

**A Pantogen<sup>©</sup> Operative Script**

# **Right Hemicolectomy**

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# INTRODUCTION TO PANTOGENS

## **What is a pantogen?**

A pantogen is a customisable script, aiming to provide all the expert information required to perform an operation.

## **Where does the word come from?**

The word pantogen comes from the Greek panto- meaning all, and the familiar gen meaning information. The word is completely new in this context and with this derivation.

## **Is there a problem in surgical training and surgical quality control?**

All traditional surgical training methods lack time and space to give little more than the principles and some detail of surgical operations. Even one-to-one teaching can be inadequate.

The trainee often has to rely on trial and error, common sense and intuition to fill in the gaps. Expertise may be gained only slowly, with unacceptable risks to patients. The problem is worsened with shorter hours of duty and reduced training programs.

Few, if any, operating departments have detailed surgical scripts to control the quality of the operations performed.

## **How can a pantogen help in training and quality control?**

The pantogen stores, on a computer, the very large amount of the information that an expert uses when performing an operation. This information is in a form that is accessible to the trainee and the operating department alike.

# THE STRUCTURE OF A PANTOGEN

## SECTIONS, STEPS AND PANTINOS

**SECTIONS** These are similar to the familiar divisions seen in traditional text.

**STEPS** Each section is divided into an unlimited number of STEPS. These are very small, and much more numerous than are seen in textbooks. Each step is often just a simple command.

**PANTINOS** A pantino is an item of information. Each step is supported by an unlimited number of pantinos. Such pieces of information are usually very simple, obvious when pointed out, and easy to remember, but might take years to acquire by trial and error.

Pantinos have not been comprehensively documented previously. Some steps such as “Check you have the correct patient” need little information support. Other steps will require a large number of pantinos, of several different types.

Pantinos come in 24 or more useful surgical categories, which break down into three main groups – basic pantinos, problem- avoiding pantinos and problem-solving pantinos.

The categories fit into the easily remembered acronym WIMBLEDON DITCHES SUPERMAN.

Basic pantinos	Problem-avoiding pantinos	Problem-solving pantinos
<p>Why do this Materials Beginning Landmarks End point Do it this way Other ways No-no's</p> <p><b>WIMBLEDON</b></p>	<p><b>Dangers</b> If If <i>a</i> happens, then do <i>b</i> Or If you can't do <i>c</i>, then do <i>d</i> If you still can't do <i>c</i>, then do <i>e</i> etc. Or If <i>f</i> and <i>g</i> and <i>h</i>, then probably do <i>i</i></p> <p>Tips Checks Hints Evidence Suggestions</p> <p><b>DITCHES</b></p>	<p>Surprises i.e The opposite to common sense Unpredictable i.e. No way of working this out from basic principles. Problems Errors Rectifying errors May day i.e. When to call the boss Anything else Next step</p> <p><b>SUPERMAN</b></p>

Any step may be supported by pantinos from any category.

# USE OF PANTOGENS

## **Content**

The content of the information is unlimited in size and scope. It is perhaps 20 times that available from standard operating surgical books. It is personalised to a surgeon's exact preferences.

## **Applications**

We keep printouts in ring binders in the theatre for the theatre staff, particularly those in training. Each double page consists of a text page on the right and a blank page on the left for written comments, notes and sketches. The information is amended/ updated/ changed as techniques develop and to record solutions to new surgical variants and problems. The text is expanded to cover questions and particular difficulties experienced by trainees.

We have texts covering over 60 general surgical operations ranging from haemorrhoidectomy to 3-stage oesophagectomy.

Colleagues in other hospitals can easily modify the information to suit their own regimes, equipment, materials and training requirements. They then have their own documentation in their theatres.

Each trainee can collect pantogens. They can modify, add to and expand the texts as they pick up hints and tips from surgeons during their rotations.

Further, the principle has been extended into three interactive multimedia programs on CD-ROM. They cover basic skills for the surgeon's assistant, open repair of inguinal hernia and laparoscopic cholecystectomy. They give multisensory impact to the trainee. They contain aptitude testing, modular structured teaching, exercises, tests and appraisals, plus simulations and decision training practice.

The latter two disks qualify the user for 4 hours of Category 1 CME credits with the American Medical Association.

## **Customising and writing pantogens**

Edit any of the text on this printout by hand to suit your preferences. Have the alterations entered onto disk. You can then print out your own customised pantogen. It is as easy as that.

Writing new pantogens is harder work. However, most experienced surgeons can visualise the steps of their operations. It is relatively easy to dictate the first draft of the text into a hand held dictaphone. Dictating a few lines a day while sitting in a traffic jam is an efficient use of time.

Put everything down that comes to mind. There are no limitations to the size of the pantogen. The first draft can be rapidly typed onto disk using a word processor. Editing takes longer. Check the steps and the pantinos against what you actually do during your next case. Check them again when you are assisting your registrar. You will become aware how much information you use subconsciously as an expert, when you see a trainee operating. Add all this to the text. Do not leave anything to doubt. Put in the numbering last.

Expect to make three or four drafts before the text is good enough. Make printouts. You will be revising the text continually to accommodate your changes of surgical technique as time goes by.

## WARNING

A pantogen is a useful tool for training and for quality control.

BUT it has major limitations.

It does not cover all the details of the procedures.

It is not a comprehensive training system.

It may complement, but it does not replace standard accepted surgical practices, or accepted forms of surgical teaching and training.

It does not set out to establish or impose any specific standard of surgical practice.

It does not set out to impose any particular way of performing an operation.

It describes some procedures which carry an inherent high risk of serious or lethal complications.

It describes some procedures and operations which are changing very rapidly, but the information in a pantogen is only as good as its last update.

The information in a pantogen is only a part of the requirements for successful surgery.

Pantogens assumes certain levels of surgical skill. These skills may have been acquired with the help of more basic pantogens. eg. The steps of an oesophagectomy are far more difficult than the steps in an inguinal hernia repair.

It is possible for a surgeon to follow pantogen steps to the letter, and still get into serious trouble for a large number of reasons, some of which are listed above.

The clinical judgement of the surgeon at all times overrides the information given in pantogens.

We accept that there are entirely acceptable alternatives to the procedures, techniques, equipment, and materials mentioned in pantogens.

We do not claim that any of the procedures, techniques, equipment, and materials in pantogens are in any way superior to others.

While the author and publishers have made strenuous efforts to make pantogens as safe and as reliable as they possibly can, they accept no liability for:

Problems occurring from the use of pantogens in their original or in any modified form, either now or in the future.

Any difficulties encountered in performing any of the techniques, or using any of the equipment or materials, surgical and non-surgical, described in the text.

Changes, discrepancies, errors that may appear in the information as the result of data inputting, programming, system faults, data handling, transmission, and printing or any other computerised process.

Pantogens should not be used on patients without the information being vetted by an expert surgeon.

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## **SECTION 1.00 OVERVIEW OF RIGHT HEMICOLECTOMY**

A right hemicolectomy is a common major operation for bowel cancer. It does not require the specialist facilities of an anterior resection of the rectum or the creation of an ileal pouch. It is well within the capabilities of the advanced surgical trainee.

The aim is to remove the malignancy en bloc with a surrounding normal tissue.

The operation is very similar when done for inflammatory bowel disease, Crohn's disease, with a narrower clearance. Other conditions requiring the same operation include solitary diverticulum of the caecum, ischaemia of the right colon, volvulus of the caecum, ileo-caecal tuberculosis,

The dissection of the malignant tissue in right hemicolectomy is a useful lead into more complex clearances such as radical gastrectomy or oesophagectomy.

The anastomosis is more demanding than a small bowel anastomosis because the colon has a poorer blood supply than the small bowel, has more septic contents and does not permit easy rotation for inserting sutures into the back wall of the anastomosis.

However, the right side of the large bowel is amply long enough to avoid tension problems, unlike the left side where the colon may have to reach the depths of the pelvis.

## SECTION 2.00 WORK UP

STEP  
NUMBER  
2.01

### FOR AN ELECTIVE PATIENT

A full clinical work up is needed.

i.e.  
History.

Examination.

Sigmoidoscopy.

Barium enema or colonoscopy and biopsy.

An IVU or Ultrasound scan will identify a possible obstructed kidney on the right and should confirm a normally secreting kidney on the left.

Hb + Full blood count.

Urea and electrolytes.

ECG.

Chest X-ray for lung metastases.

Special tests as needed for intercurrent diseases and past illnesses.e.g. diabetes, cardiac disease respiratory disease.

Cross match 2 units of blood.

Transfuse preoperatively if the Hb is less than 9gm./dl. Ideally this should finish 3 days before the operation.

Bowel washout using soap enema 24 hours and 2 hours before the operation.

Shave from nipples to mid thighs.

Arrange a steroid programme if the patient has been taking steroids for more than 4 weeks.

2.01

### FOR AN OBSTRUCTED PATIENT

In addition to the above procedures:

Resuscitate as necessary.

Correct fluid and electrolyte balance.

### SECTION 3.00 PRELIMINARIES

STEP  
NUMBER

3.01 CHECK YOU HAVE THE CORRECT  
PATIENT

3.02 CHECK YOU HAVE THE CORRECT  
SIDE

3.03 CHECK YOU HAVE A DIAGNOSIS

The diagnosis may be certain, based on histology of a carcinoma from biopsy.

Quite often the diagnosis is uncertain. The histology may be suspicious without clear evidence of malignancy. Sometimes the histology is benign with a diagnosis of a dysplastic cells, benign polyp, normal mucosa, because the biopsy has missed the tumour. Decide to continue on clinical grounds.

