that a realistic option?

AM Yes.

AC For you to recommend, in the presence of this situation? You see you are making recommendations the applicability of which is to the general person? Is that a viable option to say, "Keep mobilising, turn it upside-down, bring it down?" Is that...? And how often have you done that?

BH Not very often

AM Once or twice in my career.

AC I am being devil's advocate here, I have to be.

AM Half a percent, maybe. It's a big guess.

AC (To BD) You would just back off and say, "That's it, give the patient a colostomy"

BD I would complete the rectal dissection, and then come back and look at it again, and if I was unhappy with the viability I would rather have a live problem than a dead patient.

AM I think that one of the issues with all of this sort of thing when you're dealing with the left colon with inadequate blood supply, this is anecdotal, but I find that these people are often middle-aged or elderly people, who are heavy smokers, and they have problems, general problems with atherosclerosis. I think beware of these patients.

BH I think we all agree with that, but isn't this a thing to which there isn't a specific answer, because it depends upon the patient? It depends on the patient's wishes, and knowing how desperate the patient is to avoid a stoma and so on. Some patients will say, "So long as you've cured me of my cancer, I'm quite happy with an Ileostomy". If this colon is that short, and most of the left side has been dead, you're probably better to make it an Ileostomy than a right-sided colostomy I would say. But I do think there have to be areas where it's a matter of clinical judgement. I don't think you should be – you say the live problem and the dead patient: if you had to use the right side of the TC and anastomose it to the rectum (we haven't said how much rectum we've left), but you could get quite a reasonable function if you've got 5-6cm of anorectum, and the whole of the right colon, and a bit of right TC. If it all sat there nicely, defunctioned temporarily with a loop ileostomy, that would be quite a satisfactory end to an operation, I think

AC My point – which I’m not explaining myself well here, as the devil’s advocate – is if the surgeon is competent, and there is this sort of back-blacking of the bowel that is going on, it seems likely to me that there is a vascular problem in this patient, and the tissue perfusion would be impaired on the right side as it is on the left, and in the context of recommendations for safe practice, would it be sensible – as a recommendation – if this happens, and you have this sort of creeping, impaired perfusion, dark bowel, you’d better cut your losses. This is what I’m trying to get at.

RS I think really that’s the case.

BH Absolutely

AC OK, I think we’ll stop for lunch.

BD That was the easy bit!

[Lunch break]

### **Mobilisation of the Rectum**

AC ...Concerns the mobilisation and excision of the rectum, and the final anastomosis to the rectal stump. So we start with Task 8 which is obviously very important: mobilisation of the rectum down to the pelvic floor, avoiding damage to mesorectum or adjacent structures. And this has 5 sequential steps, or 4 or I should say. Start with a posterior dissection, then a lateral dissection – on both sides I should imagine, dissect anteriorly, then complete lateral dissection. This to me, if I was a beginner, tells me very little. Where do you start your dissection, starting from BH.

BH If you’re asking me to start, I think the division of convenience is important because you can tuck the proximal colon and the small intestine well up out of the way, so to

have divided the colon – as indeed we did before lunch – is I think good tactics, because it enables one to draw what will be... I mean I make a kind of objective in everybody's mind in capital letters that what we want is the perfect untorn mesorectum, removed without damaging the surrounding autonomic nerve plexuses, that would be good as a kind of objective. But I think that it's easier to start at the back, and the key thing is to lift this potential specimen forward by the recto-sigmoid, gently using those nice hand gloves would be a possible way. There are various ways – I think a swab on the back of the mesorectum, to identify the shiny back of the mesorectum, and to draw upwards on the pre-aortic tissues that we've talked about that slightly obscure the actual bifurcation of the aorta, to draw proximally on those so as to open up the areolar plane behind, and then to develop that by a combination of sharp monopolar diathermy dissection or scissor-dissection, according to personal preference. To go really quite a long way at the back, dividing the recto-sacral ligament, then to develop it round the sides, observing as a guide the hypogastric nerves, which are somewhat adherent to the package and need to be gently eased away from it, as I say, proximal dissection of the extra-peritoneal – sorry the extra-mesorectal tissues that you wish to preserve, most particularly those plexuses. I mean I can ramble on for a long time as you can imagine. But starting at the back would be my point.

AC Are we agreed that everybody starts at the back? (Consensus nod) Can I ask you a question: do you go back as far down as you go, or do you go back as you open the lateral space as well?

BH Yes, it's very much a rotary process...

AC It's a U-shaped, almost

BH ...and sometimes it's more intelligent if you get a little bleeder which is terribly near to a nerve, maybe to put... to use the mesorectum as a pressure and to go over to the other side, so that I think it is very difficult to be absolutely prescriptive. I would start at the back and go to either side in a progressive and intermittent way...

AC And going further down (both hands palms up at 45° angle) as you go

BH Leaving the front probably until much of the mid-pelvic dissection anyway has been done at the back and sides. But that's a personal view, and I'm sure there are other views.

AC Can you add to that?

BD No, I wouldn't dream of...

AM Just to be devil's advocate, one of the interesting things I find is that having done that (going down the back), when you are fairly far distal, then you can get round the corner a little bit, to the right and the left, and when you are really down the back a long way and you're still pulling on the recto-sigmoid, what you find is that you've got these firmer tissues coming out laterally, which I guess are where the middle rectals are, but often you can define much better where you are going to do the lateral resection once you've done the back, and you're well down, so you've really mobilised it. And then you can slip your fingers around the side just to open the space on either side of the rectum, or the space is open. I think that's very useful, because...

BD So you're leaving the lateral peritoneum intact?

- AM Well I often take the peritoneum itself, at an early stage, but leave everything else, and then you can – by pulling up on the rectum – you’re then in a much better position to determine where you are going laterally. I don’t think that the back or the front is much of a problem. I find that the both sides are the areas perhaps where you’re not quite sure at what level you should be taking. It’s very much clearer when you do that.
- AC How do you know when not to transgress. There is a fascia that protects the mesorectum. How do you know that you’ve not transgressed that?
- BD I – after watching the videos, and seeing Bill in action a number of times – I find the 2 main branches of the autonomic plexus the best way to guide the dissection, looking for the T-branches, which took me a long time to find, but now that I know what you’re talking about... and you work your way down, and it is a sequential step of going along the trunk, you see the branch going into the mesorectum, I use bipolar scissors to do this, cut it, go down to the next one, cut it, and it is a certain ...measure..., but I use the nerve trunks as a guide.
- PQ Can I emphasis tenderness and the time you take, so it is a slow process, and it should be done very, very sensitively. Because the things that I notice on looking at surgeon’s specimens is a number of things that you see: one is early entry into the mesorectum, so a poor surgeon will actually enter the mesorectum and be completely in the wrong plane, and he will ...loose up or down... in the wrong plane...
- RS This will be high up
- PQ Yes, they start high up in the specimen, and they will be completely in the wrong place, and they don’t know the ...back’s off..., so they’ve completely lost their way.

An irregular dissection plane where they get it right in some places, but they don't get it right in others, so they're going in and out, and they're going in and out on the lymph node drainage. Anteriorly, we see the most errors, because the anterior plane is the most difficult to access, and is also the thinnest, because on average there's 9mm of fat; laterally there's less, but then there's a lot more posteriorly, so those dangerous areas for the surgeons are anterior from sort of 10 till 2, and they go in and out again. And if you go in, you're already on the muscle, because there's so little there. So it's how we avoid the surgeons – how we get them to stay in the plane, posteriorly, which is actually easier, and then to get the right plane and develop it anteriorly, and to stay in that plane, above Denonvillier's fascia.

AC OK. Good points. How do you do the anterior dissection. We've done posterior and the lateral, now we're at the anterior.

AM Well I would take the peritoneum...

AC Where do you take the peritoneum?

AM Well, let's say in a male I would take it pretty much – it depends where the cancer is, and how big the cancer is – I would take it in the trough, the recto-vesical pouch. But if it was a big tumour, I would take a little bit of extra peritoneum behind the bladder as well...

AC Higher up?

AM ... so that I'm not quite down in the... well I'm up and over the other side, as it were, of the trough. I would take the peritoneum first, make sure there's no bleeding. I would tentatively dissect – I tend to use Lloyd Davies scissors for this – laterally I've been using the bipolar scissors, and find it very good. And I would try and identify at

a relatively early stage the seminal vesicles. And I would tend to – certainly in a rectal cancer, say mid-rectum – take Denonvillier’s fascia out with me. I would always try and find Denonvillier’s fascia...

AC On the specimen?

AM Yes, always do that, whereas somebody with IBD I would go into Denonvillier’s fascia, I would go behind it at an early stage. There’s one or two little tricks (I’m not an expert in the field), but what I’ve found is that using a Lloyd-Davis retractor, just using that little bit of pressure, and sometimes I take the Lloyd-Davis retractor, and once I’ve got through the peritoneum and can see a little bit of seminal vesicle, I would use the tip of the Lloyd-Davis retractor on that tissue, and just ease it like this behind the seminal vesicle, and stay very close to the seminal vesicles, but you can see this beautiful white areolar tissue coming up if you that, because you can get traction pushing the rectum from behind with one hand, the LD with the other, and just opening up the plane, and then you can lay down the retractor...

AC The traction is between the tip of the LD and your hand?

AM Using traction with the hand you can see the plane, and DF I think mostly you can see DF in the sort of thin elderly patient it’s quite white; in the fat patient it’s not so white, it’s fat-laden, but you can usually see it pretty clearly.

AC (To BD) Would you add anything to that?

BD I tend to do it slightly differently. I think that an operation for rectal cancer is not an operation... I try not to think of this as an operation on the rectum. At the back it’s an operation on the nerves; at the side it’s an operation on the nerves, and at the front it’s an operation on the prostate gland. I try not to think too much about the rectum itself.



The incision in the peritoneum, I don't go down into the sulcus in a man, ever: I always make it quite far anterior at the top of the prostate, and do take a bit of time dissecting out the seminal vesicles and the prostate. I suspect I do quite a lot a parasympathetic damage in the process, but there is a very nice bloodless plane when you get into it. There's always a vessel that comes off the middle of the seminal vesicle, right in the middle of it, which you have to see and get. Bipolar scissors will do that.

AM I think if you do that retraction on the front with the lip of the retractor (either that or do it with the retractor without the lip), you will then see these vessels crossing the loose areolar plane – your white plane – you see them coming back, and you can diathermy these very precisely I think.

BD An awful lot of trainees that come down into the sticks to work with me have been working in Glasgow, training in Glasgow, have never seen the seminal vesicles still. They still haven't seen the SV's. [Shown picture of BH of front of rectum] Yes that's it, and there's the vessel in fact.

AM What do you call that vessel?

BH Well I'm not... the which vessel, well I don't know what that is, it's sort of running on the surface of Denonvillier's fascia, that one. What I tried to show in that picture (it's a still clip from a video), it's sort of trying to show that the nerves are here, Denonvillier's fascia I think exactly how you (AM) just described it, with areolar tissue in front of it. This was published in the BJS last month as part of a kind of friendly ongoing argument with Neil Mortenson who says you can dissect behind Denonvillier's fascia. Well I think you can, of course, and I think if you dissect

precisely behind it, it probably doesn't make much difference. But what possibly would make a difference is if you burrow into the anterior fat, and you had an anterior tumour. And it seems to me that staying in front of it is safer in respect of an anterior tumour, but perhaps more dangerous in respect of these converging nerves.

AM Presumably there comes a time though when you cut through the apex of the Denonvillier's fascia as it ...

BH Well I feel you've got to do it in a sort of...(draws horizontal semi-circle in air, with apex pointing away from him) a U, respecting the nerves as they converge, and hopefully staying comfortable distal to the tumour.

AC Do you alter this anterior dissection if you have an anterior tumour?

BH Well I think you do, really. I think you probably are – I mean I'm open to being shot at, but I think one is very careful to stay anterior to it very low down, even uncomfortably low down if the tumour is anterior. Whereas if the tumour had come up nicely and was at the back, I would perhaps be giving a greater priority to the converging nerves. And I mean there is undoubtedly a substantial group of these tumours where you... maybe the tumour started at 10cm or something, and you're beginning to think, "Actually it's all mobilised up so beautifully, that putting nerves at risk for the sake of anatomical perfection is not in the patient's best interests." So although one describes a TME, it may only be T with a capital T for low tumours, and for the more anterior tumours. I think as surgeons it is awfully difficult to write these things down, though, but one has always to be balancing the benefit for this particular patient. So that clearly there are competing priorities when you get down

there, and if the tumour's miles away, the risk of going in – tapering in – a little bit at the bottom is obviously very much less.

BD Tapering and (...at?... ) the lateral points is the bit I find most difficult. The anterior plane (indicates AM), beautifully done, that was fantastic like that...

BH (To AM) But it's exactly what you were describing, isn't it...

BD And at the back you've got a definite plane, then you've got – you're left with – tissue coming in at about 10 and 2 o'clock, like that. And you want to be as wide as possible, but I get lost at that point.

BH So do I

AM Can I maybe just make a point about that, because I think if you've done quite extensive dissection at the front before you touch the lateral dissection, and then eyeball it – It's like eyeballing the hypogastric nerves on either side. You can eyeball the posterior bit, because you've dissected it out, and you can eyeball where the seminal vesicles are, and you can eyeball roughly where the converging nerves are coming, because you can see the back, you can see front, and I use that as a landmark to do the lateral dissection. And you go as close as you dare, you can actually see that, you can visualise... I go around doing these dissections with this image in my mind of where the nerve is. Because if you've done a dissection at the back, well round, do the dissection at the front, then what you can do is visualise where the nerves might be...

AC I still don't...

BD There's a risk of coning in at that point

AM For sure, for sure.

BD There's also a small vessel – there's a branch of the internal iliac vessel that sometimes bleeds, and sometimes doesn't, and I don't know because it's not there, there's a constant vessel a branch of the internal iliacs, which is about 2/3 of the...

BH It comes in from one of the ones going to the vesicles, doesn't it? Not in the place where you think it's going to come.

BD The only way of stopping it is with a Prolene stitch or something like that. I usually end up doing that...

AM And that's quite separate from the middle rectal vessels, it's about that much round (holds up index & middle fingers of right hand in 'V', making ~30° angle), indeed, or even...

AC I still have not got it clear in my own mind how your anterior dissection differs when you have an anterior tumour (looking at BH).

BH Well there comes a point at which you must go through Denonvillier's fascia, because it will run down and become adherent to the back of the prostate, and to me it's rather like an apron, and the top half of the apron is usually rather firmly fixed to the anterior mesorectal fat; the bottom half of the apron not at all adherent to the rectal side, but rather adherent to the back of the prostate, and I think what we believe we know about what's happening to the back of the prostate implies that we should have gone through Denonvillier's fascia by the time we are dead posterior to the actual prostate...

AC Close to the prostate?

BH Yes, so that I think at some point we have to go through Denonvillier's fascia. If I could sort of describe 2 nerves tending to do this (holds 2 index fingers in a horizontal 'V', with tips touching), cause they are going to run parallel from behind the prostate, but from where we see them on that pelvic side wall, they are quite a long way apart, so they are converging towards each other to join up round along the back of the prostate. So we're forced to go through Denonvillier's fascia in a somewhat U-shaped manner, and I think if we have to cut through Denonvillier's fascia then we get into some, maybe the lowest bit of mesorectal fat, maybe nothing more than a little areolar tissue, then we see muscle of the anterior rectal wall low down. All I'm saying is that if there's an anterior tumour, I will have my fingers on the anterior tumour, and I will make very sure I stay in front of Denonvillier's fascia till I am beyond it, and that would be perhaps putting the nerves a little bit more at risk than if the tumour had mobilised up a long, long way, in which case I would probably go through it a centimetre higher up in order to leave the nerves more safely. I don't know, what do other people think? It's one of the most difficult things to discuss. Bob (RS) is terribly silent...what do you think?

RS I must agree with what you're saying. I think one of the things we haven't really mentioned, and it's something you see when you get trainees starting to do this operation is the importance of constant traction when you're doing these procedures. So anteriorly, when you're going down posteriorly, you need really firm traction to develop a plane laterally. Firm traction is the key to seeing the right place to go. And anteriorly, I think (AM) referred to this, when you're trying to develop this plane and you have the retractor under the seminal vesicles you don't just pull the rectum back, you have to push it posteriorly and back, and I think the key is that you're always

exerting very firm traction in the opposite direction of the point you're operating on.

There's also the issue of counter-traction

BD So you get a plane of cleavage with another white line.

AC So mesorectal excision of the tumour is never total for an anterior tumour.

BH No, no, I think for an anterior tumour it is. All I am saying is that in a little bit – as you (AM) have said in IBD – you might well decide you will not do a close muscular dissection, but you'll still stay in the holy plane, but I'm sure you will tend to taper antero-laterally, because you know that is the safest treatment for the nerves, but I think a TME... I would perhaps prefer to back away from this and just describe it as 'incising in a U-shaped manner' Denonvillier's fascia after you've dissected / developed the areolar plane behind the vesicles, and before it becomes adherent to the prostate you must go through it, and you must identify and not damage the nerves while you do so. I mean, we're amongst friends so we'll have to accept that...

AC So damage to the nerves is second priority

BH Well in an anterior tumour it would be 2<sup>nd</sup> priority, but if your cancer had been at 9cm, and posterior, and was now mobilised up well out of the way, then I would tend to be a little more generous to the nerves, that's all I'm saying, really. It doesn't mean to say that we do anything that's measurable different, it's just that in the real world these are difficult places to dissect, and it's jolly difficult to get pictures of them to see them even very often.

AC Do you agree with the endpoint of Task 8 – that this is completed when the rectum is...

PQ I don't like the word 'exposed'. I think the big problem here – we get to the AP problem here – in that the standard British AP follows a TME, the mesorectum comes in, the surgeon follows that plane all the way to the anal canal, and then goes along the anal musculature. Now what that means is if.. the other thing a TME in a low tumour, and they decide they then have to do an AP, and they're actually on anal canal, and they continue on the anal canal, so you don't get a wide excision of low tumours. The other problem is that if you really go and push the limits about getting a really low anastomosis, we're coming down to this part of the mesorectum which is coning in. And therefore the amount of mesorectum which you have surrounding the tumour is reducing from about that (holds finger and thumb ~1cm apart), and as you go lower it gets thinner and thinner. So there comes a time when actually you are doing an operation which is getting closer and closer to that tumour and it becomes more and more dangerous the lower you get. The evidence for it being dangerous is that in the Leeds data we have a much higher margin involvement in the abdomino-perineals, in the Dutch data in the abdomino-perineals at 0-5cm their marginal involvement rates are 10-12% higher than they are in the anterior resections. Also survivals are worse in those series, and involved margins are...

AC Doesn't surprise me.

BH And that's not... that's real, that's double, that's not 10 or 12% relative to...

PQ Yes, ..... We had this fantastic AP day down in Basingstoke, where we had a Swedish surgeon who does a completely different operation, and the different operation is the perineal approach, where you go up (holds both hands fingers pointing to ceiling, ~30cm apart) in a cylinder, and you take out a hole of the

ischioanal fat and the levators attached to the rectum. So the standard approach is you come down and you're onto the anal canal, and then you cut through the levators, and so either you get a very little cuff of the levators – which is the standard British way of doing this operation – I've seen a Swede take a very wide cuff of levator, and John Nichols described that operation, but the trouble is the levators come off the anal canal, so the surgical margin is the anal canal. And I've just reviewed 350 of these in Holland: 10% of them are either perforated or into the submucosa, and 25% are either through into the muscular wall. So 35% have infringed the muscle in some way or another. So if it's a Dukes' A you will get local recurrences, and we know you get local recurrence in abdomino-perineals. So the concept at the moment is that you should know before you get anywhere near that coning area whether you're going to do an AP or not, and you shouldn't go into it unless you're sure you can do a TME [does he mean AR?]. If you think you're going to do an AP, then the important part of the operation is doing the perineal aspect, and concentrating on that, and doing that in a cylindrical fashion, and taking off the levators associated with the specimen. I will show you some beautiful pictures of this Swedish operation and the slices...

BH I've got the videos...

RS (To PQ) So which part of the operation should you do first.

PQ Well that's a very interesting question – if you're going to do an AP. If you're going to do an AP you could argue that you should actually do the bottom bit first, because you're a fresh surgeon, and you can set the patient up, do the most important bit first. But actually Torbian does the abdominal bit, what he doesn't do is he doesn't go very



low. He goes to the widest part of the rectum and he stops, and he turns the patient over.

RS So he doesn't divide the anterior fascia at all

PQ (To BH) Does he divide the anterior fascia?

RS Not fascia, anterior peritoneum

PQ Yes he does, yes

BH Well he starts from above, and does a complete operation from above, including dissection down into this plane, but at the front, he would basically in principle stop from the.. (holds heels of hands together, cups fingers to form a wide 'U') at the point where the levator muscles take origin from the... well it runs round in a curved line from the coccyx at the back, (index fingers pointing down, tips touching, then parting to describe a long ellipse running posterior to anterior) round the inside of obturator internus round the side in an oblique way, and at that point he would stop visceroparietal plane dissection, because that would tend to create a waist, and he would then go down and dissect outside – well, that is what he did. He dissected around the globular ischio-rectal fat until you actually could see him doing something which I confess we seldom have done in my experience of abdomino-perineals, and that is actually see the origin from below of the levator muscles coming off obturator internus. I could show you that on the computer.

RS Have you seen these videos of Lockhart & Mummery doing abdomino-perineal resection

BH You mean JP Lockhart or HE?

RS The ones where they are black & white.

BH Yes, well I've seen... John Norfolk came and showed us this St. Mark's stuff, and...

AC Can I just ask, what is the perineal healing rate like after these operations?

PQ You use flaps. You either bring a unilateral or a bilateral buttock flap, or you can flip the anterior abdominal wall

BH In the absence of a plastic surgeon, Torbian just swung a gluteal flap, which is almost a colo-protcologist's operation, although I can't say I've done it

PQ The advantage is, you're bringing in non-irradiated...

AC And it's a musculo-cutaneous type flap?

BH Yes. Well I think there wasn't a skin coverage problem, more just gluteus...

AC Can I get back to... at which point in this dissection would you say the AR is not on?

BH Well I think you've got to decide this beforehand really, and...

AC At which point?

BH I don't think it's very often you're going to change your mind in the middle of the operation, and certainly not if we're moving towards a new, more cylindrical kind of abdomino-perineal. I think that the size of the problem... I mean it was my idea to run this thing, but I knew I would be opening a can of worms. We called it "APE – R we doing it right?" And it was a bit like an alcoholics anonymous meeting, because people kept sticking their hands up and saying, "I think perhaps I'm not doing it right either" and we all ended up feeling we weren't doing it right, and what to do about it now is still... you know... the opinions round this table are just as good if not better than any other opinions we might add. Half the time, of course, it's that traditional

abdomino-perineal we do, which is perhaps a bit of a compromise with no clearly defined planes from below. It's perfectly adequate for a lot of tumours, but it does have a much higher – again and again – the circumferential margin rate is coming up as being much higher. And indeed, in MERCURY, which is our study, that Ian Daniels is doing, it's much higher still, than the data you've (PQ) mentioned. It's like four times the size, and that's with good surgeons – not good necessarily, but committed group of surgeons who feel they're interested in the problem anyway, all sort of linked up a bit to the Marsden.

PQ You're asking a surgeon to do a very difficult job, because he's right down the bottom of this big dark hole, in a narrow male pelvis, and he hasn't got the mobility to use his knife effectively down at that end, so it's much easier for you to get access from the bottom end (holds hands 30cm apart, fingers pointing to ceiling) and go up there. And the only problem that everybody threw at us was the holes that the Swedes and the Danes do these flaps, and they're very happy with these flaps. They actually bring unirradiated skin into the area, so they heal better quite often. It's difficult because this is new stuff: it's not standard.

BH It's old stuff and new stuff, in a way.

AC Can I put a question to you lot? The reason why AP results are poor in terms of LR, because it's one part of a very uncommon operation that is never taught.

BH (Nods) And nobody's ever seen.

AC And usually the good surgeon who is right at the top, and the assistant who has never been shown how to do this, that is the truth, I think.

AM Can I make an observation as a bit of an outsider in coloproctology these days. My feeling is that what's happened is that a previous era of surgeons – colorectal surgeons, I mean 1950's / 60's perhaps - did a different operation to that we, perhaps and our contemporaries have been doing over the last 20 years, and it's all associated with this obsession with conservation. I'll put this perhaps in a slightly better perspective, in that 1977 I was an RSO at St. Mark's, and Oswald Lloyd-Davies came along one day and said, "Would you help me, Munro, because I have an AP resection to do?" It must have been one of his last AP resections, and I said "Delighted, Sir", and went along and was in many ways amazed, because as far as I recall he used a big pair of scissors, and he swept from below. He did some dissection from above, but he swept below with a pair of scissors, and took out – as far as I recall – a great chunk of levator, and he knew exactly where he was, and he did this kind of thing (mimes scissors making cuts in a U-shaped arc), and lo and behold we had this beautiful great big specimen with a few swipes of the scissors. And I suspect that he was very much more radical than our generation of surgeons have been in AP resection. I mean correct me, I may be wrong, but that's the impression I have. And I think we have gone backwards in this difficult scenario, where you can't do a LAR, well you can't do it properly, then you change your mind, you resort to doing an AP, and you have forgotten the radical principles. (BH nods)

PQ You're creating a margin which is very close onto that musculature...

BH In a way, we re-lived exactly what you've just said, at this 2-day meeting, because John Norfolk had brought these B&W St. Marks movies, which really did show us, more or less, how in the 30's they would do that kind of... I mean it was done very

quickly, with a series of (mimes similar scissor action to AM) of very positive cuts, a bit of blood, and the whole thing was over in a trice, really.

AM They were dissecting well outwith the tumour ...margins?...