Clinical, radiological or other imaging evidence may be all that is available, particularly in Crohn's disease.

3.04 CHECK THE CONSENT

The patient needs to agree to have more extensive surgery than the planned right hemicolectomy if there is spread into other tissues and organs.

These include, small bowel resection, stoma, excision of fistulas, right nephrectomy, oophorectomy and possible hysterectomy.

3.05 CHECK THE FUNCTION OF THE  
LEFT KIDNEY IS SATISFACTORY

This is important if the right kidney needs to be removed.

See the intravenous urogram or ultrasound scan.

3.06 CHECK THERE IS NO OTHER PROCEDURE  
TO DO

3.07 CHECK A DIATHERMY PAD IS ATTACHED  
TO ON THE RIGHT THIGH

3.08 CHECK A NASO-GASTRIC TUBE HAS  
BEEN INSERTED

3.09 CHECK THE PATIENT HAS HAD  
ANTIBIOTICS

Metronidazole 1gm.intravenously.

Cefuroxime 1.5gm. intravenously.

## **SECTION 3.00 PRELIMINARIES**

STEP  
NUMBER  
3.10

### **ANAESTHESIA**

General anaesthesia is the norm.

Epidural anaesthesia may be given in addition.

Local anaesthetic will be given by the surgeon before incising the abdomen.

Spinal anaesthesia may be preferable to a general anaesthetic at the anaesthetists discretion.

## **SECTION 4.00 OPENING THE ABDOMEN**

STEP  
NUMBER

4.01

POSITION

Supine.

Have access from nipples to knees.

4.02

INSERT A BLADDER CATHETER

Use a 16 French gauge rubber 2 way urethral catheter.

Use a full aseptic technique to insert the catheter.

Inflate the retaining balloon with 20ml. sterile water.

Pull on the catheter until you feel the balloon held inside the bladder.

Connect the catheter to the connecting tube and the collection bag.

Hang the collecting bag over the far end of the operating table so that it will be visible to check the urine flow.

Check the connecting tube is slack to avoid tension on the patient's urethra.

Have the connecting tube secured to the end of the table using 25cm. of 10cm. wide Elastoplast with a mesentery around the tube. This will avoid a full bag slipping down and pulling on the urethra.

Check urine is flowing into the bag.

Check the outflow tap on the bag is closed.

4.03

STANCE

Stand on the patient's right side with your one assistant opposite.

4.04

HAVE ANY STOMA BAGS REMOVED

4.05

HAVE ANY STOMA AND SURROUNDING  
SKIN CLEANED

Use 2 large Chlorhexidine soaked swabs.

4.06

CLEAN THE ABDOMINAL SKIN

Clean from the nipples to mid-thigh and from one iliac crest to the other.

Use 2 swabs on sticks with 0.5% Chlorhexidine in 10% Propanol and a third swab on a stick to dry off.

4.07

TOWEL UP

Use disposable drapes with adhesive edges.

## SECTION 4.00 OPENING THE ABDOMEN

### STEP NUMBER

4.07 continued

Apply the side drapes first. This will prevent the adhesive sticking to the patient's intravenous lines, wiring and the operating table and cushions.

Place a medium skin towel horizontally on the skin on the level of the right iliac crest, centered on the patient's umbilicus.

Place a medium skin towel horizontally on the skin at the level of the left iliac crest, again centered on the umbilicus.

Place a large towel transversely over the lower half of the patient up to the symphysis.

Place a large towel transversely over the upper half of the patient down to the xiphisternum.

Rub the adhesive edges with a swab to ensure they are firmly attached to the skin.

4.08

### SEAL OFF ANY STOMA

Stick an adhesive iodophore drape over the whole of the exposed abdominal skin, covering any stoma and extending onto the skin towels.

An extra large Steridrape is ideal.

4.09

### CHECK THE DIATHERMY IS WORKING

Step on the pedal to hear a buzz from the diathermy machine at number 4 coagulation.

If there is no sound:

Check the diathermy pedal is present.

Check the diathermy lead is plugged into the diathermy machine.

Check the machine is adjusted to unipolar.

Check the diathermy machine is plugged in at the wall and is switched on.

Call a technician.

For more details see Diathermy pantogen.

4.10

### CHECK THE SUCKER IS WORKING

i.e. A loud hiss.

## SECTION 4.00 OPENING THE ABDOMEN

### STEP

### NUMBER

4.10 continued

Check the sucker tubing is pushed onto the sucker so tightly that no rings show on the sucker connector. This will prevent the tubing detaching at a critical moment.

4.11

### CHOOSE THE INCISION SITE

The most convenient incision is in the midline. It is the ideal incision to perform on an unscarred abdomen. This is quick to make and can be easily extended, as needed, to the above the xiphisternum or down to the pubis. It is quick to close.

A right paramedian incision gives a somewhat better access to the right paracolic gutter than a midline incision of the same length. It is slower to make and to close. It will be nearer to a stoma than a midline incision increasing the risks of infection and incisional hernia. A healed wound may eventually be stronger than a midline incision.

Muscle splitting or transverse incisions have their advocates, but suffer from limitations of access and are more difficult and slow to open and close.

Reopening a previous incision is frequently required. It raises the risks of damage to bowel, which may be very closely adherent to the back of the wound, or even herniating into the wound. Go slowly and take great care.

Avoid making a new incision parallel to an incision which has been made within six months. There is a real danger of the intervening abdominal wall necrosing.

The same applies to any incision crossing an old incision, where the centre of the wound may necrose..

4.12

### SKIN INCISION – READ ON

4.13

### INFILTRATE THE SKIN AT THE INCISION SITE

Use 20ml. 0.25% Bupivacaine in a 20ml. syringe with a green top 21SWG needle.

Check the needle is pushed onto the syringe so hard that it stops creaking.

4.14

### FOR A PARAMEDIAN INCISION GO TO STEP 4.22

4.15

### MIDLINE INCISION – READ ON

4.16

### EXCISE ANY PREVIOUS MIDLINE SCAR

Hold up each end of the scar with a Littlewoods forcep. The scar will stand out like a strand of tight cotton. This is the scar in the skin and in the

## SECTION 4.00 OPENING THE ABDOMEN

### STEP

### NUMBER

4.16 continued

superficial subcutaneous tissue.

Use a scalpel with a number 22 blade.

Make a cut in healthy skin along each side and around the ends of the scar.

Excise the scarred skin and subcutaneous tissue.

4.17

### INCISING INTO NEW SKIN

Have the umbilicus held in a Littlewood forcep and retracted to the left by your assistant.

Use a scalpel with a no. 22 blade.

Identify the midline.

Cut from 2cm. below the costal margin to 5cm. above the pubis.

Cut around the right hand side of the umbilicus.

Beware of a symptomless umbilical or paraumbilical hernia.

4.18

### CONTROL BLEEDING AS YOU GO

Capillary bleeding will stop in 5 –10 seconds.

Use coagulation with diathermy forceps for other vessels.

Diathermy needles are cannot squeeze vessels as they are coagulated.

The needles can cause stick injuries to operating staff.

4.19

### DEEPEN THE INCISION

Apply traction to the skin to the right using a large abdominal pack.

Have your assistant apply counter traction to the skin to the left using another large abdominal pack. This will allow the wound to gape as you deepen the incision.

Use a new scalpel with a no. 22 blade.

Cut through the subcutaneous fat down to the linea alba. This is pinkish line rather than a white one. It is much tougher to the blade than the subcutaneous fat. The scalpel will cut through the linea alba, probably in the middle of the wound. You should see extraperitoneal fat bulging out through the opening.

If muscle bulges through the defect:

## SECTION 4.00 OPENING THE ABDOMEN

### STEP NUMBER

4.19 continued

You have missed the linea alba in the midline and have opened the rectus sheath. This will probably be the right rectus sheath, because your assistant is not applying as much counter traction as you are.  
Increase your assistant's countertraction.

Incise the tissue further towards the left to find the linea alba.

If you still encounter muscle:

Dissect the muscle with dissecting scissors to identify its medial edge. This will be on either side of the muscle, depending which rectus muscle you have encountered.

Identify the linea alba, medial to the medial edge of the rectus muscle.

Open the linea alba.

Finish this step with the whole of the subcutaneous fat and linea alba opened up in the entire length of the wound. Make sure the opening in the linea alba is as long as the skin incision to provide maximum access for the rest of the operation.

If there has been an incision previously:

Be prepared for:

Suture material.

Use artery forceps and stitch scissors to pull out strands and knots.

Incisional hernia(s) containing omentum or bowel.

Dissect the contents free and reduce the hernias.

Be prepared to repair any such hernias at the end of the operation.

Old abscesses.

Mop them out.

Take a bacteriological swab.

Collections of liquefied fat.

Mop them out.

4.20

### OPEN THE PERITONEUM

Choose a site in the middle of the opening in the linea alba for a new incision.

## SECTION 4.00 OPENING THE ABDOMEN

### STEP NUMBER

4.20 continued

Choose a site at one end of the opening if adhesions are expected. This is where the chance of damaging bowel is somewhat less than in the middle.

Pick up extraperitoneal fat/ peritoneum between 2 artery forceps.

Incise the tissue longitudinally for 2cm. Use a scalpel with its no.22 blade held flat.

The peritoneum should open and the intraabdominal tissues should fall back into the darkness of the peritoneal cavity.

If the peritoneum does not open:

You may not be deep enough.

Pick up the tissues deeper in the opening using the artery forceps.

Reincise the tissue with the scalpel.

If the peritoneum still does not open:

There may be adhesions beneath the peritoneum.

Look for the pinky brown colour of adherent bowel.

Slow down and go very carefully.

It may take an hour or more if there have been one or more previous operations.

Cut deeper with the flat of the scalpel blade once more.

Stretch open the tissues very carefully with dissecting scissors.

If there are dense adhesions and no sign of the peritoneal cavity:

Consider making the opening at the other end of the wound.

Consider making a new incision in healthy skin.

Call a more experienced surgeon.

If you open the bowel (yellow bubbles of small bowel contents or brown faecal matter from large bowel):

Close the defect with continuous 2/0 Vicryl (Ethicon W9136).

Consider making the opening at the other end of the wound.

Consider making a new incision in healthy skin.

## SECTION 4.00 OPENING THE ABDOMEN

STEP

NUMBER

4.20 continued

You are in serious trouble.

Call a more experienced surgeon.

4.21 ENLARGE THE PERITONEAL OPENING

Use dissecting scissors, with 2 artery forceps on the peritoneal edge.

Enlarge the opening to 5cm. so that you can see whether there are adhesions.

If there are no adhesion:

Open up the peritoneum for the whole length of the wound.

Use dissecting scissors.

Start by cutting towards the xiphisternum. Have your assistant using a left forefinger in the peritoneal cavity as a retractor. He should be lifting and pulling towards the patient's left axilla to prevent his finger popping out of the wound.

Finish by cutting towards the pubis. Your assistant should use his right index finger as a retractor, pulling down towards the patient's left hip.

If there are filmy adhesions:

Open the linea alba and peritoneum as much as you can under direct vision.

Sweep these adhesions away with gentle finger movements.

Clear the adhesions 5cm. back from the peritoneal edge all round.

Use a Morris retractor to display any more adhesions.

Sweep away these adhesions or cut them with scissors to display the remainder of the inside of the planned opening in the peritoneum and linea alba.

Complete the opening of the peritoneum and linea alba using dissecting scissors.

If the tissues are too tough for the dissecting scissors:

Use stitch scissors.

If there are dense adhesions:

Go very slowly and carefully.

## SECTION 4.00 OPENING THE ABDOMEN

### STEP NUMBER

4.21 continued

Use dissecting scissors to free the adhesions.

Have your assistant hold the edge of freed peritoneum and linea alba with artery forceps to put delicate countertraction on the adhesions.

Increase the length of the incision as you go.

Aim to free 5cm. of the peritoneal surface of the whole wound.

This will enable you to insert a self-retaining retractor into the wound for a further inspection of the peritoneal cavity.

GO TO STEP 4.35 PLACE 2 SKIN EDGE TOWELS

4.22 RIGHT PARAMEDIAN INCISION – READ ON

4.23 EXCISE ANY PREVIOUS RIGHT  
PARAMEDIAN SCAR

Hold up each end of the scar with a Littlewoods forcep. The scar will stand out like a strand of tight cotton. This is the scar in the skin and in the superficial subcutaneous tissue.

Use a scalpel with a number 22 blade.

Make a cut in healthy skin along each side and around the ends of the scar.

Excise the scarred skin and subcutaneous tissue.

4.24 INCISING NEW SKIN

Use a scalpel with a number 22 blade.

Make a skin incision 3 cms. to the right of the mid-line, from 2cm. below the costal margin, to 5cm. above the pubic tubercle.

Move this incision medially to keep 2 cms. of healthy skin between the incision and the edge of any stoma.

4.25 CLEAR FAT AWAY FROM  
THE RECTUS SHEATH

Use blunt dissection with a gauze swab.

The anterior rectus sheath usually shows up clearly with its vertically striped surface.

## SECTION 4.00 OPENING THE ABDOMEN

STEP  
NUMBER

4.26

### DEEPEN THE INCISION

Cut with a new scalpel through the fat and through the anterior rectus sheath along the whole length of the wound.

There will probably be two tendinous intersections in the rectus muscle IN in this exposure.

If there has been an incision previously:

Be prepared for:

Suture material.

Use artery forceps and stitch scissors to pull out strands and knots.

Incisional hernia(s) containing omentum or bowel.

Dissect the contents free and reduce the hernias.

Be prepared to repair any such hernias at the end of the operation.

Old abscesses.

Mop them out.

Take a bacteriological swab.

Collections of liquefied fat.

Mop them out.

The tissues may be obscured by scarring.

Perform a rectus split by incising through the rectus muscle to the posterior rectus sheath and peritoneum.

4.27

### COAGULATE BLEEDING VESSELS

Use diathermy forceps on bleeders in the fat and anterior rectus sheath.

4.28

### PICK UP THE MEDIAL LEAF OF RECTUS SHEATH

Use 4 artery clips equally spaced down the wound.

4.29

### FREE THE MEDIAL LEAF OF THE RECTUS SHEATH

Free the leaf from the rectus abdominus muscle.

Your assistant holds the lowermost two forceps up and apart.

Dissect the tissues with a scalpel in the right hand to cut and a diathermy forceps in the other to retract and coagulate.

## SECTION 4.00 OPENING THE ABDOMEN

### STEP

### NUMBER

4.29 continued

Start at the bottom of the incision in the rectus sheath, and move steadily up to the top.

Slow down at the tendinous intersections in the rectus muscle because of blood vessels there. Coagulate the vessels before cutting them. Avoid detaching the muscle from the tendinous intersections.

If you do detach a muscle from the intersection:

Tuck the muscle inside the rectus sheath.

Take more care with the rest of the dissection.

Avoid making holes in the rectus sheath. Close any defects with interrupted 2/0 Vicryl (Ethicon W9136).

Stitch off obstinate bleeders in muscle with interrupted 2/0 Vicryl (Ethicon W9136).

4.30

### EXPOSE THE POSTERIOR RECTUS SHEATH AND EXTRAPERITONEAL FAT

Use a gauze swab to sweep the rectus muscle laterally off the posterior rectus sheath, and below this, off the extra peritoneal fat. The posterior rectus sheath finishes 2-3cm. below the umbilicus with a semilunar line. Below this level, there is only the extraperitoneal fat and peritoneum.

4.31

### COAGULATE THE INFERIOR EPIGASTRIC ARTERY AND VEIN

These vessels will be running cephalically, first on the extraperitoneal fat and then on the posterior rectus sheath. They will cross the line of incision into the peritoneal cavity.

Coagulate 2 sites on each vessels, medial and lateral to the planned opening of the peritoneum.

4.32

### PICK UP THE PERITONEUM

Use two artery forceps in the middle of the wound.

Check, by pinching the peritoneum, that you have not picked up abdominal contents with the forceps. The 2 layers of peritoneum feel about 2mm. thick. Omentum or bowel with the peritoneum make the tissues feel thicker than this.

4.33

### OPEN THE PERITONEUM

Choose a site in the middle of the opening in the linea alba for a new incision.

## SECTION 4.00 OPENING THE ABDOMEN

### STEP

### NUMBER

4.33 continued

Choose a site at one end of the opening if adhesions are expected. This is where the chance of damaging bowel is somewhat less than in the middle.

Pick up extraperitoneal fat/ peritoneum between 2 artery forceps.

Incise the tissue longitudinally for 2cm. Use a scalpel with its no.22 blade held flat.

The peritoneum should open and the intraabdominal tissues should fall back into the darkness of the peritoneal cavity.

Be prepared to remove ascites with a sucker. Take a specimen for cytology, since the fluid may be simply inflammatory (or a transudate if there is obstruction).

If the peritoneum does not open:

You may not be deep enough.

Pick up the tissues deeper in the opening using the artery forceps.

Reincise the tissue with the scalpel.

If the peritoneum still does not open:

There may be adhesions beneath the peritoneum.

Look for the pinky brown colour of adherent bowel.

Slow down and go very carefully.

It may take an hour or more if there have been one or more previous operations.

Cut deeper with the flat of the scalpel blade once more.

Stretch open the tissues very carefully with dissecting scissors.

If there are dense adhesions and no sign of the peritoneal cavity:

Consider making the opening at the other end of the wound.

Consider making a new incision in healthy skin.

Call a more experienced surgeon.

If you open the bowel (yellow bubbles of small bowel contents or brown faecal matter from large bowel):

Close the defect with continuous 2/0 Vicryl (Ethicon W9136).

## SECTION 4.00 OPENING THE ABDOMEN

### STEP NUMBER

4.33 continued

Consider making the opening at the other end of the wound.

Consider making a new incision in healthy skin.

You are in serious trouble.

Call a more experienced surgeon.

4.34

### ENLARGE THE PERITONEAL OPENING

Use dissecting scissors with 2 artery forceps on the peritoneal edge.

Enlarge the opening to 5cm. so that you can see whether there are adhesions.

If there are no adhesion:

Open up the peritoneum for the whole length of the wound.

Use dissecting scissors.

Start by cutting towards the xiphisternum. Have your assistant using a left forefinger in the peritoneal cavity as a retractor. He should be lifting and pulling towards the patient's left axilla to prevent his finger popping out of the wound.

Finish by cutting towards the pubis. Your assistant should use his right index finger as a retractor, pulling down towards the patient's left hip.

If there are filmy adhesions:

Open the linea alba and peritoneum as much as you can under direct vision.

Sweep these adhesions away with gentle finger movements.

Clear the adhesions 5cm. back from the peritoneal edge all round.

Use a Morris retractor to display any more adhesions.

Sweep away these adhesions or cut them with scissors to display the remainder of the inside of the planned opening in the peritoneum and posterior rectus sheath.

Complete the opening of the peritoneum and posterior rectus sheath using dissecting scissors.