BH Absolutely. The downside probably was nerve damage, I think. And I think it is a real... it's a bit of a conundrum, really, because...

RS What we're saying is that we should do everything we can to make the decision whether it's going to be an AR or an AP before...

BH Before. You *must* do that if you're going to go for wide levator cutting. Unfortunately, I was taught as a registrar – when was I a registrar? Earlier than you're (AM) talking about – as a registrar, you should do almost all of the abdomino-perineal from above, and I think that was a balance of power thing, in that you sent the boy to do the bottom bit, and the worst thing of all was to be the boy of somebody like Hedley Atkins was doing the top, because he only did a few little snips, and expected you to come up, but you didn't really know how to do it anyway. The most famous Australian...

AC If you knew Hedley Atkins, you don't know how true that is!

AC Can I just come to before we leave this bit, in the unusual – but it does happen – in the unusual situation where the rectal wall is breached, the rectal wall either submucosally or through, in the presence of a rectal tumour.

BH The tumour is breached?

AC Well, the rectal lumen is entered in the course of the deep pelvic dissection. What should you do? And there is sufficient clearance.

RS You have to make sure you have good lavage of the surrounding tissues with a cytocidal agent.

AC What sort of cytocidal agent would you use?

RS I would use undiluted Betadine. What would you do? (To AM)

AM I would probably try and stitch up the hole if I could.

AC (To BH) What would you do?

BH Well, both of those things: extensive lavage, repair the hole, try and keep the instruments that have been doing that separate; try and minimise in a commonsense way the further spillage of malignant cells, which by no means always implant. They can, and we know it's a high-risk situation for LR, but I think one would treat it as rather a bit of a surgical catastrophe, try and get out, and try and get them to put a clean bit of green and a towel to put dirty instruments on, and try and pretend it hadn't happened and complete the procedure as cleanly as it was possible to do.

PQ People pull too hard on the specimens. You can see the tears on the specimens, so they must really try and avoid... if they are going to do the standard operation, they need to do it very tenderly, and not to apply too much trauma to the specimen.

RS One of the most difficult areas is where you have a tumour which has maybe just above the peritoneal reflection, which has almost eroded through. It is *very* easy to perforate that tumour by putting a bit too much traction on it.

AM Absolutely

BD In AP resections with anterior tumours...

- PQ But you can stop that if you don't do the standard operation, because you're cutting from below rather than heaving from above.
- BH During one of my earliest visits to Norway, I had access to the data from one of the hospitals called ...Ullival... from Oslo, not a bad hospital, but they had – in abdomino-perineals – no less than 70% of the specimens were ruptured, and in anterior resections something like 40%. So that you know, there was a fair way to go in terms of trying to improve results.
- AC Would it alter your antibiotic policy
- AM I would lavage with antibiotics – put antibiotic solution into the peritoneal cavity. Usually a cephalosporin these days. I wouldn't do anything other than that.
- AC Would you consider any adjuvant treatment?
- BD Some would say it depends: we do tend to differentiate between rectal perforations and tumour perforations. If you perforate through the tumour itself, and the patient hasn't had any neo-adjuvant therapy...
- AC You would.
- PQ (To BD) How strong is the evidence base for 'between the tumour and the lumen'?
- BH There *is* an evidence base for that. I can't give you the references, but tumour rupture compared to rupture of the bowel distal to the tumour but not through it, there is – I believe – there is an evidence base.
- AC (To BH) So you would differentiate between perforation of the tumour and perforation of normal rectal wall not involved by tumour?

BD Your adjuvant therapy will ultimately be determined by the pathologist, but within that, a tumour perforation in an otherwise clear margin is just a bad thing. There's another question, which is probably nothing to do with this, and probably comes up later, but I've had one positive distal margin in a young fit man who didn't want to have a colostomy, and we got macroscopic clearance into the anal canal. We did a frozen section, and the distal margin was negative. When the definitive pathology came back, there was tumour in the submucosa.

PQ But that wasn't in the frozen section...

BD That wasn't in the frozen section.

PQ So it's probably more than a mm, so it may not recur.

BD Well, I'll never know now, because it was a positive distal margin, and what would you do about that. This was a Dukes A tumour – a T2N0 tumour, that I crunched through with a stapler.

PQ If he'd had a TME, you could always argue you could wait and see and do an AP. That's one way of doing it. Or you could give him radiotherapy; radiochemotherapy. There's not much of an evidence base for these sorts of things.

RS Well I would take it out actually.

BD Would you irradiate them first?

AM I would certainly advise him to have the anorectum removed, whether or not you give, there may be a case for radiotherapy. Would you? (To BH)

BH Well I think it's very much an individual situation, really. The submucosal bit of tumour leaves you with an anastomosis which is *extremely* easy to examine, and



therefore close follow-up without any further treatment would immediately alert you as to whether that was leading to re-growth and a local recurrence. Some pathologists – not Phil – but some can be confused about exactly where the margin is. I would be reluctant to do an abdomino-perineal without being absolutely certain that there was a biopsy positive piece of tumour inside that patient. That’s all that I would say. Unless he wanted to pursue the safe route. I mean, if he said “I’m frightened, I understand what you’re telling me, let’s get on with it”.

PQ Frozen section may have taken 3mm of tissue in order to get you to that positive margin on the specimen, so 3mm is good enough, generally. Tricky.

BD Well, we irradiated him, and I took it out. And there was no tumour in the anorectum.

PQ But you never know.

BD If he had been node positive, it would have been an easier decision. But it was a node negative tumour, with ... we took it out, and there was nothing in the anal canal at all.

AM Doesn’t mean you did the wrong thing.

BD I get concerned about Neo Mortensen’s recent article that says “AP’s a dead operation”.

BH Does he say that? I missed that one.

BD He says intersphincteric division of the anal canal. He says there’s no such thing as a potentially non-restorative patient.

PQ Symptomatic results from the Dutch study are interesting, because they show awful function, and for these very low operations, the patients who had AP’s and colostomies are just as happy – and much happier for a certain period of time – as the

people who have had the restorative operation. I think the Swedes show a 20% AP rate, don't they? (To BH) PO Nystrom was at your September meeting.

BH I don't, but then I think that they use a lot of radiotherapy, and I think the very low join doesn't hang very comfortably with radiotherapy, and one of these two.

BD Your percentage also depends on what you classify as a rectal cancer. You can alter your percentage very easily...

BH From the top end you mean? Absolutely.

BD Sorry for diverting.

### **Excision of Rectum**

AC OK, then. No, no, we're doing very well here. Now we come to Task 9 – we're excising the rectum with adequate margins. The steps of the task are shown there – first row of staples, then washout – we come to some detail here – place second row of staples, divide rectum with knife, release stapler, in series. Can I ask the old chestnut, sort of, which is the minimum safe level? I know this... I just was at a meeting, and there was this guy called Marks, who's the son of Jerry Marks, he presented this series of LAR, where the margin was <1cm, and with chemoradiotherapy reports no recurrence. So what is the current thinking? What is the level you would recommend?

RS (To BH) Well you've published on 'the close shave', haven't you?

BH I've published 3 papers going close to the lower edge of tumours, and they all depend upon the fact that you've got to try to do a perfect MR excision, so I've got to lift all the visceral mesentery of the rectum out of the pelvis. I personally, think there is

something a little bit generous to us about the... I mean all that one is doing really is putting a finger in the...you are dissecting all the way round until you come onto a muscle tube which can be slightly pushed up from below by a fist, and gently pulled up from above by a finger and thumb put in front of and behind, and one then gets the tumour, and I think one is slightly rolling the muscle over the end of the tumour, and if you can put your clamp on beyond that, I reckon you can then (the clamp I choose is a PI30 or a TA30 stapler, simply because it enables one to – it's very firm, it won't come off; the Sitinski I find a little bit awkward to handle, and there's the danger of it slipping off, whereas a stapler there's a – which I notice is the way you've put it anyway – so this is the placement of the pathologist's staple line, as it were, the first one. And I think you can, so long as you can clear it practically, so long as you look through the end of the stapler, and you can't see any tumour beyond the stapler. You will have the doughnut beyond that. It won't be a completely 360° safety margin. But I think as far as the muscle tube is concerned, Versil Morsen was right when he said that the palpable lower edge of a palpable lower edge of a rectal cancer is almost always its microscopic lower edge. Almost always. Not absolutely always, that's the trouble. And so I have published a substantial series of very, very close shaves. I don't think, at the moment I can't give you chapter and verse, cause it's time we re-ran them, but this has not been a significant cause of LR in our series. Nearly all our LR – almost all of them – are pelvic side wall and that sort of thing.

RS The view that we've taken – I think I'll just say what you were saying – if you can feel the lower end, and get the first staple line below your fingers, then that will be adequate in the vast majority of cases. And then you have to remember you've still got another staple line to put on, which is going to add another half cm or two.

- BH Exactly, and if you're in any doubt you send your colleague, who needs to be really experienced, with a proctoscope to look at the first staple line before you fire it. Because if there was any tumour sticking through that wouldn't do.
- AC You can honestly... really tell that you have rolled up the tumour and put your stapler so its now definitely not involved in fronds of friable tumour.
- BH Well of course I can't. All I can say is that as a practical surgeon we've done it a lot of times, usually because people were desperate to avoid colostomies. I mean I've had people get sent to me, where more sensible surgeons have said "You've got to have an abdomino-perineal", and they look up 'lunatics' in the yellow pages and find me, and I do exactly what you've said: put the stapler on, and get Brendan or my colleague to look at it from below, and be sure that there's no tumour sticking through. As you say – finger and thumb – I do need to have my finger and thumb beyond it, and then another stapler which is quite easy to get below, even as low as the dentate line, and then a colopouch on top of that. And our big, what's the word, if you look at LR versus what we've done, the big point at which things get worse is when we turn abdomino-perineal, not when we do that, and that's the strange thing to me. Doing that I would have thought to be very high risk, and abdomino-perineal to be very safe, but it has turned out to be the other way round, that's all.
- PQ Another thing to clarify is that we know that in classic, the distal margin positivity rate was I think 1%, and in the Dutch study it was 2%, so this is an extremely unusual problem, compared to circumferential margins where you're looking at up to 30% in some people's hands. But one of the things that you should bear in mind is – close shaves, OK that's about a cm for distal margin – but we know that all the way down

anteriorly you're only 0.9mm [cm?] away from the circumferential margin, so from the point of view of worrying about which margin you really want to have a go at, we have this obsession with the distal margin, but actually this much bigger one... we mustn't forget the circumferential margin, but what you must also remember is that as you come in to get to that distal margin you cone in, and so you actually take off less and less of that tissue around the edge, and therefore be very careful about your distal margin, but at the same time be very careful about the circumferential margin on that close shave. Because that tumour spreads out in a circular fashion, so it's going distally probably the same distance as it's going invasively

AC So can I ask the colorectal surgeons: there is no limit, provided you can get below it? Is that the view?

BH I think the first person who actually said that to me was Norman Williams, who he said that. Because for years and years I was doing this, but not daring to admit it in public for fear of being hung, drawn and quartered. And Norman, who was a bit more important than I was, he said, "I don't think it matters how close you go so long as you're clear. But there happen to be exceptions to that of course, but on the other hand... because there are tumours that go down in the submucosal layer, there are a few, but most of those go in all sorts of other places too, don't they. So they get such a rotten prognosis, and I think that's well documented in the literature.

AC Alasdair – do you agree?

AM Can I speak on behalf of the amateurs. I think if you say that in your TA, if you make some of the statements you made in the TA what you'll find is a whole new generation of patients will get inadequate operations...

AC It concerns me

AM ...and I think that you've got to err on the side of being very cautious about this. I would suggest also that the diagram which you produced there with this wonderful conceptual idea, you've got to get across somehow, and if you put these, some termites or something like that at the front...

BH (To AM) He asked us what we thought, not what we thought ought to be written down.

AC That's true.

PQ There's a new finding from the Dutch study, from the pathology, which is that mucoid cancers have twice the rate of margin involvement than any other type. And the poorly-differentiated ones have a much higher rate...

AC So you would put a caveat here: you would not do this for mucoid cancers and poorly-differentiated cancers.

PQ Yes

AC And you would have that information beforehand?

PQ Yes, and that ...

AC Is that your experience too, Bill?

BH Absolutely, and incidentally, there's another thing which I don't know whether we're coming too separately. I recently review for the Annals of surgery – the American journal – the best paper I've yet read on the subject of internal iliac nodes and their relevance to rectal cancer by the people in Tokyo, or the Tokyo cancer institute, I think, including Moota, and they have come up with what to me is the best statement

about this situation so far, and now I'm mentioning the internal iliac nodes, which is that there are 3 risk factors for having an internal iliac node: one is tumour within 3cm of the anal verge; the other is cancer with nodes elsewhere (presumably the mesorectum), and the third is poorly-differentiated and mucoid cancers. They reckon if all 3 of those are positive, the risk of internal iliac node being involved is 70%. But they confess – for the first time ever from Japan – a) that Radiotherapy might be better treatment than more extensive surgery, and b) that those 3 things are all bad prognostic features anyway. So I don't know... I mean if you wanted me to say what I thought ought to be written down, it would say that probably somewhere between 4 & 5 cm is as low as you should go with a sphincter-preserving procedure.