If the tissues are too tough for the dissecting scissors:

## SECTION 4.00 OPENING THE ABDOMEN

STEP  
NUMBER

4.34 continued

Use stitch scissors.

If there are dense adhesions:

Go very slowly and carefully.

Use dissecting scissors to free the adhesions.

Have your assistant hold the edge of freed peritoneum and posterior rectus sheath with artery forceps to put delicate countertraction on the adhesions.

Increase the length of the incision as you go.

Aim to free 5cm. of the peritoneal surface of the whole wound.

This will enable you to insert a self-retaining retractor into the wound for a further inspection of the peritoneal cavity.

4.35

### PLACE 2 SKIN EDGE TOWELS

These towels fold over the edge of the wound.

They keep the operation site neat and tidy.

They will reduce contamination of the wound by bowel organisms.

They will protect the wound edges from pressure effects of the self retaining retractors.

Place the 2 towels, folded 4 thicknesses, over the edges of the wound and 5cms. inside the peritoneal cavity. They need to extend the full length of the peritoneal opening.

4.36

### FIX THE SKIN TOWELS

Use 2 towel clips at the ends of the wound to fix the towels to the skin.

Place a finger inside the end of the skin incision and lift up.

This will allow the skin clip to bite into the skin through the towel.

4.37

### RETRACT THE WOUND EDGES

Use a large Finochietto retractor.

Place the winding mechanism facing your assistant.

Use 2 Finochietto retractors on a large wound.

## **SECTION 4.00 OPENING THE ABDOMEN**

STEP

NUMBER

4.37 continued

Open the retractor with your assistant's hand under the winding mechanism. This will prevent skin drapes blocking the winding gears.

Check that bowel has not been nipped in the retaining arms of the retractor.

Additional retraction may be needed using a Morris or broad Kelly retractor to obtain a clear view of adhesions.

4.38

### **DIVIDE PERITONEAL ADHESIONS**

Use dissecting scissors and finger dissection to get a clear view of the abdominal cavity and pelvis.

Ideally a complete view is needed. Previous surgery and dense adhesion formation may make this hazardous. Lack of access to the liver and pelvis may have to be accepted.

## SECTION 5.00 INSPECTING THE PERITONEAL CAVITY

STEP  
NUMBER

- 5.01      INSPECT THE PERITONEAL CAVITY  
            This assessment considers a malignant tumour of the caecum or right colon, but can be applied in large part to Crohn's disease and other rarer conditions.
- An easily remembered approach is to use an acronym TNMO.
- i.e.    TUMOUR
- NODES
- METASTASES
- OTHER PATHOLOGY
- 5.02      ASSESSING THE TUMOUR - READ ON
- 5.03      CHECK THE PRESENCE OF A TUMOUR  
            A tumour is usually palpable as a hard mass in the wall of the right colon.
- A benign or malignant polyp in the right colon may not be palpable through the bowel wall. You will need to rely on colonoscopy or radiological findings for the position of the lesion.
- 5.04      CHECK THE SIZE  
            A typical tumour of the right colon is a bulky mass. This is partly due to the diameter of the right colon being large. The tumour is less likely to encircle the bowel and cause an obstruction than in the narrower left colon.
- 5.05      CHECK THE AMOUNT OF LOCAL SPREAD  
            This will determine the resectability of the tumour.
- Spread around the circumference of the bowel, causing obstruction.
- Spread up or down in the bowel wall, dictating how much bowel needs to be removed to ensure clear resection margins. This is conventionally about 15cm. beyond the macroscopic tumour margin.
- It may spread through the wall of the bowel in any of 4 directions – medial, lateral, posterior or anterior.
- 5.06      CHECK THE MOBILITY OF  
            THE TUMOUR  
            If the tumour feels mobile when held in the hand, it is unlikely to have spread into local structures.
- It is very likely to be resectable.
- More than 60% of tumours are mobile and respectable without major additional surgery.

## SECTION 5.00 INSPECTING THE PERITONEAL CAVITY

STEP  
NUMBER  
5.07

### CHECK THE ADHERENCE TO LOCAL STRUCTURES

#### Anterior spread

The surrounding peritoneum.

This implies transcoelomic spread as well as local spread.

#### Omentum.

Part of the greater omentum may be adherent to the tumour or seal off a perforation. It should be removed in continuity with the tumour.

The omentum attached to the right colon is removed as part of an en bloc procedure, mainly because of the lymph nodes embedded in it.

#### Small bowel.

There may be anything from a marginally adherent loop of small bowel to a mass of small bowel, usually ileum, fixed to the tumour.

#### Large bowel.

A low caecal tumour may be adherent to the sigmoid colon with the chance of fistula formation.

#### Lateral spread

Lateral abdominal wall.

There may be an abscess in thickened tissue in this area.

#### Medial spread

Mesocolon.

There is usually lymph node spread in addition.

#### Posterior spread

Ureter.

If the ureter is affected by the tumour, it is more likely to be compressed by the tumour than invaded by it.

Nevertheless, the surgeon should be prepared to divide the ureter and even remove the right kidney if required.

The left kidney must always be assessed before embarking on this surgery.

#### Right kidney.

The right kidney may be directly invaded by a tumour in the hepatic flexure of the colon. It is more often the site of hydronephrosis from ureteric compression.

## SECTION 5.00 INSPECTING THE PERITONEAL CAVITY

STEP

NUMBER

5.07 continued

It may need to be removed as part of an en bloc resection, or for ureteric invasion.

Duodenum.

The third part of the duodenum lies directly behind the hepatic flexure of the colon. It should be sought in every right hemicolectomy.

It may be compressed or invaded by a tumour of the hepatic flexure. If invaded, it needs to be resected with an appropriate bypass such as a gastro-jejunostomy.

Vena cava

The vena cava is an important posterior relation to the right colon. It needs to be avoided when mobilising the right colic vessels. However it is rarely invaded in otherwise operable cases of carcinoma of the right colon

If necessary, parts of the vena cava can be resected and repaired with a vein graft

5.08

### CHECK THE DEGREE OF OBSTRUCTION

This implies circumferential spread. It is most likely in a tumour affecting the narrow ileo caecal area. The presentation will be that of a low small bowel obstruction, often incomplete at first.

If the tumour stenoses the colon more distally and the ileo-caecal valve is competent:

There will be a closed loop obstruction presenting as an emergency.

This will be much more rapid than if the ileo-caecal valve is incompetent. Then there is only gradual distension of large and then small bowel through the ileo-caecal valve.

It is more acute than an ileo-caecal obstruction, with perforation of the caecum possible within a matter of 4-6 hours or so.

Distension of the small bowel due to obstruction may help match the diameter of the small bowel to that of the undistended distal large bowel for the anastomosis.

However the distended small bowel is likely to be oedematous, fragile and hypoxic, making the anastomosis more hazardous.

## SECTION 5.00 INSPECTING THE PERITONEAL CAVITY

STEP  
NUMBER  
5.09

### CHECK FOR FAECAL LOADING PROXIMALLY AND DISTALLY

Faecal loading proximal to a right colon carcinoma is not a problem, because the faecal matter will be removed with that part of the bowel.

It is a main indication for performing an extended right hemicolectomy for a tumour in the left colon.

Faecal loading distal to a right colon tumour is not directly related to the malignancy, but is a source of damaging back pressure on an ileo colic anastomosis.

Milking the faecal matter down as far as possible into the sigmoid colon and rectum is worthwhile.

Consider a gentle anal sphincter stretch in a patient under 70 years.

A postoperative enema is worth considering.

Review preoperative washout procedures.

### 5.10 CHECK FOR LYMPH NODE SPREAD

Lymph node spread indicates an increased chance of death from distant metastases.

In addition, invaded lymph nodes may cause morbidity and mortality directly by obstructing bowel or the biliary system at the porta hepatis.

Look for enlarged nodes:

The mesocolon.

The paraaortic region.

In the porta hepatis.

Enlarged nodes are not necessarily invaded with tumour. Reactive nodes are common, as are nodes enlarged secondary to abscess formation.

### 5.11 CHECK FOR METASTASES

In the abdominal cavity, as in the whole body, start at the top and work your way steadily downwards.

Take biopsies by excision or with needles such as Trucut needles to confirm the histology. Fat necrosis and scar tissue may mimic malignancy.

## **SECTION 5.00 INSPECTING THE PERITONEAL CAVITY**

### **STEP NUMBER**

- 5.12      **CHECK FOR LIVER METASTASES**  
Examine visually and by palpation both lobes of the liver.
- You may not be able to feel metastases deep in the liver substance, which have been demonstrated on ultrasound or CT scans.
- You may feel granular metastases on the liver surface, which are often not detected by imaging.
- 5.13      **CHECK FOR PERITONEAL AND  
OMENTAL METASTASES**  
On the peritoneal surface, these are usually granular, but may coalesce in folds and creases in the peritoneum.
- Omental metastases are often gritty or lumpy. They may reach 10cm. or more in diameter.
- 5.14      **CHECK FOR BOWEL METASTASES**  
These are usually peritoneal metastases which can be sufficiently large or stenosing to cause or threaten obstruction, particularly in the small bowel.
- Occasionally there is a diffuse infiltration of the mesentery.
- Palpate the whole length of the small bowel.
- 5.15      **CHECK FOR OTHER TUMOURS IN  
THE LARGE BOWEL**  
Palpate the whole length of the large bowel to exclude previously undetected primary tumours.
- Add resection of any such lesion to the planned right hemicolectomy.
- 5.16      **CHECK FOR SKIP LESIONS IN  
CROHN'S DISEASE**  
In Crohn's disease, examine the whole of the alimentary tract from the stomach to the rectum for skip lesions.
- They are reddened, oedematous thickened patches on the bowel wall.
- They may extend all round the circumference of the bowel and involve 2-10cm. of the wall or more. There may be more than one. In severe cases, most of the small and large bowel may be affected.
- 5.17      **CHECK FOR OVARIAN AND  
PELVIC METASTASES**  
Krukenberg tumours of the ovary are found in perhaps 5% of female patients with carcinoma of the large bowel.

## SECTION 5.00 INSPECTING THE PERITONEAL CAVITY

### STEP

### NUMBER

- 5.17 continued      In fact, a benign ovarian swellings are also relatively common in this age group. Seek gynaecological assistance in further management.
- If gynaecological advice is not available:  
                                    Perform an oophorectomy for a mobile ovarian tumour and await histology in the postoperative period.
- 5.18                    CHECK FOR OTHER PATHOLOGY  
                            IN ABDOMEN AND PELVIS  
                                    Common findings include stones in the gallbladder, symptomless aortic or iliac aneurysms, uterine fibroids.
- Usually simply noting the findings at this stage is all that is required.
- Resist the temptation to embark on extra procedures for non urgent conditions.
- 5.19                    CHECK FOR ADHESIONS OR HERNIAS  
                            AROUND ANY STOMA  
                                    If a caecostomy or ileostomy has been performed:  
  Check whether the peritoneal space lateral to the stoma has been closed. This will need to be freed off later in the operation.
- Check that there is no herniation of omentum or small bowel alongside the stoma. Again, this will need to be freed off later.

## SECTION 6.00 DECIDING ON RESECTABILITY

STEP  
NUMBER  
6.01

### DECIDE ON RESECTABILITY

Resectability depends on the amount of fixity to local structures.

THE IDEAL CASE for a resection:

A mobile tumour without any proximal obstruction.

This applies to about 60% of patients coming for surgery.

There is little to be gained from major surgery for a fixed tumour in patients with liver metastases, peritoneal seedlings, extensive mesenteric invasion, or other life-threatening disease.

Blood loss and obstruction are indications for resection of a mobile tumour even in the presence of the further spread.

Consider a proximal stoma or a by-pass.

If there is fixation to tissues in the abdomen:

A resection is nearly always possible.

Check you have the expertise to resect small bowel, and if necessary, kidney.

If not:

Call a more experienced surgeon.

Consider whether the patient will gain from these procedures.

Ask for advice if the condition is not absolutely straight forward at this stage.

## **SECTION 7.00 MOBILISING THE RIGHT COLON AND ILEUM**

### **STEP NUMBER**

- 7.01 **IF THE TUMOUR HAS LIMITED  
EXTENSION INTO THE LATERAL PERITONEUM:**  
Excise the affected peritoneum with a 5cm. margin of healthy peritoneum with your mobilisation of the right colon and ileum.
- 7.02 **IF THE TUMOUR PENETRATES THE  
MUSCLE OF THE ABDOMINAL WALL:**  
Excise the muscle with a 5cm. margin of healthy abdominal wall in continuity with the tumour and the right colon and ileum.
- 7.03 **IF THE TUMOUR IS ADHERENT TO  
SMALL BOWEL, OMENTUM, OR LARGE BOWEL:**  
Remove the adherent tissues en bloc with the tumour after mobilising the right colon and ileum.
- 7.04 **IF THE TUMOUR IS FIRMLY FIXED  
TO LOCAL STRUCTURES:**  
Consider a proximal stoma or a bypass.
- 7.05 **A TRIAL OF MOBILISATION IS ACCEPTABLE  
BUT DO NOT GET CARRIED AWAY**
- 7.06 **MOBILISING THE RIGHT COLON  
AND TERMINAL ILEUM - READ ON**
- 7.07 **MOVE TO THE PATIENT'S LEFT**  
Check the diathermy pedal is moved to left side.
- 7.08 **RETRACT THE RIGHT WOUND EDGE**  
Use a broad Kelly retractor held by your assistant to expose the right para colic gutter.
- 7.09 **PACK OFF THE SMALL BOWEL**  
Use 2 or more large packs to cover all the right side of the right colon and the lowest 20cm. of terminal ileum.  
  
Make sure the packs completely control the viscera.  
  
Get it right.  
  
Use your left hand to hold the packs medially.
- 7.10 **DISSECT FREE ANY ILEOSTOMY**  
Clamp across the loop of bowel forming the ileostomy.  
  
Use a Doyen's clamp with 8 clicks on the ratchet to prevent the clamp slipping.

## SECTION 7.00 MOBILISING THE RIGHT COLON AND ILEUM

### STEP NUMBER

7.10 continued

Free the adhesions of the ileostomy to the defect in the abdominal wall and to any closure of the lateral peritoneal space.

Use scissor dissection.

Continue until the adhesions of the ileostomy to the skin are freed.

Bring the ileostomy loop into the peritoneal cavity.

Mop out any bowel contents the ileostomy.

Cover the clamp and the ileostomy with a gauze swab.

Tie the swab in place with a 2/0 Vicryl tie (Ethicon W9025).

Tuck the covered ileostomy out of the way until the anastomosis is to be done.

7.11

### INCISE THE RIGHT PARACOLIC PERITONEUM DOWNWARDS

Use dissecting scissors to incise the peritoneum only, at the level of the upper caecum, 5cm. lateral to the bowel.

Extend the incision downwards over the brim of the pelvis to the peritoneum behind the most distal 10 cms. of the terminal ileum. This incision opens the peritoneum round the lower limit of the root of the mesentery.

This will be easier than starting at the ileum and working upwards for a right handed surgeon.

Coagulate transverse peritoneal vessels before cutting through them.

Avoid the longitudinally running right testicular/ovarian vessels, which are very near and very fragile.

The blue testicular/ovarian vein shows through the tissues prominently and is a useful landmark .

Avoid the longitudinally running right ureter which may be very near due to your retraction.

Extend the incision to include the peritoneum over the mesentery of any ileostomy.

7.12

### INCISE THE RIGHT PARACOLIC PERITONEUM UPWARDS

Extend the scissor incision upwards to the hepatic flexure of the colon.

## SECTION 7.00 MOBILISING THE RIGHT COLON AND ILEUM

### STEP

### NUMBER

7.12 continued      Keep medial to the right kidney, which you will feel as a firm retroperitoneal mass.

Avoid the third part of the duodenum. The lower margin should be visible behind the hepatic flexure, looping down medial to the upper pole of the kidney.

Cut any peritoneal adhesions to the gallbladder and liver.

Modify the incision to get a 5cm. clearance of any invaded peritoneum.

7.13                    **DISSECT THE LATERAL PERITONEUM**

Use a swab on a stick.

Dissect the lateral peritoneum away from the right colon and terminal ileum.

7.14                    **IDENTIFY THE RIGHT GONADAL VESSELS**

They are superficial and may be mistaken for the ureter.

The vein is obviously blue. The artery is pinkish and usually less than 2mm. diameter.

When touched, they do not show peristalsis and usually bleed instead.

Sweep them laterally.

Ligate them with 2/0 Vicryl ties (Ethicon W9125), if they cause troublesome bleeding. **IDENTIFY THE URETER BEFORE LIGATING THEM.**

7.15                    **TRACE THE RIGHT URETER**

Identify the ureter as it runs down behind the ascending colon and caecum.

It is deeper than the testicular/ovarian vessels. In the upper half of the dissection it is lateral to the gonadal vessels. In the lower half, it runs medially.

It is thicker, being over 5mm. diameter.

It is whiter than the testicular artery and has very fine blood vessels running along it.

It may be adherent to the medial leaf of the paracolic peritoneum as you pull that tissue medially

Prod it to show its characteristic downward peristaltic contractions.

## SECTION 7.00 MOBILISING THE RIGHT COLON AND ILEUM

### STEP

### NUMBER

7.15 continued

Trace it from the kidney to lower end of the peritoneal incision as it runs over the right common iliac artery at the pelvic brim and into the pelvis.

Make sure it is out of danger, but do not deliberately free it from its bed.

If you cannot find the ureter:

Ask for help from a more experienced surgeon.

If the ureter is compressed by the tumour:

Dissect the ureter free.

If the ureter is definitely invaded by tumour:

Remove the invaded ureter in continuity with the tumour.

Tie off the proximal ureter.

Consider a right nephrectomy.

7.16

### MOBILISE THE RIGHT COLON AND RIGHT MESOCOLON

Free the posterior surface of the colon and mesocolon from the posterior abdominal wall lateral to the vertebral column.

Lift the bowel and its attached mesentery out of the depths of the wound. It should lie outside the wound in an accessible place for the resection and anastomosis.

Use a mixture of blunt and sharp dissection.

Take care to avoid damage to the vessels in the posterior wall of the mesocolon.

Avoid damage to the vena cava at the medial limit of the posterior dissection.

Remove locally invaded small bowel loops, omentum and even invaded sigmoid colon or transverse colon in continuity as necessary.

7.17

### MOBILISE THE HEPATIC FLEXURE OF THE COLON

The aim is to free the hepatic flexure of the colon and that part of the greater omentum which is attached to it.

The right margin of the greater omentum is indistinct and often very fatty.

Use artery forceps to clip, cut and tie the greater omentum above the hepatic flexure.

## SECTION 7.00 MOBILISING THE RIGHT COLON AND ILEUM

### STEP

### NUMBER

7.17 continued

Use 2/0 Vicryl (Ethicon W9125).

This can be tedious.

Take your time.

Make sure you do not damage the duodenum.

The right colon and terminal ileum and their mesentery should now be fully mobile.