RS From the anal verge?

BH From the anal verge, yes. Maybe 2cm from the dentate line is a sort of working limit for a... even then it probably should be specialists doing it.

RS The other issue is should we specify a distance beyond the palpable margin, because what we're saying is "If you can get your fingers beyond it, that's fine.

BH All my life I've settle for say 2cm, it seemed the intelligent thing to do.

PQ ..... It's different for different heights. Because if you've got a 15cm tumour, you'll go 5cm distal and there's no problem, you can do that. The difficulty arises right down at the bottom end where you have the waisting starting to happen in the mesorectum, and you've got very little tissue to play with, and at that stage you get to having 2cm as your minimum that you should go for.

AM Could we insert the caveat that Phil has mentioned, that you must be very careful about coning in, because that, I'm sure, is a cause of, a possibility of, recurrence

- AC So what we are all agreed is 4cm & 2cm below the lower limit of the palpable tumour, is that right?
- BH Those should be limits to sphincter-preserving surgery, is that right?
- BD Tumours within 4cm of the anal verge should be treated by AP resection, is that what we're saying?
- AC Yes, that's what I understood you were saying to me now. Tumours within 4cm...
- BH Well you see there will be some people who will prefer with a T1 tumour who will prefer to have a local excision, that's the only...
- AM What you could say is that this is a general statement, obviously, there will be variations with this as a general statement.
- BD There will be variations, both because of patient choice, and whether they're physically-fit, whether they're continent at the start, there will be lots of riders to that. It will be a difficult thing to word too precisely.
- BH You see that also raises the question: does everyone who has an abdomino-perineal have to have pre-operative radiotherapy?
- PQ Well pre-operative short-course radiotherapy does no good.
- BH Yes, but not everyone will believe you, Phil.
- PQ Dutch data shows that it makes not a jot's worth of difference...
- RS We'd better not get into that.
- BH I'm quite prepared to believe you, but I don't know that other people will. It's now being given all the time, by everyone.



PQ Until they see the data...

AC Can I raise the issue: does everybody agree that there should be 2 rows of staples?

AM I've tended to use a clamp instead of the 1<sup>st</sup> row of staples, but I mean it's perfectly reasonable to use staples for both. I'm perhaps a little old-fashioned in that...

BH I think if you're going to use 2 rows of staples, it's either got to be very comfortable, or you should remind people that where you're very low down, the first stapler should be left on and used to draw up, in order to insert the second one.

AC You're using it as a clamp, really.

BH You're using it as a clamp, and it's avoids anybody pulling on the tumour. It enables you really, It's the easiest way of putting a staple line as low as dentate line.

AM If you do that, you've got to remember to put the first stapler on the same orientation of the clock as the 2<sup>nd</sup> one, because otherwise you won't get it down.

BH That's true, I mean it goes in almost shadowing the first, and it goes in much more easily than the first, too.

AC I suppose you're using it as a handle, really.

BH Exactly

AC Right – the washout of the rectum after the stapler

BH After the first stapler.

AC After the first lot of staples – what sort of washout do you use?

RS I use povidone iodine. (Consent from rest.)

### **Create Colopouch or Simple Colotomy**

- AC Everyone uses povidone iodine – magic stuff. OK, that’s fine. We come on to 10 now: this is an issue that is I think of some importance, whether to create a simple pouch or simple colotomy. How do you decide?
- RS Well I think if you’ve got an appreciable length of rectum, colopouch is not a good idea, as it tends to cause constipation. So we’re really only looking at anastomoses that are at the level of the pelvic floor.
- AC What level are you talking about?
- RS I suppose...
- BD I think if I’ve done a TME, I will do a pouch. If I haven’t done a TME then I won’t
- AC Explain that for me. Reason why for that.
- BD Because if I’ve done a TME and I’ve divided the anorectal junction at the level of the pelvic floor, it sits much nicer, it looks better, the blood supply of the anastomosis is better, because it’s not the end. Whether it really gives better functional results I am not convinced, but there’s some evidence to say that it does, particularly in the first year. At the pelvic floor I would always put a pouch.
- BH I think if you’ve done a TME, your anastomosis will lie somewhere between 3cm above it, say 5cm from the anal verge, maybe 6 at a push. Therefore it will be by definition low down, because otherwise you will have a big denuded piece of rectum which you would be really uncomfortable about. And you’ve also created a great big hole, and the pouch is a very nice way of filling that hole, because it creates a sort of neo-mesorectum at the back which fills the hole and prevents, must be a preventive

for haematoma formation there. So lots of length, and a small pouch does seem – to most of us I think – the best kind of reconstruction for anything below 5cm.

AC So ‘always’ if you’ve done a TME

BH I think we’re in a sort of ongoing state of partial ignorance is the truth really. There was one ludicrously over-optimistic paper partly from Sweden and partly from the Cleveland clinic, suggesting there was a massive impact on anastomotic leakage. And then if you talk to any of the people that contributed to it, in the pub they all admit that immediately the paper stopped, they all started having leakages. I think it’s safer to, I think it’s still a good method in the present state of our ignorance.

RS PQ leaves

PQ I would thoroughly recommend that more of this sort of stuff goes on for surgeons, and they talk more about their techniques. Also, get expert surgeons to teach juniors, because too many of them are being taught out there peripherally by guys who were taught by the wrong sorts of people.

RS One of the points that might be worth discussing is, if you don’t make a colopouch, which part of the distal colon do you use for the anastomosis? What we’ve tended to do in the last few years is rather than end to end is side-to-end, in other words use the anti-mesenteric border, perhaps about 5cm proximal to the stapled-off end, even without a colopouch

BH Well there has been a paper from ...Ester hospital in Stockholm showing that a 2x 8cm pouch is indistinguishable in results from an ordinary side-to-end, and I sort of, one of the things I kick myself about is that various people used to tell me that side-to-end was better down there, years ago, and I took no notice, and continued to do

end-to-end, because that's what I preferred for instinctive reasons, and I now believe that side-to-end is a perfectly valid alternative to doing a small pouch.

RS It just strikes me that probably the most dependent part of the colon is not the stapled end, but a few cm proximal, because it always tends to curve. And also you're pretty secure in the blood supply if you're doing an anastomosis through the anti-mesenteric border of the colon; if you're doing it at the very end, you probably have the least ... piece of tissue. That's certainly what we've done for the last several years.

AC You have less tension too. And I think that applies to all anastomoses, that end-to-end is not good, by and large. So we're agreed to recap colopouch after all TME's. (To RS) When don't you do a colopouch?

RS Well certainly if I haven't done a TME, and I've left rectum behind. Having done a high tumour, come across the MR with 5 or more cm of rectum, I wouldn't do a colopouch. And also I must say occasionally...

AC And even then you wouldn't do an end-to-end

RS No, never do an end-to-end. And I must say if we're not happy that it's a really beautiful, soft piece of distal colon that it's easy to make a colopouch from, I wouldn't push the boat out. And I have to say I don't always do a colopouch – haven't done one for several weeks.. months.

AC Any dissention?

BH I think we're almost saying exactly the same thing, aren't we. The only thing that we probably should mention is because it is cropping up in all the meetings nowadays, and that is Marcus ...Cooper's coloplasty. You do an anterior coloplasty 10cm long,

and 5cm above the end, stitching it sideways. The Cleveland clinic is very keen on that, but I must say that the most recent guy I heard speaking about it, from Switzerland where it was originally conceived, seemed almost even though that's what he was talking about, seemed to say that the colon pouch was better. Not much better, but... Do you think it ought to be mentioned (to RS)? It is certainly being talked about, and it is *an* alternative.

AC (To AM) What do you feel about this coloplasty?

AM I have no experience of coloplasty, but regarding colopouches I would agree pretty much with what's been said already. One thing I would say is that it just mentions, "Create a colopouch". I think we ought to go into some detail about to do a colopouch, because I think it's easy to get it wrong.

AC Tell us how you do it.

AM Well, what I would do is to... my colopouches are quite short, about 5cm long, so I would turn... do a sort of J with the distal colon, I would stitch the anti-mesenteric aspect of the end, having stapled the end, stitch that to the colon, usually ~5-6 cm proximal to the most dependent part. I would then make a longitudinal incision on the teniae, at the most dependent part, having put a stitch in above and below the most dependent part, in other words at the mesenteric and the anti-mesenteric side, a sort of stay stitch. Then I would slip the GIA in...

RS 80mm?

AM I tended to use sometimes the 80, but the 60 is something I would probably use more often. And I would make sure it was up well, make sure you are stapling anti-mesenteric to anti-mesenteric border, because it's easy to get round the circumference

of the colon, and fire it. What I would then do is, that does leave you, almost always, with a little angle of tissue on the superior aspect of where the hole is, which is perhaps a little blue sometimes, and I would take the scissors and snip that off, and maybe snip a few staples with it. Then I would put a purse string, and then put the anvil in.

AC Any differing opinions or views on how you do colopouches?

BD I do it slightly differently.

BH Oh, one little thing. Some people put a sterile proctoscope in to make sure that the staple line isn't bleeding, because once you've put your purse string in, you're not going to be able to see if it's bleeding until after it's too late. And there is a small but not totally... Actually I don't think you need a proctoscope. If you get a pair of Babcock's, get the light in the right direction, you can look up inside the colopouch and make sure that the staple line isn't bleeding.

AM That's where the headlamp is very handy

BH A headlamp would do it

AC What size stapler do you use?

BH I use a 60

AC No, size of stapler – blue, green, white.

AM Oh, I see

AC The reason why it bleeds is that you are using staples that are too big for the thickness of the wall. So if you use green for example, which is 4.2, it will bleed. But if you use blue or white.... That's important. Tell me which colours do you use?

RS Blue. (AM also)

BH Well blue, but you've taught me something, because for the pouch I use... No, no, it's green I use (some confusion follows re. whether it's the circular stapler for anastomosis vs. straight for pouch)

AC No, no, you're right. For the pouch, for the two colonic walls, it should be blue.

BH I use... I use what I'm given.

AC But if you use green, it will bleed.

AM The CEA instrument with the green head is actually green because of its circumference, not because of the staple size. Whereas the straight staplers are green or blue (or white) because of the staple size.

AC If you have very thin colon, I suggest you use white which are 2.2 when they're closed. Stapler closes like this (makes 'B' shape with fingertips of both hands). The bigger stapler – starts at 4.2 – has got quite a big gap. The blue is 2.8, and that's the one you should have to do a pouch of any sort: small bowel...

BH It's a bit late in life to be learning this, I must say. But I think that's really useful, really important.

AC People don't realise this.

BD I make a colotomy transversely. I don't cut along the teniae, I make it transversely, because, thinking that the blood vessels come in from the side. If you cut transversely, you'll disrupt less blood vessels than if you cut longitudinally. I don't know if any sense applies in that at all, but it just seems to make more sense to go in the line of the vessels than that way...

AM Well I cut that angle off

BD Well I don't get a little blue bit! So maybe there is some science in it

AC I'm not clear. Can you draw this for me?

BD Well you've got your loop of colon, with its mesentery which is in there. And that's stapled off. I would put a stitch in to hold these two bits together. You then have to make sure the mesentery is clear of that. You can then make either a longitudinal incision there, or a transverse incision. I put my finger round the back to make sure the mesentery is clear before firing the gun. You can either cut in the long axis of the bowel, or in the transverse axis. And I cut the transverse axis...

BH I'm not able to see your hand there, but what you're saying is it's just the hole you're making.

AC Yes, he makes a transverse hole rather than a vertical hole.

AM What I find sometimes is that this little bit here sticks out sometimes, it's a little dog ear, and I just lop it off.

BD Because you've stapled internally there is – where everything comes together – there is an area where there is no blood supply. And that's why I think just a side-to-end might actually be better. And I agree with what you're saying (RS) that a side-to-end might be better.

AC You know in upper GI surgery it's called an Omega loop and I often use it. Where you take the small bowel, and you take it around and you anastomose it to itself, so you end up with a circle. Then you anastomose that circle to the oesophagus, and in



upper GI that works fairly well. I don't know why it's called the omega loop, and I didn't describe it, it's some Japanese...

BH It's like Norman Tenner's 'Roux 19'

AC No, that's slightly different: the Roux 19 has a twist on it. I often wondered whether the colon would be very nice to form a C-loop, because it tends to lie like that. And then you've got a very nice thing to anastomose to the rectum. Obviously no colorectal surgeon has ever considered it.

GH Just a question – why do you make your pouch to the end. Why don't you just make a loop? Like this: if this is a loop like this, why do you stop here? Why don't you go to the end? You open here, and just leave here...

RS Because we tend to make the colotomy at the apex, because you need that anyway to put in the head of the gun.

GH But you don't go with the stapler to the end.

AM We go the other way. We go from the end to the...