This will allow easy access to ligation of the mesenteric vessels without risk of damaging the ureter or duodenum.

Remove this part of the duodenum in continuity if there is direct invasion here. Some form of duodenal bypass will be needed.

Continue this dissection to 15cm. beyond the site of any more distal tumour if an extended right hemicolectomy is planned. Mobilise the splenic flexure of the colon as described in the Left Hemicolectomy pantogen.

7.18

### CHECK THE MOBILISATION IS ADEQUATE

At this stage, see if the provisional sites of resection on the ileum and colon will touch without any tension and with a 10cm. overlap.

If not:

Extend the freeing of the mesentery of the colon and ileum from the posterior abdominal wall.

Extend the freeing of the right side of the greater omentum from the stomach.

Extend the freeing of the colon from the greater omentum distal to the provisional resection site.

Recheck the adequacy of mobilisation.

Do not be satisfied with any tightness at this stage, because freeing the tissues later on becomes increasingly more difficult.

7.19

### CHECK HAEMOSTASIS

Use diathermy coagulation to control bleeding vessels where the hepatic flexure, the right colon, caecum and terminal ileum have been freed.

Start at the upper end and work your way downstream to maximise visibility.

## SECTION 7.00 MOBILISING THE RIGHT COLON AND ILEUM

### STEP NUMBER

7.20

#### PACK THE SPACE BEHIND THE FREED OFF BOWEL

Use 1 or 2 large packs to control oozing in this space.

Leave the packs in place until the anastomosis is finished.

7.21

#### RETURN TO THE RIGHT SIDE OF THE PATIENT

Check the diathermy pedal is returned to the right hand side of the patient.

7.22

#### IDENTIFY THE MESENTERIC VESSELS

The aim is to ligate and divide the relevant mesenteric vessels with their associated lymph glands as high as possible to their origins. This should improve the clearance of invaded glands.

The method is to hold up the mesentery and let light shine through to outline the vessels.

The vessels to be ligated and divided are all branches of the superior mesenteric artery:

The ileo-colic artery running to the terminal ileum and caecum.

The right colic artery running to the ascending colon and hepatic flexure.

The right branches of the middle colic artery running to the hepatic flexure.

The whole middle colic artery will be ligated if an extended right hemicolectomy is performed.

The vessel to avoid is the superior mesenteric artery. This artery is at risk if the origins of the above arteries from the superior mesenteric artery are not clearly identified due to obesity or adhesions.

If in doubt:

Clamp and ligate the arteries under direct vision, further away from the superior mesenteric artery than their origins.

7.23

#### CHOOSE THE RESECTION SITE ON THE ILEUM

Pick a site on the terminal ileum 10cm. proximal to ileo-caecal junction for a tumour resection or resection of a benign colon lesion.

There is likely to be poor healing if the resection is nearer the caecum.

There is an increasing risk of bile salt diarrhoea and vitamin B12 deficiency if more ileum is removed.

## SECTION 7.00 MOBILISING THE RIGHT COLON AND ILEUM

### STEP

### NUMBER

- 7.23 continued For ileo-caecal Crohn's disease, pick a site 5cm. beyond any macroscopic ileo-caecal disease. Decide whether to resect skip lesions separately or in continuity with the right hemicolectomy according to their number and distribution.
- If there is an ileostomy:  
Choose a site proximal to the ileostomy.
- 7.24 **CHOOSE THE RESECTION SITE ON THE COLON**  
Pick a site at least 15cm. distal to macroscopic tumour.
- It is also sensible to include the hepatic flexure in the resection in case the ligation of the right colic artery devascularises the hepatic flexure.
- 7.25 **DIVIDING THE MESENTERY - READ ON**
- 7.26 **TURN TO THE PERITONEAL SIDE OF THE RIGHT MESOCOLON**
- 7.27 **SPREAD OUT THE RIGHT MESOCOLON**  
This will let you plan a resection line on the meso-colon.
- 7.28 **IDENTIFY A RIGHT MESENTERIC RESECTION LINE**  
Use dissecting scissors.
- Slit the peritoneum from the terminal ileum 5 cms. from the ileo-caecal junction, across the mesocolon to the transverse colon at least 15 cms. distal to the tumour.
- This prevents disorientation during the next step.
- 7.29 **DIVIDE THE MAIN VESSELS IN THE MESENTERY**  
Hold up the mesentery to show the ileo-colic, the right colic and the right branch of the middle colic vessels.
- Double ligate and cut the vessels at their origins from the superior mesenteric vessels.
- Use 2/0 Vicryl (Ethicon W9125).

## SECTION 7.00 MOBILISING THE RIGHT COLON AND ILEUM

STEP  
NUMBER

7.30

### DIVIDE THE RIGHT MESOCOLON

There will probably be considerable fatty tissue containing blood vessels remaining after tying off the main vessels.

Use pairs of artery forceps to clip, dissecting scissors to cut, and 2/0 Vicryl (Ethicon W9125) to tie bunches of the right mesocolon along the planned line.

The mesenteric veins are very friable and some of the mesenteric arteries are very big.

Take 1 cm. bites.

Take your time, particularly in the depths of the mesocolon.

Save time by leaving the artery clips on the colonic side of the mesentery, which is to be removed. Only tie off the tissue on the side of the mesentery, which is to remain.

7.31

### CHECK THE BOWEL ENDS WILL MEET EASILY

Pull the transverse colon and terminal ileum together.

The bowel should be sufficiently free to allow the chosen resection sites to touch without any tension. The bowel should be quite floppy.

If the bowel is at all tense:

Free off any restricting tissues.

Any tension will lead to the anastomosis leaking.

There is always ample bowel for a right hemicolectomy (unlike an anterior resection of rectum for instance).

The main requirement is adequate mobilisation of the bowel.

## SECTION 8.00 THE ANASTOMOSIS

STEP  
NUMBER  
8.01

### THE PRINCIPLES OF THE ANASTOMOSIS

Two tubes of different diameter are to be joined.

An end to end anastomosis is the simplest in concept.

This is achievable with sutures.

Sutures which will last for more than 10 days without significant weakening are satisfactory. This includes virtually all sutures except plain catgut.

I prefer 2/0 Vicryl on a 3/8 curved 7.5mm. round bodied needle (Ethicon W9136).

A stapled anastomosis is not usually performed by this method.

The circular stapler has a head, which has to be inserted into the bowel and then withdrawn from the bowel after firing the instrument. This requires an extra opening in the bowel and can cause contamination with bowel contents. It is slow.

(The stapler head can be inserted easily into and withdrawn from the anal canal after a colo-rectal anastomosis. Similarly the stomach is a satisfactory entrance and exit site for a gastro-oesophageal anastomosis.

Unequal diameters of bowel can be accommodated by:  
Cutting the narrower bowel obliquely.

Stitching with larger bites on the larger diameter bowel.

Slitting the back of the narrower bowel to increase its circumference.

(A circular stapler accommodates inequality by using purse string closure of the bowel ends.)

A side to side anastomosis is more complicated in concept.

The ends of the ileum and colon bowel are closed off.

The side to side anastomosis is made between the distal ileum and proximal colon.

The hand sutured end to end anastomosis has superseded the side to side anastomosis.

## SECTION 8.00 THE ANASTOMOSIS

### STEP NUMBER

8.01 continued

The side to side anastomosis the preferred way of stapling, using 4 rows of staples from a straight stapler.

The join needs to be water tight enough to prevent bowel contents leaking out.

Ideally the less bowel content flowing through the anastomosis before the anastomosis is sealed by healing (repair and by regeneration) the better. This takes about 7 days.

i.e. Milk the contents of obstructed small bowel back into the stomach, where they can be aspirated.

Milk any faecal matter away from the anastomosis site, as far as possible into the lower large bowel.

Perform a proximal ileostomy if the anastomosis is doubtful

There should be no narrowing at the anastomosis.

The anastomosis should heal in the shortest possible time.

I.e. Maintain the arterial supply and venous drainage.

Accurate identification and preservation of vessels.

Minimise faecal contamination of the anastomotic site.

Meticulous control and removal of bowel contents.

Avoid damage to the tissues by clumsy handling and overclamping.

Avoid any tension on the anastomotic lines.

Imagine that any tension greater than venous pressure will run the risk of venous infarction.

Prevention of suture line recurrences

Adequate clearance of the tumour.

Application of cancericidal solutions to the bowel ends.

e.g. cetrimide.

8.02

### THE PERFORMANCE OF THE ANASTOMOSIS

The end to end anastomosis

The bowel will not rotate to give access all round for suturing.

The anastomosis therefore has to be performed from the front, with the back wall of the anastomosis completed before the front wall.

For a 1 layer anastomosis:

This is simple.

## SECTION 8.00 THE ANASTOMOSIS

### STEP NUMBER

8.02 continued

1. The back walls of the bowel are sutured.

2. The front walls are stitched. It is now that the bowel ends close off.

The corners, where the back and front walls join, are relatively inaccessible to the sutures.

One of the corners is on the mesenteric border which can obscure the bowel wall with fat, blood vessels, adventitia and peritoneal coverings

There are also 180 degree changes in direction as the surgeon goes round the corners. This can be disorientating for suture insertion.

Gaps in the suture line may occur due to misplaced stitches.

Special care and extra techniques are needed at these corners.

For a 2 layer anastomosis:

There are 4 parts instead of the 2 for the 1 layer method.

1. The outer layer of the back wall is sutured.

2. The inner layer of the back wall is sutured.

3. The inner layer of the back wall is continued round the corners as the inner layer of the front wall.

4. Finally the outer layer of the front wall is added.

The same caveats apply to the 2 layer closure as the 1 layer closure, plus the problems of bowel shortening and anastomotic bunching.

In practice, there is always ample bowel for a right hemicolectomy.

8.03

### CLEAR THE TERMINAL ILEUM AT THE CHOSEN RESECTION SITE

Clear a 4cm. segment of terminal ileum of all adventitia, fat and blood vessels. (2cm. is all that is required for a single layer anastomosis.)

Tie off the tissue with 2/0 Vicryl (Ethicon W9125).

## SECTION 8.00 THE ANASTOMOSIS

### STEP NUMBER

8.03 continued

This will ensure that the anastomosis will be free from any intervening tissues.

Check that the bowel remains pink at this site, suggesting that the venous drainage and arterial supply are adequate. The ileum more distally will probably have a bluish tinge by this stage, due to venous and arterial ligation.

If the ileum is blue or suspicious:

Clear a new resection site 5cm. more proximally or where the bowel stays healthy.

8.04

### CLEAR THE TRANSVERSE COLON AT THE CHOSEN RESECTION SITE

Clear a 4cm. segment of transverse colon of all appendices epiploicae, blood vessels and omentum. (2cm. is all that is required for a single layer anastomosis.)

Tie off the tissue with 2/0 Vicryl (Ethicon W9125).

Coagulation is not very effective and can damage the bowel wall.

This will ensure that the anastomosis will be free from any intervening tissues.

Check that the bowel remains pink at this site, suggesting that the venous drainage and arterial supply are adequate. The colon more proximally will probably have a bluish tinge by this stage, due to venous and arterial ligation.

If the colon is blue or suspicious:

Clear a new resection site 5cm. more distally or where the bowel stays healthy.

8.05

### ASSESS PROGRESS

The right colon and terminal ileum should now be completely freed.

The right colon may be quite heavy, so support it, to prevent traction damage.

The demarcation line between viable pink bowel and ischaemic blue/purple bowel should be present on the specimen to be resected and not at the planned resection lines.

8.06

### SURROUND WOUND WITH ANASTOMOSIS DRAPES

8.07

### ISOLATE THE RIGHT COLON WITH 2 LARGE PACKS

## SECTION 8.00 THE ANASTOMOSIS

### STEP NUMBER

#### 8.08 CHECK THE PLANNED RESECTION LINES LOOK HEALTHY

If in doubt:

Resect any ischaemic or doubtful bowel.

Choose a definitely healthy section and clear the surrounding tissues.

#### 8.09 CHECK THE PLANNED RESECTION SITES WILL COME TOGETHER WITHOUT TENSION

In addition, allow an extra 10mm. of bowel on each side to allow for the shortening effect of the suturing.

If in doubt:

Redo the mesenteric dissection to allow this.

You must be absolutely satisfied before  
Continuing the operation.

#### 8.10 NON-CRUSH CLAMP THE TERMINAL ILEUM

Use a Doyen's clamp 5 cm. proximal to the proposed resection line.

NB. The clamp flattens the cross section of the bowel from a single layer circle into a double layer of bowel with folds at each end. The sitting of the folds are critical for ease of anastomosis and for enlarging the circumference if necessary.

Place the clamp so that the mesenteric and the antimesenteric borders of the bowel are folded by the jaws. Place the handles towards the antimesenteric border of the bowel.

Place the clamp at 45degrees to the long axis of the ileum to allow an oblique resection. This will maximise the circumference of the narrow ileum so as to match, as much as possible, that of the colon for the anastomosis.

In addition the antimesenteric border will be exposed for possible incision to increase the circumference of the ileum even more.

The clamp will compress a triangle of mesentery in addition to the bowel.

Use the middle part of each clamp jaw to hold the tissues. This will prevent one fold of the bowel being over-compressed, and the other fold slipping out of the jaws.

## SECTION 8.00 THE ANASTOMOSIS

### STEP NUMBER

- 8.10 continued      Use 2 clicks of the ratchet to control any leakage of bowel contents when the bowel is divided, and to prevent the jaws damaging the tissues.
- 8.11      **NON-CRUSH CLAMP THE TRANSVERSE COLON**  
Use a Doyen's clamp 5cm. distal to the proposed resection line. Place the clamp so that the mesenteric and the antimesenteric borders of the bowel are folded by the jaws. Place the handles towards the antimesenteric border of the bowel.
- Place the clamp at 90 degrees to the long axis of the colon to allow a perpendicular resection. This will minimise the circumference of the colon, so as to match, as much as possible, that of the ileum for the anastomosis.
- Use the middle part of each clamp jaw to hold the tissues. This will prevent one fold of the bowel being over-compressed, and the other fold slipping out of the jaws.
- Use 2 clicks of the ratchet to prevent leakage of bowel contents when the bowel is divided, and also to prevent the jaws damaging the tissues.
- 8.12      **EMPTY THE BOWEL PROXIMAL TO THE COLON CLAMP**  
Use finger and thumb to milk the bowel contents proximally for 4cm.
- This will minimise the amount of contamination of the operating site when the bowel is opened.
- 8.13      **CRUSH CLAMP THE TRANSVERSE COLON**  
Use a Peyr's clamp on the proximal side of the planned resection line.
- Make sure the jaws of the clamp have been fully opened for you by the scrub nurse.
- Place the clamp:  
Parallel to the Doyen's clamp.
- Handles towards the antimesenteric border of the bowel.
- Jaws at the proximal limit of the cleared colon.
- Jaws extending 2cm. beyond the mesenteric border of the colon.
- Close the handles completely.  
This requires considerable force. (2-3000gm. weight)

## SECTION 8.00 THE ANASTOMOSIS

### STEP NUMBER

8.13 continued

Make sure you do not jolt the bowel and cause damage as the jaws snap shut.

The jaws will grip and crush the bowel. There is virtually no chance of these jaws slipping unless the tissue is very atrophic or weakened by steroids.

8.14           EMPTY THE BOWEL DISTAL TO  
TO THE ILEAL CLAMP

Use finger and thumb to milk the bowel contents distally for 4cm.

This will minimise the amount of contamination of the operating site when the bowel is opened.

8.15           CRUSH CLAMP THE TERMINAL ILEUM

Use a Peyr's clamp on the distal side of the planned resection line.

Make sure the jaws of the clamp have been fully opened for you by the scrub nurse.

Place the clamp:

Parallel to the Doyen's clamp.

Handles towards the antimesenteric border of the bowel.

Jaws at the distal limit of the cleared ileum.

Jaws extending 2cm. beyond the mesenteric border of the ileum.

Close the handles completely.

This requires considerable force. (2-3000gm. weight)

Make sure you do not jolt the bowel and cause damage as the jaws snap shut.

The jaws will grip and crush the bowel. There is virtually no chance of these jaws slipping unless the tissue is:

Very atrophic.

Weakened by steroids.

Oedematous and damaged by obstruction.

8.16           PREPARE TO DIVIDE THE ILEUM

Divide the ileum before the colon, to reduce the risk of contamination of the operating site. This is because the ileal contents are probably less infected

## SECTION 8.00 THE ANASTOMOSIS

### STEP NUMBER

- 8.16 continued      than the colon contents. The colon will be open for the minimum of time if it is dived at the last possible moment.
- 8.17      HAVE YOUR ASSISTANT HOLD  
A SWAB ON A STICK UNDER  
THE ILEAL RESECTION LINE  
This will catch any ileal contents.
- 8.18      CUT THE ILEUM FLUSH WITH  
THE PEYR'S CLAMP  
Use a scalpel.  
  
Make sure the scalpel does not cut any other structure.  
  
Have your assistant hold the ileal Doyen's clamp.  
  
Hold onto the ileal Peyr's clamp yourself.
- 8.19      HAVE YOUR ASSISTANT HOLD  
A SWAB ON A STICK UNDER  
THE COLON RESECTION LINE  
This will catch any colon contents.
- 8.20      CUT THE COLON FLUSH WITH THE  
PEYR'S CLAMP  
Use a scalpel.  
  
Make sure the scalpel does not cut any other structure.  
  
Have your assistant hold the colon Doyen's clamp.  
  
Hold onto the colon Peyr's clamp yourself.
- 8.21      REMOVE THE SPECIMEN  
Lift the whole specimen out of the wound by the Peyr's clamps.  
  
Check there are no restraining strands of tissue.  
  
Drop the specimen with all its attached clamps and forceps into a receiver held by a non-scrubbed person.  
  
Leave the specimen available for inspection at the end of the operation.
- 8.22      CHECK FOR BLEEDING FROM  
THE MESENTERY

## SECTION 8.00 THE ANASTOMOSIS

STEP  
NUMBER

8.23

PLACE THE 2 BOWEL ENDS  
SIDE BY SIDE

Swing the Doyen's clamps parallel to one another.

The handles of the clamps should lie together facing you.

The ends of the jaws will be facing away from you towards the mesentery.

If the ileum is not mobile enough:

Free off the ileal mesentery from the posterior abdominal wall.

Make sure small bowel has not intervened between the ileum and colon.

Make sure that there is no twist in the ileum or colon.

Make sure the ileum and colon lie easily together.

8.24

ISOLATE THE ILEUM AND COLON  
STOMAS FROM THE REST OF THE WOUND

Use 2 large packs.

8.25

CHOOSE THE METHOD OF ANASTOMOSIS

Probably factors such as lack of any tension, a good arterial supply and venous drainage and a non-contaminating technique are of more importance than the anastomotic method.

A 1 layer anastomosis is described first.

This consists of:

An end-to-end anastomosis.