AC They're coming from this way, they couldn't do that

AM It's possible, but the problem is that it's taking away from length, because you need maximum length to get down...

AC What I am trying to say that is in my view – humble view – the circular loop would work a lot better than your stapled pouch. And would be much simpler.

BH But why...?

AC Because it would be less rigid.

BD You mean what you would have is colon anastomosed to itself...

AC Yes, if you went up (none of the above diagrams seen)

BH That would be so easy for us to do. I have a feeling somebody has tried that.

BD The anxiety is that, because the blood supply to the small bowel is pretty predictable, but it's the cut end, which is the bit furthest away from the heart, which causes the anxiety, the bit you worry about. And you're anastomosing that to that, I would have worries about that anastomosis

### **Anastomose Colon to Rectal Stump**

AC (Shrugs) What I can tell you about high-risk areas like the oesophagus, it's good.

Anyway, we're digressing. So we've done the colopouch, now we've got ... clear on that. Anastomose colon to rectal stump. The steps: Choose appropriate head of stapler...

AM Are we going to stipulate staplers?

AC We'll come to it. Insert stapler, assemble gun, activate gun, check integrity. So we'll take them one by one. How do you choose appropriate stapler? Alasdair. Do you use sizers?

AM No. In practice I tend to find that the 31, and we use the CEA31

AC Those are the ones that flip

AM I think the flip lid is quite useful, the anvil, is quite useful, because it comes out so much easier.

AC Yes, I agree.

AM That's what we use.

AC 31 - always?

AM Almost always, yes. And... one or two things about this. Having put the anvil into the pouch, lets say into the colon pouch, I would tend to put the instrument in myself, from the anus. Rather than ask an assistant to do it, because I am terrified that the assistant will push the whole assembly through the rather carefully made anorectal stump. So I would tend then to go round and do it myself, then reglove and gown again when I came back. And I think that putting in the stapler can be quite a task in someone who's got an anus which is tight, and requires sometimes a fair degree of manipulation, with a bit of gentle dilatation, and I think it's a skilled task.

RS I would agree entirely – I think it's one of the most crucial parts of the operation. Really, if you push too hard you could disrupt your lower staple line.

AC (To BH) Do you agree with them?

BH I agree with everything that Alasdair's just said, except that being a fraction idle, I settle for putting my left hand through the legs as a steadier, and my right hand on the transverse staple line, to make sure that the guy is easing it through in a way that doesn't do the disruption, and then you can just change your glove. But I mean in principle we're all agreed that you don't just give it to someone to shove up.

BD Two hands is very important, because when it's difficult you need to have a hand on both ends. Position of the retractors is very important at that time, because the St. Mark's retractor has an unerring ability to obstruct insertion of the gun. And as the St. Mark's is being pulled out the way, the top can come off the stump, and having two hands, it makes a lot of difference.

AC Do you have any recommendations as to the direction of the curved circular stapler?

BH Yes, I think particularly in females, where anastomotic-vaginal fistula is a significant risk, it is a good idea for the handle of the gun to be tilted towards the ceiling a bit, so as to get the anastomosis as far back as it's possible to get it, because I think that is a dangerous proximity, and I would try to avoid the anastomosis being bank against the back of the vaginal wall.

AC Now you have the stapler stretching your rectal stump in the right place, and you have this thick line running across. Where do you perforate? Through the staple line, anterior to the staple line?

AM I would either do it immediately in front, or immediately behind the staple line. I wouldn't do it through the staple line, because I think you can easily disrupt a staple line by shoving the spike through the staple line.

RS It tends to sort of tell you itself, I have to say, and it usually comes out behind.

BD And that takes it away from the vagina as well, the angle makes you...

AC (To BD) So you prefer behind?

BH Well in a female I think, yes. I get a little bit worried about a recto-vaginal fistula which I have seen a few times

RS I think another thing that's important particularly in females is to inspect when the stapler's in and is stretching the rectal stump a little bit you can see it, and you can actually see if the vagina's encroaching onto the corner, and you can take that opportunity to peel back the vagina if you can...

AM Checking the vagina, I think, that's pretty important

- BD Doesn't do to be *too* careful, because it's pretty frightening to look at, what the anal canal looks like with a stapler through it: you can see right through the muscle, it looks like nothing at all.
- BH That brings me on to another thing, where I think that Alasdair already hinted at this, that is one of the worst things you can do with a circular stapler is to push skin, and a mixture of sphincter muscle up in front, and then crunch it down, and actually end up taking away some muscle. And I have known an anal canal ruined by that, and rendered unfunctional. I think in a way it is important – I agree with you it's frightening – but I think one should see that tiny green rim, and that it's only one layer of muscle between you and the stapler.
- RS You need to check that the sphincter complex isn't being pushed ahead of you. And you also need to check that the vagina isn't encroaching on the rectal stump.
- BD It can be very difficult to get the head of the gun into the canal proper. And that's where you said gentle dilatation... always worries me terribly, but has to be done sometimes.
- AC Now what about the approximation. Is this limited to what the gun tells you in terms of the window. Do you have anything else to recommend?
- RS One thing to recommend is to make sure that you are familiar with the gun. Because if you're used to one gun, and somebody hands you another one, the worst time to discover you don't know how it works is when it's in the patient.
- AC I forgot to ask the other 3 of you. Alasdair says he uses always the same size of stapler, a 31. Is that the same for the rest of you?

BH Not absolutely always. I'm left with a little question mark, in my head about the fact that the person that I know to be honest, who has the lowest leak rate for these things, is Geoff Oates, and he's always used the biggest sized gun. And I have a feeling that Poiseuille's law, or whatever it's called, or perhaps just the dilatation of the whole works from putting in the bigger gun makes the anastomosis safer if you can use a 34, but I'm a non-believer in forcible dilatation, so perhaps we should have a more generous approach to the bigger gun if it can be slipped in without obvious damage. But it's certainly a thought – I've no idea if there's any evidence for it, other than knowing that Geoff's results are particularly good, and I know that he's honest.

BD I try and use the biggest gun I can

BH From time to time you have to use the littler one, don't you.

BD It's usually a 31 – 33 is the Ethicon gun isn't it.

BH There's a yellow 34 – Tyco.

PW And do you size these, or do you just have a look, and think...?

BD Sometimes if the anal canal is tight I use the sizer to see if you can get it through the anal canal

RS And it also acts as quite a nice dilator

BD One of the difficulties is that you've got to make the decision at an early stage. If you're going to put the anvil into the pouch, you can't wait, you have to think quite a bit ahead, because I have experience of, I've put a 31mm head in, and I just couldn't put a 31mm... so I've ended up opening two guns, taking one out... Perhaps sizing the anal canal, making the decision of what gun you're going to use has to come in a

few steps back. And the other thing about closing the gun in females is to ensure the vagina has not been dragged into it.

AC You do that in all females? (BD nods)

BH I must say that an illuminated St. Mark's is very nice for doing that, just slip it down the back of the vagina...

AM Or the headlamp

AC Do you always check the integrity of the anastomosis?

RS Do a rectal examination and check the staple line

AC (To RS) Is that how you check the integrity of the anastomosis?

AM I always do (AC – how?) I use a Foley catheter, a 24 Foley catheter, which I slip in, and an occlusion clamp well above the anastomosis, across the colon, and use a bladder syringe and inject some air, and at the same time what I usually do is to get some cephalosporin antibiotic washout in the pelvis, and see if there are air bubbles.

AC Have you ever had to do anything?

AM Yes, I have. Overstitching. What I have had to do on more than one occasion is, I've had tiny little bubbles through a staple hole in the rectal stump, individual staple holes, and what I've done in these situations is to oversew it, to put a Lembert type stitch in.

RS We might do that for a high AR, if you're doing a high transection of the MR, but I must say if you're doing a low TME with a low anastomosis down in the pelvis...

BH To say I do it invariably would be... if I'm going to defunction sometimes I don't bother. If we've got people watching and a TV set up, it's all part of the show, and I

like to see no bubbles coming out, but it's not very serious. I don't think it's terribly important, especially if you're going to defunction which we do most of these.

AC OK – now the last point, last task rather. Do you or do you not do an ileostomy.

BH Before that should we do pelvic drainage?

AC Oh sorry, did I miss that?

BH I don't know..

AC Oh, we haven't come to it, it's in the next page.

AM Can I also ask at this stage, it's maybe a controversial viewpoint, but should we not be telling people how to do a hand-done anastomosis as well as a stapled anastomosis. Because there are very occasionally situations where that will have to be done.

BH There's a significant percentage where if you're determined to preserve the anal sphincters – there's not very many, but there's a few, where the combination of the lone star retractor and suturing trans-anally is probably the best option. You haven't got enough internal sphincter. You save a fraction of internal sphincter by not stapling, don't you? I imagine laparoscopically that that is quite an attractive option, and not one that even we open surgeons should totally reject.

AM It may just be small print, but I just raised the question

RS The colo-anal anastomosis is something that we don't do on a regular basis because of the staple ...

BH And certainly with triple stapling it's less and less, but I still think there's a small percentage of people very determined to hang onto their anuses, as it were...



AM Maybe it's not something we should talk about

RS We could do that as a separate issue

BH Why shouldn't we talk about it?

BD I think it should be mentioned

AC No, no, I think it should be one of the recommendations

BD Because if you don't mention it, the suggestion is that the only way to do it is to staple, which would be wrong. I've only had to do it recently to salvage problems...

AM It is also something that trainees these days will not be confident with, because they will not have seen it to any great extent.

BH But that's another point, that if something goes wrong with that stapler, with a very low stapler, sometimes it's the only thing left to you perhaps.

AM And also sometimes reinforcing that staple line, if you're worried about that staple line, sometimes reinforcing, the best thing is to put an Eisenhammer into the anus and just put a few stitches in from below. And what's more, if you get a leak, 1cm or less leak, at a later date, you can rescue that anastomosis by going back and putting a stitch in. I've done that on a few occasions. So being handy with an Eisenhammer, and the ability to put a few stitches in very low down is a very useful thing

BH (To AM) Do you not think the lone star's a help too?

AM I'm not familiar with the lone star

BH I think that's a great help. It's a series of tiny little hooks that just everts the whole thing.

BD It's a slightly Gil...

AC Gives you much better exposure

RS We've gone to using it in the AP's actually

BH With full relaxation and the lone star, you're sort of looking almost half way in.

### **Formation of Ileostomy (Also Step 14)**

AC OK. Now, but that's an important point. Now what about Task 12, that is ileostomy or no ileostomy.

RS Ileostomy or a colostomy, that's the other issue.

AC Ileostomy/colostomy, or nothing.

BH Who are you looking at first, because we all have slightly different opinions. If you ask me first I would say that I defunction most of the low anastomoses, especially those that have had long-course radiotherapy, because although there's no data, I'm aware of a 30% leak rate at Mount Vernon after long-course chemo-radiotherapy, and I think we're trying so many things in the pre-operative era that we should be very cautious. I will occasionally defunction one because the patient didn't want one, and the patient accepts that I might have to go back in again if things went wrong – defunction that is, but I think most of those ultra-low anastomoses, by which I mean below 5cm, are safer defunctioned. But personally, I have a personal preference for transverse colostomy which I will come back to, but we're actually doing a prospecting randomised trial of which we've published preliminary data. There's not much to choose between the two I don't think as a method of defunctioning.

BD I defunction all patients after TME. Alasdair.

AM Almost always.

PW To clarify, when you say TME, you mean when it goes right down to the pelvic floor

BD Yes, when the patient's had a dissection down to the pelvic floor

AC By definition, TME has to go down... Total TME... Now that's fine, if we're agreed, and you've decided on an ileostomy, is there a preferred technique that you use? For loop ileostomy

BD I'm not sure what techniques there are. You bring out an everted spout...

AC That's the Brook, isn't it?

AM No, it's the Turnbull.

BD ...on a rubber just to bring it out through the abdominal wall, and then do a proximal spout, distal flush. I'm told I should be doing a bit of a spout on the distal part as well now

AC That's new to me. What's the reason.

BD If there's something of a spout on the distal end it reduces ..., suggesting that you get less ileostomy problems, and there's no doubt that some people do get major ileostomy problems

RS I think the issue is that because the distal limb is flush with the skin in a loop ileostomy you get mucus seepage from that onto the skin. Whereas if you create a small spout on the distal limb as well then the mucus goes into the bag. Although I can't say we've had much trouble.

AM Can I suggest a little alteration of technique which might help, and which I've done for a long time now. I use a 22 PVC whistle tip catheter through the mesentery of the

ileum, and pull the bowel through with that. Now I leave that in, and it does keep the proximal and the distal limb up on the surface nicely. So that by definition the distal bit is always above the surface. I keep it in for a week to 10 days. But it's only that long (holds up index & thumb ~1 inch apart). What I do is I put a stitch through the catheter, through the skin and back up on either end of this little short bridge and it just keeps it up there. It's a very simple thing to do.

BD I'll need to ask my stoma therapist first

AM You could speak to our stoma therapist.

BD I've never used a bridge for our stomas

AM It seems to work quite nicely. You use a rubber catheter to pull it out.

AC Somebody once told me that if you do an ileostomy, you're making sure that the patient leaks – from the ileostomy. How long are you talking about.

RS Our patients often have their ileostomies for 4 or 5 months, just because of waiting lists, but you want to leave it until all the oedema has settled, because it's completely oedema-free, and that you had checked the integrity of the anastomosis, so probably talking about 6 weeks.

BD We tend to leave them until they are finished their chemotherapy, that's the thing that slows down closure the most, and that might take 6 months.

BH I think that's a terrible shame

BD I think so too. I think we should agree...

BH I think we should try to work into our systems the fact that if you do an AR, a component of it the closure of the temporary stoma, and it should be no longer than 6 weeks, and not a low-priority thing that goes...

AC I think that's terrible, I really do.

BD I don't have any evidence base for *not* closing the stoma until the chemotherapy has finished, but...

BH The value of chemotherapy in rectal cancer is pretty arguable anyway. There's a Dutch trial which showed no benefit in rectal cancer as opposed to colon cancer. I know that wasn't altogether logical and perhaps... but it seems an awful shame... I mean I closed one yesterday for somebody before chemo starts. And they do say that 3 months is permissible before starting chemo after an operation. Some of them argue a bit, but I don't supposed any of them really knows. What do you think? I think it's a terrible shame to leave people with an ileostomy for a year, and the people that keep coming visiting it's a very common thing that's low priority on waiting lists.

RS I think we should specify that it should be closed at 6 weeks.

AC I think we do need to make that recommendation

AM Not before 6 weeks

RS Well, by 6 weeks

AM Or soon after 6 weeks.

BH Between 5 & 8, or something like that.

AM I may be wrong in this, but I remember reviewing the literature at one time for transverse colostomy, and the evidence basis at that time for TC was that you

shouldn't close it before 6 months, because the leak rate from TC closure was higher before that time. Now I can't put my finger on the data, but this was the sort of evidence base of this review. So I don't know if the same holds with ileostomy or not.

BH Well our little prospective trial doesn't have the sort of numbers to argue with that, except that when you look at the... actually when you looked at the numbers, it seemed to me that there were more people with *serious* troubles due to the ileostomy than *serious* troubles due to the colostomy. Colostomy has a higher incidence of late hernia which is all too easy to get, but some of the ileostomies had high outputs, and got people into quite a bit of trouble. I admit that you can get rid of them fairly smartly, but otherwise there was no difference in the leak rate, anyway. There's no reason why there should be really, is there. I mean the blood supply of the right TC is pretty good.

AM Our stoma therapists are not keen on TC's

BH No, and nobody likes them for any length of time, but if for instance you are doing a temporary stoma for a leak, it's the better one, because it more effectively defunctions, as it's much closer to the leak.

RS The other thing I should be clear about is there's little point in defunctioning the colon if the bowel is not properly prepared. Because if you have imperfect bowel preparation and a colon full of faeces, to save your anastomosis an ileostomy's not going to help, you

BH I have seen people develop generalised peritonitis despite an ileostomy.

AC But that's bad management, isn't it.

AM Needs to ... lavage; brings you back a few stages...

AC So can I press you: when do you not for a LAR, TME, when do you not do a covering stoma? Never?

BH Almost never. There are some people, usually females, who just don't want another scar on their abdomen, and are prepared to take the risk, and you have to indulge patient...

AC Those cases where you...

BH Because I must admit that my lifetime experience is that the thing can look perfect and leak, and some of the ones that I did... time and again in my life I've been persuaded by other people that I shouldn't be defunctioning, and sooner or later I've regretted it, and it seems to me most other people have been through the same sorts of experience.

AC So you can't individualise it? So you can't tell?

BH Well I think if the person hasn't had radiotherapy, everything looks lovely, and they just desperately don't want another scar on their belly, it's a vanity thing, they almost refuse, you can take the risk for them, or they can take the risk. You discuss the risk. So don't think any of us can get our leak rate down below about 5% for these low anastomoses, can we. Probably nearer 10. Do we all agree with that?

BD I don't know, because we don't look any more. I don't know what my leak rate is, because all the at-risk... are defunctioned. Well I know what my clinical leak rate is, but I don't know my true leak rate is. It's a complex question.

BH It *is* a complex question, yes.

PW Sorry, I find it intriguing that there's no way of knowing whether something will leak or not when it seems to be a relatively technical issue. Why do you think that is?

BH You would need to do I think in order to know for sure – if you're going to defunction – then you could do water-soluble enemas every 2 or 3 days for a month

BD Golligher did

BH I don't think he had to, but he did report a 60% leak rate at one point

AC With water-soluble enemas

BH But I had seen a healed anastomosis on a water-soluble enema which leaked a week later. So I think that's why you don't really know. I feel I've seen everything. You know Murphy is the chap – if it's possible to go wrong, it will.

### **Closure of Abdomen**

AC OK, so I think the message is clear. Defunction always. Now we come to the end of the operation before we close the wound. No doubt one is ensure that no swabs or instruments are left in the abdomen. According to the report "Making amends", do you know what's the incidence of retained in the UK after surgery? It's quite substantial actually. It's something like 2%. (General surprise) According to this report. Or maybe it's 0.2%. You should read "Making amends" – that's surgery and Gynaecology. That includes needles, of course. Ensure no swabs or instruments remain in the abdomen.

BH What do they do about retained needles these days?



AC I can tell you that the official position is that the patient must be told. But other than that there is no recommendation to remove. Now if the patient is told, and the patient says “I want it out”, you have to take it out.

BH A very nice chap called Peter Monks did a sigmoid resection on my mother, who fell over about 10 years later and had a hip X-ray, and there was a corrugated drain and a safety pin inside her. I took great joy in showing the picture to Mr. Monks, but my mother by then had gone a little ga-ga, and I didn't tell her, and she never suffered. Mr. Monks looked distinctly embarrassed, as he pointed out to me it was clearly the nurses' fault, it had somehow worked its way inside with its safety pin.

RS Amazing. There was a famous Edinburgh surgeon who had an X-ray of an abdomen which had one of these metal suckers in it. And this had been one of his patients he had left this metal sucker in 20 years previously, and this patient was still walking about with this metal sucker inside, and was very proud of it.

AC “Washout pelvis and abdomen” – does everybody washout with what – saline only? Hartmann's? Antibiotics?

AM Saline plus cephalosporin.

AC “Place drain into pelvis” Any comments on drains.

BH I but we all put something different. I put two little soft abdo-bags, with a squeezezy bag on the end, and leave them there 48 hours.

AC And do you think they do any good?

BH Well, I once tried leaving the drains out, and out of 6 consecutive patients I had something like 4 out of the 6 had some kind of trouble due to haematoma in the

pelvis. So I suppose I think they do. It's one of those things I would be very reluctant to give up, although people have told me that I shouldn't. What do the rest of you...?

BD I try very hard not to put drains in. And I've tried even harder since I've fallen into the trap of using Adept, an anti-adhesion solution. And so for the last 5 months I've been really trying very, very, very hard not to put drains in, because when I put drains in, and put Adept in, it always comes out the drains. I'm kind of persuaded that Adept might be very beneficial.

AC (To RS) Do you drain?

RS I place a single Redivac...

AM Yes.

AC It amazes me that drain is the only situation where fluid travels against gravity. What is the evidence that drains help?

RS The problem I think... there's this issue of haematomas, because there's nearly always some ooze around the back; there's always some collection of blood gets in behind there.

AC But you are recommending anyway that you should always drain? (To RS/AM)

BD Is that what it says?

PW I think that in the long protocol it says "If surgeon preference", as a get-out clause

AC How do you close the abdominal wound – the parietes?

AM I use PDS, mass closure technique, with a single, not a looped.

BH Nylon loop. (Also BD)

RS Same as AM, single-stranded, No. 1

AC Blunt needle or sharp

RS Blunt (AM agrees)

AM I find that the pressure you need to apply to the blunt needles is...excessive

AC I couldn't agree with you more. Cleaning wound – meaning what? With what?

AM Wash the wound – with the same solution

BD I wipe any blood away, that's about it

AC “Approximate skin edges with staples”

AM No – subcuticular PDS (BD); or monocryl. (AM) Nylon (BH)

AC The majority go for subcuticular

BD Perhaps take that out: “Close skin with staples”. That's quite prescriptive

AC What sort of dressing do you apply?

AM Very soft dressings – Mepore

RS (To AC) Should we be looking at glue-type dressing here?

AM Could I just make a point while I remember – we have not talked about, while we were making our incision, any kind of wound protection. This is perhaps... just because I always use a wound protector.

AC Same here.

BH The bigger thing we haven't talked about is when we don't do a TME, and instead to a partial ME, and lay down a few rules for that, because that's very important for the upper tumours.

AC Can you tell us about that?

BH I can certainly tell you what I say, and that is that the first part of the operation is identical until mobilisation of the recto-sigmoid upper rectum and even the beginnings of the MR mobilisation including hypogastric nerves and at least their upper parts, and most of the posterior avascular mobilisation has been completed. If at the end of that it is possible to transect the MR with 5cm of MR distal to the lower edge of the tumour, and thus make a smaller operation out of it, avoid the dissection between the hypogastric plexuses and the distal MR, and thus end up with an anastomosis about 8-10cm, I think that would make a smaller operation which wouldn't need defunctioning, and I would settle for 5 cm of peripheral, properly dissected MR. I think that's what some people call PME.

AC Would you hand-stitch that anastomosis?

BH I personally love hand-stitching, but I would be easy to push either way.

AM I would frequently... This kind of situation arises sometimes, when you've got an old lady, let's say, when you've got a tumour which is stuck to the uterus, and you do a hysterectomy, do an anterior resection and you end up with a rectal stump which comes up almost to the pelvic brim, because the pelvic structures are so mobile. And in these circumstances I would always hand-stitch that, because it's just so easy to do.

BH And somebody's got to learn to hand-stitch, just in case the stapler factory burns down.

AC Single layer, or double?

BH Single layer, extra-mucosal

- BD Good reasons – other reasons – for doing that, is that I've always found it very difficult to get a gun safely up a long rectal stump. You can get quite a lot of rectal damage, particularly in an old woman, who tends to have a very stenosed...
- RS If you haven't mobilised it so that it's a straight organ...
- AM Could I make one little point, it's not really for minuting, but I found that putting the back layer of the extra-mucosal or sero-submucosal sutures in, especially if it's low – quite difficult sometimes – what I would do within these circumstances is to do a Gambi-type stitch, from the inside, so it's through all layers and back through the mucosa, for the back layer only, just because it's sitting there asking for it, and you don't have to fish around away down here for the muscle of the rectal stump.
- BD We threw Zebedee out last year.
- RS Can I just make a point about this. To a certain extent, doing a hand-sewn anastomosis is a Task Analysis on its own. To go through the steps of a hand sewn extra-mucosal or Gambi sutures is actually quite a complex business, and I wonder whether for the purposes of this we should concentrate on the operation of TME with stapled anastomosis, because if we looked at all the different options that are open to us, we would have a whole series of Task Analyses. I don't know what...
- AC It depends really. If the study is on LAR, TME, then you are right. If the study encompasses high AR with PME, then you have to cover that. But from my understanding is this study was conceived as for TME, so perhaps...
- BD Sometimes you don't know until you do the operation, so if it's going to cover the options...

BH Perhaps it should have a paragraph something along the lines of what I said, if you agree with it.

AC I think everyone agrees with that.

RS Absolutely, yes. It's a decision point, but we could then

BH Because otherwise you've not defined...

RS We could easily spend a whole day working out a Task Analysis for a sero-submucosal anastomosis

BH And if you do that, you don't really need to mobilise the splenic flexure, so it alters quite a lot of things, doesn't it. And that's the reason for not necessarily doing the splenic flexure mobilisation first. Again that needs a paragraph, wouldn't you agree (to BD)?

BD I'd still mobilise the splenic flexure, but yes...

BH For a recto-sigmoid cancer, or something at 14cm ... would you?

RS Then we start to argue about whether we're sigmoid colectomy or an AR

BH Yes, OK

BD You make the decision on the day

AC Anything else to add?

AM Did we decide on wound protection or not?

AC Oh, good point, yes. (To RS) Do you use wound protection?

RS I have to say, unless I am doing an open anastomosis – a hand-sutured anastomosis – I've not used wound protection, because I sort of feel that the whole thing is done

almost without opening the colon. It's just at the point where you either make the pouch or make the colotomy, in which case you can make a temporary isolation using packs, so I tend not to. The reason for that is that I find that particularly at the beginning of the mobilisation, where you're putting the self-retaining retractors, the plastic of the wound protector can actually get in the way.

AM Yes, but I tend to put a wound protector in at a later date, inside the retraction system. The one with the ring, which springs out

AC (To BD) Do you use a wound protector?

BD Routinely, for all operations. The interesting of course is that for elective cancer operations with a wound protector, is that just when you need it, which is when you're opening the ileostomy, you're bringing the ileostomy, you have to take it out, because you can't take the ileostomy through the top, but yes I agree with you

AC (To BH) Do you use a wound protector?

BH Sometimes. That's really helpful, isn't it? My Irish colleague always does, and I tend not to, but I often do out of deference to him.

AC So it seems to be optional. I must say I've always used a wound protector for upper GI surgery... OK. Do we stop there, or shall we...

BH We should probably finish the abdomino-perineal...

RS Of course we've really got a problem just now, haven't we, because we're not sure we're doing it properly.

BH But I don't think that creates a problem, I think it makes it easier...

- AC Well that's the reason why I raised it, I mean if practice is going to change, it means that the situation is not stable, and therefore it would be wrong to make a recommendation that may not be the standard 2 years from now.
- BH It's only going to change in the sense that we haven't held a meeting saying APE – R we doing it right, and Quirke got carried away, I mean I floated at the beginning, as a kind of, because I wanted a nice lively meeting for a couple of days, and we had a great audience there, the business of the waist in the middle of the AP specimen, and was it optimal to have a waist there, because as Basil Morson had told me years and years and years ago, that even at St. Mark's all the AP specimens had a waist in the middle, and the cancer was almost always above the waist. And we had two great days of knocking it around, came up with beautiful videos, came up with all sorts of lovely ideas about position. There was the Berlin position – one of the German surgeons, Paul Joek from Strasbourg, from Berlin – has suggested that we don't need to turn the patient in order to be able to do these nice cylindrical operations, that we can do it by putting the patient in a deep, deep, deep, deep, deep Trendelenburg position, really deep with shoulder supports and so on, because it has to be so deep that you could stand a cup of tea on the perineum.
- RS Or a Stein of beer...
- BH I don't know whether it's going to change, I just know that it's just made us even more unsure whether we're doing it right, and PQ has gone off with a whole new set of pictures which he talks about everywhere, and you know he shows the slices that he and I dreamt up as being a good way of auditing rectal cancer stuff, and he shows that you come to a point where the slice is littler. Below it there's great big wide



ischiorectal fat and stuff, and above it there's mesorectum, and then there's a narrow bit, and often there's perforation in the narrow bit. It certainly seems to be quite an indication that AP's do have a very high rate of CRM involvement. I have to say that our Swedish surgeon produced the most impressive result which you will see on Phil's pictures, when you next see him lecturing. He's bound to have this, because he's got it into his head, so you're going to see it. But actually, the Swedish surgeon did a beautiful job, but the tumour which had had short-course radiotherapy for 1 week, but we didn't have any AP's, but we had 2 expert visitors, we Joel Rwa to do the top end of one laparoscopically, and I managed to poach a patient from the Guildford area that needed an AP, and was very keen to have that done, and that went beautifully, and our chap, Darren Gould, did the bottom end with him. And then, that had no involved margins. Old fashioned way, if you like, but laparoscopically at the top, old-style bottom. Then we had the star performance, was the Swedish one, where you could have driven a number 10 bus through the cylinder that had been left, and the margins were involved in 3 places. So you know I don't think anything has been proved yet. I'm not sure that you *shouldn't* perhaps put down a few guidelines. Not a bad idea, may just have a coffee and chat about it...

AC I just want to clarify the air on that

BH It's easier to pose questions rather than answer them, isn't it?

BD How long is the patient held standing on his head, how long does the procedure take?

BH Very good point, it's not all that quick, been there for a couple of hours, maybe more. It's less than an AR perhaps, but still appreciable...

Coffee

Abdomino-perineal Excision

### **Excision of Rectum**

AC OK, shall we continue, then and finish the task in hand. So step 9 is continuous of course... Previously that's Task 9, we're now proceeding to do AP resections. Tasks 1 to 8 are identical, now we have 9 onwards. We're excising the rectum with adequate margins, whatever that means. We prepare perineal skin with Betadine – everyone does that, obviously. Place stay suture through the anus. My question to the colorectal surgeons is do you actually close the anus with the suture.

(Nods from BD & BH)

AM I don't put the suture through the anus – circum-anal is what I use. Around the anal margin.

AC Like a purse-string. Do you keep it long?

AM A few centimetres long, because it's often useful to move it around with the artery forceps.

RS Obviously if you pull it to one side, and then put traction to the skin on the other side, you can then see which ...

AC So you tie a circum-anal purse string, and you leave it lone, and you clamp it between small artery forceps for traction. And then cutting diathermy or knife to create an elliptical incision around the circumference of the anus, the long axis in the antero-posterior direction. How long is the long axis?

BD Well I would take...

AC Does it reach the coccyx behind – do you take the coccyx?

AM No.

RS No.

BD But perhaps it should.

BH Why?

RS At the moment most of us are making a small elliptical incision

BD I make as small an incision as possible

RS Because it soon gets bigger

BD When we're doing these more radical perineal dissections...

RS I don't think we should worry about that. I think we should just think about what we do now.

AC So what length is the long axis of the ellipse?

RS 3 to 4 cm.

AM I make mine a little bigger than that, I would say. 6-8 cm

AC That's big!

AM Well (holds up thumb and forefinger ~5cm apart)

AC That's 4. Your sense of measurement is...

BH That's 5 (Indicates distal 2 phalanges of forefinger)

AM He's right

AC OK – 4 to 6. What about it's width? Do you skirt the anal skin?

AM Just make sure you don't cut out your purse string.

AC That's quite important.

AM It is – it happens.

BH I would say minimum of 5cm all the way round, 10cm diameter.

AC OK. Agree with that (General nods)

RS It's very difficult, because the skin's so floppy

BD Because however small you make it, but the end of the operation it's big.

AC Whoever wrote this is using the Lone Star retractor... retractor, which is a...

BD I don't use it, because it costs more money. I just use...

BH It is very expensive, nearly £100.

BD I use a Travers self-retainer for the first bit, and then a St. Mark's retractor...

AM It's a lovely instrument.

BD The great big thing that exposes it

AM I use the Travers initially, just to get started, and then I would use a St. Mark's retractor, which is a very nice instrument, because it exposes everything so beautifully for you.

BD And is haemostatic.

AC So you would put a self-retaining retractor anyway, you wouldn't specify. Or would you specify St. Mark's?

AM Well a St. Mark's pattern perineal retractor, I think. You could always put "E.g."

AC OK.

BD Rather than use the suture round the anal canal to manipulate it, I usually put tissue forceps on the anal canal as well. Laine's tissue forceps or... .. a little bit stronger

AC Then the assistant places hand in pelvis and extends fingers alongside...

AM I think that's extremely dangerous.

AC Can I ask...

AM I would not advocate that at all. I think that's when it will go very badly wrong.

RS I'm not sure what this means at all.

AM Well it means that the person at the top end is sticking their finger down, and using that as a guide.

BD And you cut down onto the fingers.

AM Makes me shudder to think about that.

AC Do you uniformly condemn that practice?

(Consensus nod)

AC Good. Out!

BD The perineal dissection has to be as anatomical as the abdominal...

AC Can I therefore ask you from now onwards (to AM) how do you do the perineal dissection. Bearing in mind that I said this is an operation that is never taught?

AM OK. Blow by blow? Let's say we sue the Travers first to go into ischiorectal – I'm in ischiorectal fat on both sides, and I leave a little bit of ischiorectal fat on the specimen...

AC How much do you leave?

AM Maybe about a cm or two on the specimen all the way round. And I would tend to start – with tissue forceps on the anus, I would add, pulling the specimen – I would tend to start on my right, the patient's left. And I would dissect on one side in the ischiorectal fat almost up to levator, and then I would come down, I would swing my hand across and do the other side. I would then probably go up to the transversus perinei...

AC That's the difficult bit, isn't it.

AM Yes, I would go up until I could see Transversus perinei. By and large, and then I would go round the back at that stage and cut

AC Can I just stop you there? At the anterior dissection you've reached the TP, and the perineal body. What do you do then to make sure you're in the right plane, after that?

AM I would leave that at this stage, I wouldn't proceed at the front.

AC So you go back?

AM Yes. What I would then do is to go round the circumference of my dissection, make sure that I was up to levator on both sides. I would then palpate the coccyx, and I would know from my dissection above that the levator complex was clear in front of that. So I would then use the diathermy and cut through the levator complex at that point posteriorly.

AC There is like a raphe, going to the coccyx. Do you cut through that?

AM I would cut through that with the diathermy, and I would cut through that until I got some of my washout meeting me. And I would visualise that. I would then slip my index finger through that hole, above...

- RS Can I just ask a question? You would not advocate at this point having any assistance at this point from above?
- AM I don't. I personally don't.
- AC But you put your finger through the hole. And your finger is now above the levator, and you're pulling it medially? You are pulling it downwards and medially?
- AM I would put my finger first... blow by blow... I would put my index finger into that hole, I would know exactly where I was, I would put it along the levator complex, I would hook it slightly, OK, and then I would be sure, I would know where I was in relation to the lateral wall of the rectum, because I am in that 'V' between the rectal wall and the levator complex. Then I would use, usually a pair of scissors, but sometimes I would diathermy if the diathermy was working nicely, and I would take about 2cm probably of the levator complex from the rectum, and go forwards.
- AC Is it in a curve?
- AM It would be a 'U' shape at the back, and I would go forward probably to almost to the level of the puborectalis. Almost, but not quite – I would leave the puborectalis at this stage. Then go to the other side, and do the same on the other side, but this time using my index finger to push the rectum out of the way. And again I would take a couple of cm or so of levator with me.
- AC Can I stop you there? You haven't mentioned the inferior haemorrhoidal artery.
- AM I would almost certainly cut through the inferior haemorrhoidal artery in the process of this, but I would just put a clip on it if it was a problem. Now, having done that, I would then sit back, stop the bleeding, and then decide exactly what

I was going to do next at the front. It depends a bit on where the tumour is. What I would do is to go behind the TP, and I would dissect immediately behind the TP, and at that stage what I would do is to slip my index finger in front of the rectum, and by that time what I would have done from above is almost certainly go to the apex of the prostate. So my finger would then slip into the position behind the apex of the prostate, so that I know that what's behind my finger is rectum. I would probably at that stage come up then and take puborectalis on one side, my finger pushing the rectum back, and then do the same on the other side. I would then take the upper rectum, swing it round and slip it through with the back behind me, so that the rectum will be outside at that stage, like an inverted 'U', because there's plenty of room for it. I think that gives a very useful...

BH I'm sorry, I had to pop out. Have you taken out coccyx or not?

AM No I haven't taken out coccyx, not usually, but if there was tumour there I would take it out.

AC I'll come to this in a little bit.

AM Now I think that's a very useful way then of making sure that you're at the right plane at the front, because I think that the front in the male is a devil. So, you then have a much narrower pedicle at the front. You have the tissues basically behind the TP, and you have that little bit of PR sling on either side which you need to cut through. And you can let your finger come out and what you'll see is that curvature of the anterior wall of the rectum which is outside, going back up and going along like that (draws index finger through inverted 'U' arc in air), and what you do then is to – almost sideways, you twist the specimen round a



little bit, but almost sideways use the diathermy to come across the remains of PR sling, and you'll find that the rectum just drops back then, and then you take the other side.

AC Would you like to add, modify or clarify to that excellent description

BD It was very good. I'm glad you asked him first.

BH I thought that was brilliant

BD There's one thing that we didn't cover, and that is at some point during the course of the procedure I would be convinced I have cut the urethra, in all operations. I never actually do, because I think the front is so terribly difficult. I'm not sure about prolapsing the rectum down. Cause I think that sometimes distorts things

BH And sometimes it's frighteningly inadequate to do it

AM Sorry?

BH The hole – hardly seems big enough...

AM By the time you've gone all the way round. I take the levators quite well out, so you really have quite a big hole by this time. You can mostly... I mean there are occasions when the specimens are bulky... The advantage I find is that you can actually *see* this contour of anterior rectum, which I think is a devil, if you're going at it from below, if you can see it side on...

RS You just actually see the fold of the rectal wall

AM Exactly, that's exactly what you do.

AC And you don't think that manoeuvre that you mentioned in bringing the rectum down does not twist the tissue planes?

AM No, I think you can still see very beautifully, I think it works very well. You're not twisting it hugely, you're just twisting it enough to see where you are. So done under vision... you do a bit of feeling as well.

AC OK, let me put the question another way. If you leave the rectum where it is inside, and continue with your excellent dissection – anterior dissection – behind the TP muscle, mobilising from one side to the other ... the puborectalis sling, what have you, what's wrong with that? Why do you have to bring it out?

AM I think it's very difficult to know what plane you're in, quite frankly. Doing it purely from below, because there's a stage when you come to the prostate, and it's not going that way (points straight ahead) as you think it is, it's going that way (points ~60° down), and you're actually climbing into the space between the urethra and the prostate, and you're going in the wrong direction. That's the why I've taken to doing this, because I think it's a devil of a thing.

AC I sense however that your colleagues don't do this. (To RS) Do you do this?

RS I sometimes do it, I sometimes don't. If the rectum's really bulky, then I don't.

AC (To BH) Do you prolapse the rectum behind?

BH No, it's something that our Swede did after removing the coccyx, and which, he claimed that it gave him more room to do it. But I'm very convinced by AM's description, which is brilliant. I think that's what needs doing, and you've gone through the levators widely, and it's clear that in English practice it's something that has tended to be forgotten I think. I think that also, along with it, but presumably there has to be a point at which the chap from above stops going down in the visceroparietal plane, and I think that's about where the coccyx is. Because it's more or less where the... you're doing more of the operation from

below that I was originally taught to do, and I think it's widespread in English practice.

AM But I would do the top and the bottom, I would do it sequentially, rather than synchronously.

BH Sure, I mean that's the first sort of policy thing, to try and lay the ghost of Morgan and Lloyd Davis after world war 2, saying we should do these things in 45 minutes simultaneously as a race on a moving target.

AM But it would be alright if Morgan was above and Lloyd-Davis below, that was fine. But that's not the way it worked.

BH No, of course not. It was Joe Soap at the bottom and Morgan at the top, or vice versa. To say that we... for you (to AC) to say that between us we all reject the idea of synchronous combined excision, which has been a St. Mark's blessed activity, I think would be very valuable...

AC I couldn't agree with you more

BH ... and AM's description of how to get over the difficulties at the front, which I think I've wrestled with all my life, really. I would always have a urethral catheter in, incidentally (to BD), whereas with an AR we put supra-pubic's in – I'm not sure that's in your remit.

AC I think that's important (to PW). In women, when do you – if ever – take part of the vaginal wall.

AM If I felt I needed to for clearance.

AC Right. If you have a biggish anterior tumour, would you take part of the vaginal wall.

AM Absolutely. Without hesitation.

AC Even if it's not tethered, or...?

AM I would just reiterate what I said, if I thought I was doing an inadequate operation by not taking it, then I would take it.

### **Closure of Perineal Wound**

AC OK, now you've done that, and it's dry... Closure: how do you close?

BD Have we got drains in at the moment? I would always drain the perineum.

RS Where would you drain them

BD Through the perineum

AC Through the wound itself?

BD No, I'm still taking them out through the buttocks.

AC Through the buttocks. And you'd put them below or above? I did a study once with these abscesses, and these abscesses that sometimes form, used to form quite often when I was a trainee, they are hourglass abscesses. They have a compartment above the pelvic diaphragm, and then a collection, and then a compartment below. And that is invariably the case. I know because I did contrast studies... (To BD) So where do you put the drain?

BD I put two drains – one coming out through each cheek, one lying in the sacral hollow, and one which principally is positioned for the ischiorectal fossa part of the wound, but where it actually ends up in practice I'm not entirely sure.

RS I must say that I bring the drains out from above, because I think it's uncomfortable. Because I think you can drain what you want to drain by bringing them out through the abdomen.

BD You're right. I should change.

AC And where are the ends of the drain

RS In the pelvic hollow, in the sacrum

AM Because you can isolate the peritoneal cavity from the pelvis by closing the pelvic peritoneum, and these two – if you use two suction drains – you can keep the holes below the pelvic peritoneum.

BD I'm not sure if I can isolate the pelvis. (To AM) Do you still close the pelvic peritoneum?

AM Yes.

BD I find I can't do it after...

AM Well it depends whether you put your to it beforehand. I think you've got to put your mind to it beforehand. I mean before you do the dissection

RS (To AM) When you're doing the top part of the dissection?

AM You've got to start with that in mind if you're going to do it.

BD I had some bad experiences where I had closed the pelvic peritoneum partially, where I thought I had closed it completely, and ended up with small bowel ... and small bowel stuck through gaps, and ever since then I've just left it open

AC (To BH) Do you close the peritoneum?

BH No. It doesn't matter.

AC (To RS) Do you close the peritoneum? (RS shakes head)

AC (To AM) You're the only one who does

RS But he puts his mind to it!

AM Mostly I can.

AC I am still not clear in my mind what these two drains are doing. That you put below or above the peritoneal reflection. You've already got one drain, so you end up with 3 drains.

AM No, just two drains. Two suction drains.

AC What comes out of these drains?

AM Red stuff

BD About 500mls in...

AC No, no: volume.

BD 500mls in 48h.

AC What sort of fluid is it?

BD It's more haemo- then serous. It's fairly well blood-stained, and it's always about the same. Whether it's the drains that create it, or whether it's there, I don't know.

AC But you are recommending two drains, all of you?

RS It's what we do...

AM "Weak evidence base" in brackets

AC Do you wash the perineal wound? (General consent) With what?

AM Saline

AC And then closure?

BD I try and close fascial layers and muscle layers, sometimes more successfully than others.

AM We've got to talk about the colostomy before you do that, if you're going to do an extra-peritoneal stoma

AC you would have presumably brought the colostomy out before, wouldn't you?

AM No, well I would bring it out before...

AC You finished the abdominal part, so you have the unopened colostomy outwith the ...

AM Well, I think we ought to talk about that, because I think there are issues here...

AC So you don't close the perineal wound before...

AM Yes, yes, sorry, we're talking about two things

AC You're confusing me

AM You're quite right

BD I try and get a fascial plane when I can...

AC How often do you get good fascial closure

BD Well I can usually get globules of fat stuck together, but I don't think I'm achieving much.

AC Is there much point in trying to approximate such an unproximateable gap?

BD Probably not?

BH (To AM) How big is your gap between the levator muscles?

AM That much (holds up index fingers about 5-6cm apart)

BH And you make no attempt to close that?

AM No, but I do close the fat below that, just with a continuous stitch...

AC (To BH) What do you do?

BH Well I close the fat...

AC Just the fat. (To RS) Bob?

RS In that situation, yes, I do.

AC Skin closure with?

BH Subcuticular nylon

RS Subcuticular

AC Are we agreed – subcuticular?

BD And then I spend 5 minutes looking at my little dog-ear at the back

AC One thing I forgot to... Who removes the coccyx?

BH Our Swedish visitor

AM I would remove it if there was a very big tumour, but that would be very... I've only ever done that once or twice. Not as routine.

AC Right. OK. Now we go to the top end...

GH Who removes it as routine?

BH The Swedish chap does.

### **Exteriorise Loop of Colon (Also Step 13)**

AC Now we come to the top end which is the colostomy, which is 11. Now it says here...

BH (To BD) Presumably this is one time you *wouldn't* mobilise the splenic flexure.

(BD agrees) So you can't say that all the steps before are the same.



BD I wouldn't mobilise the splenic flexure.

AC Presumably the side of the colon is on the left of the colostomy, and you excise a disc of skin; complete hole for colostomy.

AM Well I think colostomy prolapse is a big problem. And para-colostomy hernia in my experience is a big problem. This group of patients we are thinking about. Now I have no hard evidence, but it seems to me there is a certain logic by doing an extra-peritoneal colostomy rather than a trans-peritoneal colostomy in the left iliac fossa. And it means of course that the colon has a much longer route – extra-peritoneal route – to go than if you do it trans-peritoneally. Therefore I would do – in most circumstances I would do an extra-peritoneal colostomy.

AC Position of the exit hole?

AM It would be sort of standard position, which we would have pre-determined with the stoma therapist beforehand. It would be a trans... through the rectus sheath

AC How do you open the rectus sheath? Cruciate or...

AM I just use a cruciate incision, but I stop short of the peritoneum, and then I would pick up the pelvic peritoneum at the pelvic brim, and burrow underneath that, and meet with my dissection so as not to open the peritoneum, and then pull the colon through

AC Anybody disagrees with that? Who does a...?

BH (To AM) Just explain that again, just exactly what you do, because that's not how we've done it. I'm thinking you're doing it better.

AM Not really, but I think there are two issues: one is the issue of colostomy prolapse, parastomal hernia, and also the lateral gutter with small bowel obstruction through the lateral gutter. To avoid that, I think that if you do an extra-peritoneal colostomy, then the point at which you stopped dividing, in an AP, the point at which you stopped dividing the mesocolon from the left paracolic gutter is the point at which you actually burrow underneath the peritoneum from the inside as it were. Am I making myself clear? Junction of descending colon and sigmoid, that is the highest point you divided peritoneum in the pelvic dissection, so what you do is you pick up that point with a pair of forceps, and burrow underneath towards the rectus sheath with your fingers. This is the pelvic peritoneum here, the iliac vessels just there, so what you do is just slip your finger underneath the peritoneum, take it round so that you're now behind the rectus sheath, and you've made your incision in the skin here, done a little trephine cruciate incision through the rectus sheath, through rectus, and you can then meet extra-peritoneally at that point. So you put an instrument down through there like that. The end of the colon – usually stapled end of the colon – is here, grasp the stapled end of the colon, pull it out extra-peritoneally.

AC So it has a sweep, extra-peritoneal sweep, it comes to the anterior wall...

BH And when it comes to the anterior wall, is this above or below the termination of the posterior rectus sheath?

AM Above

BH Definitely. It would have to be.

BD There's a sheet of peritoneum over the inside of where the ...

BH So you go below between – you strip peritoneum off that?

AM You strip peritoneum off, it's sometimes a little sticky, but you can do it quite easily

RS So you think this reduces the incidence of para-colostomy hernia?

AM I have no data, but I think it probably does?

BH Is that similar to what John Golliger used to advocate?

AC Yes, it is, exactly

BH I have done extra-peritoneal colostomies, and I think I understand what you're saying

AC Other than that you do not fix... there are no stitches from the colon to the parietes before it enters the extra-peritoneal...

AM No, if you're careful, what you do is... you will find there is no space, because the point at which the colon, the junction of descending colon and sigmoid is the point at which the colon goes into the extra-peritoneal tunnel, so there's nothing to stitch

AC So I'll come to a question, are you recommending as a group extra-peritoneal or intra-peritoneal standard.

RS We use trans-peritoneal

BD I was brought up in Leeds where I was forced to do extra-peritoneal colostomies, which I no longer do. I now do trans-peritoneal colostomies

AC Why?

BD I think when we looked at the... Prolapse I think is a manifestation of para-stomal hernia as well, and when we followed up John Golliger's patients, the incidence of para-stomal hernia is exactly the same irrespective of how it had

been done. But it is a nice technique. I don't do it, and I don't feel strongly about it.

BH But remember, I'm the chap who started a meeting "APE – R we doing it right?" I don't pretend to know.

AC So what are you recommending.

AM I think most people will do trans-peritoneal

BH That's the way I do it

BD I don't make any attempt to close the lateral space either, I just bring the colostomy out, and put everything back where I found it. I don't think you can close the lateral space. The one thing I always do which didn't come in your description is that I make the trephine, the cruciate incision in the lateral border of the rectus sheath, and I then spend the next 5 minutes trying to stop the bleeding from the inferior epigastric pedicle. Almost inevitably I get some bleeding from there.

AM It is a problem sometimes

BD I'm just not doing it right. Probably not for the guidelines.

AC Then you close the wound, and you cover the wound, and then you do the colostomy. How do you do the colostomy

BD I use monocryl now. I just wish we could have catgut back again, because catgut was the ideal solution. Chromic catgut. I use full thickness of the bowel. I remember reading here that it was suggested sero-submucosal sutures, but I just do full thickness of the colon, taking good bites, making sure you get good bites of the skin, and using as few sutures as required.

BD Usually 8

RS 4 quadrants, and then you put (draws diagonals in air)...

BD I try not to put too many sutures in. But monocril lasts too long, and Vicryl rapide is a horrible stitch. I think there's a problem with the stitches

AC Have you ever used polysorb?

BD No

AC Try Polysorb. It's wonderful. It's the best. Made by Tyco.

BD I like chromic catgut

AC Well if you like chromic catgut, you'll like Polysorb – the synthetic equivalent. Braided, but smooth, coated braided.

BD The other problem with the synthetic monofilaments is that they last too long.

BH Biosin?

AC Biosin is monofilament, it's good, same company. The best suture for biliary anastomosis is Biosin.

BD The stoma nurses often have to remove the sutures. I no longer remember whether I'm going from bowel to skin or skin to bowel, I certainly wouldn't change needles. It doesn't seem to matter.

AC I think the degradation rate of Biosin or Polysorb would be equivalent for the size of suture.

BD It's one of the bits of the operation that tends to be done badly. The viability of the colon at the end of a long hot afternoon in theatre may be not enough times taken with ... what is probably the most important part for the patient.

AC And not... tension... when you see it going in. Post-operative retraction is an intra-operative inadequacy. Anything else you would add to that anybody?

BH I always make a tiny little eversion, just against a bout of diarrhoea, make it stick into the bag, just a few mm.

AC So you take like a 3 stitch, skin...

BH Just to a minute extent, something that my senior colleague seemed to like to do.

AC Is there anything we missed? We've had a long day, but it's been a very useful productive day. Can I say that we have an account of all we've deliberated today. There will be a transcript that will be put into a hard copy form. And according to the system you will be sent this for your comments and modification. When you do your comments and modification, you must not collude with... what you're going to say about it. And thank you all very much.

AM It's been very stimulating.

AC It's really when you come to discuss things that you realise how much you take for granted in your brain. Thank you.