A single suture layer of the submucous tissue, the muscle wall and the serosa. The mucosa is not sutured and is allowed to heal unaided.

Interrupted sutures are inserted.

The aim is to achieve healing of the submucous and sero-muscular layers. The mucous layer will heal by regeneration within 4-7 days. The other layers will be healed in 10 days or so.

The single layer method avoids the potentially obstructing effect of a sloughing inner layer. It is claimed to lead to fewer leaks than the 2 layer technique.

## **SECTION 8.00 THE ANASTOMOSIS**

STEP NUMBER  
8.25 continued

It may need to have a proximal stoma more often than a 2 layer closure.

A 2 layer anastomosis is described after the 1 layer closure.

This consists of :

An end-to-end anastomosis.

An inner full thickness suture layer of:

Mucosa, submucosa, muscle and serosa.

A continuous suture is used.

An outer sero-muscular layer.

Interrupted mattress sutures are inserted. These will avoid any narrowing of the anastomotic site and allow distension of the bowel.

The aim is to make a waterproof join using the inner layer. This will slough off over 7-10 days. The outer layer will then have healed sufficiently to make a healthy anastomosis.

## SECTION 9.00 THE ONE LAYER ANASTOMOSIS

STEP  
NUMBER

9.01 START THE ONE LAYER ANASTOMOSIS

9.02 SETTLE THE POSITIONS OF THE BOWEL AND CLAMPS

The bowel ends should be touching one another without the clamps needing to be held by your assistant.

There should be 1cm. of bowel above each Doyen's clamp for anastomosis.

If not:

Part release the relevant clamp.

Move it down the bowel until 1cm. of bowel is available.

Reapply the clamp.

Catch any bowel contents with a gauze swab.

If the bowel is not free enough from the mesentery:

Free off the mesentery as needed.

The walls of the bowel should be close enough for easy anastomosis without any tension.

Adjust the position of the clamps to achieve this.

If there is tension:

Free off more adherent tissue from the bowel.

Free off more mesentery.

Adjust the position of the clamps on the bowel.

Do not accept anything less than perfect.

If you have any concern about the viability of the bowel:

Resect doubtful bowel and start the clamping again.

GO BACK TO STEP 8.10 NON-CRUSH CLAMP THE  
TERMINAL ILEUM

9.03 CLEAN THE LUMEN OF EACH BOWEL END

Use Cetrimide soaked pledgets.

Discard each soiled pledget.

This may have a tumoricidal effect to reduce the chance of suture line recurrence.

## SECTION 9.00 THE ONE LAYER ANASTOMOSIS

STEP  
NUMBER  
9.04

### CHECK THE CIRCUMFERENCES OF THE 2 BOWEL ENDS

It is surprising how much the colon circumference will shrink during the suturing.

A colon circumference up to twice that of the ileum will be satisfactory for a water tight anastomosis.

If the circumference of the ileum is less than 50% of the colon circumference:

The sutures will bunch the colon wall.

This bunching will prevent a water tight anastomosis.

Slit the antimesenteric border of the ileum with dissecting scissors to increase its circumference.

Ideally increase the circumference to between 80% and 90% of the colon circumference.

Any irregularity of the ileal margin will take up during the suturing.

9.05

### THE PROCEDURE FOR THE ONE LAYER ANASTOMOSIS

The sutures are inserted progressively from the back to the front of the anastomosis.

They are interrupted sutures passing through the submucous plus sero-muscular layers.

They should not go through the mucosa to avoid strangulating the tissue.

The first stitches join the adjacent sides of the ileum and the colon. I.e the back of the anastomosis.

The suturing starts in middle of the back of the anastomosis.

Subsequent stitches join the corners of the anastomosis and then the front of the anastomosis.

This technique avoids difficult starting and finishing of the suture line at the folded corners of the bowel.

## SECTION 9.00 THE ONE LAYER ANASTOMOSIS

STEP  
NUMBER  
9.06

### INSERT THE FIRST OF THE ANASTOMOSIS SUTURES

Use 2/0 Vicryl (Ethicon W9136) and non-toothed dissecting forceps.

Start in the centre of the adjacent bowel walls.

Under direct vision, as always, insert the first stitch through the submucosa and the sero-muscular layers of the adjacent walls of ileum and colon.

Take a 5mm. bite on each wall.

Tie the suture with a triple knot, the first throw being a 100gm. pull.

Cut the ends 3mm. long.

9.07

### INSERT THE NEXT ANASTOMOSIS SUTURES

Estimate the relative lengths of the back walls of the ileum and colon.  
e.g. 1: 1.5.

Space the distances between successive stitches accordingly.  
i.e. 7mm. on the ileal wall and 10.5mm. on the colon wall. This should allow for unequal lengths of bowel and prevent gaps occurring.

Reestimate and correct for inequalities as you continue the anastomosis.

Have your assistant dab the tissues with a swab on a stick to keep a clear view.

Make sure you pick up submucosa and muscle from the ileum, and then muscle and submucosa from the colon with each stitch.

Continue until you reach the distal end of the adjacent edges of bowel.

At these corners, the bowel edges are no longer adjacent, but separate to form the rest of the circumference of the ileum and colon.

Continue stitching, so that the separate edges of ileum and colon come together to form the beginning of the front wall of the anastomosis.

Pass the needle through mucosa and muscle of the ileum to come out of the bowel. Say "Inside out" to remind yourself.

Then pass the needle from outside in, through the muscle and the mucosa of the colon. Say "Outside in".

Be delicate.

## SECTION 9.00 THE ONE LAYER ANASTOMOSIS

### STEP NUMBER

9.07 continued

Hold the dissecting forceps down the lumen on the bowel to prevent stitches passing across the lumen.

The tissues should be pink and shiny, ideally with peristalsis showing.

If there is any doubt about the viability of the bowel or any tautness of the bowel:

Remove any doubtful tissue.

Redissect the tissues to free tightnesses.

If the tissues tear or the stitches pull through:

There is too much tension.

Release the tension.

If there are any gaps in the suture line:

Close them with interrupted sutures of 2/0 Vicryl (Ethicon W9136).

9.08 REMOVE BOTH DOYEN'S CLAMPS

9.09 ADD EXTRA STITCHES AS NEEDED

Add extra interrupted stitches to make sure there are no obvious gaps in the anastomosis.

9.10 CHECK THE LUMEN

Pinch through the lumen with index finger and thumb to check the lumen is at least 2cm. diameter.

You will be able to feel minor mucosal adhesions freeing.

9.11 EXAMINE THE BOWEL AND  
ANASTOMOSIS

The anastomosis should be satisfactory if:

There is no twist in the bowel.

If there is a twist, redo the anastomosis.

There is no small bowel looped in the anastomosis.

If there is a loop, redo the anastomosis.

There is a 2cm.+ lumen.

If not, redo the anastomosis.

There is no blueness of the bowel.

If bowel is blue, redo the anastomosis.

## SECTION 9.00 THE ONE LAYER ANASTOMOSIS

STEP

NUMBER

9.11 continued

The ileum and colon are quite floppy.  
If tight, remobilise the bowel.

There is no tearing through of the sutures.  
If there is tearing, be wary of a tight bowel.

If there is no haematoma.  
If there is a haematoma, rarely a redo is needed.

If the bowel wall is glistening.  
If not glistening, be wary of an ischaemic bowel.

If you are lucky enough to see peristalsis in the bowel at the anastomosis.  
Despite no peristalsis, the bowel is probably viable.

You may need to re-mobilise the bowel, before you can safely redo the anastomosis.

9.12

GO TO STEP 11.01

CLOSE THE MESENTERIC DEFECT

## SECTION 10.00 THE TWO LAYER ANASTOMOSIS

STEP  
NUMBER  
10.01

### SETTLE THE POSITION OF THE BOWEL AND CLAMPS

The bowel ends should be touching one another without the clamps needing to be held by your assistant.

There should be 2cm. of bowel above each Doyen's clamp for anastomosis.

If not:

Part release the relevant clamp.

Move it down the bowel until 2cm. of bowel is available.

Reapply the clamp.

Catch any bowel contents with a gauze swab.

If the bowel is not free enough from the mesentery:

Free off the mesentery as needed.

The walls of the bowel should be close enough for easy anastomosis without any tension.

Adjust the position of the clamps to achieve this.

If there is tension:

Free off more adherent tissue from the bowel.

Free off more mesentery.

Adjust the position of the clamps on the bowel.

Do not accept anything less than perfect.

If you have any concern about the viability of the bowel:

Resect doubtful bowel and start the clamping again.

GO BACK TO STEP 8.10 NON-CRUSH CLAMP THE  
TERMINAL ILEUM

10.02

### CLEAN THE LUMEN OF EACH BOWEL END

Use Cetrimide soaked swabs on sticks and pledgets.

Discard each soiled swab or pledget.

This may have a tumoricidal effect to reduce the chance of suture line recurrence.

## SECTION 10.00 THE TWO LAYER ANASTOMOSIS

STEP  
NUMBER  
10.03

### CHECK THE CIRCUMFERENCES OF THE 2 BOWEL ENDS

If the circumference of the ileum is less than 75% of the colon circumference, the sutures will bunch the colon wall.

This bunching will prevent a water tight anastomosis.

Slit the antimesenteric border of the ileum with dissecting scissors to increase the its circumference.

Ideally increase the circumference to between 80% and 90% of the colon circumference.

Any irregularity of the margin will take up during the suturing.

### 10.04. THE PROCEDURE FOR THE TWO LAYER ANASTOMOSIS

The sutures are inserted in 4 main moves:

#### 1 The back of the outer layer of the anastomosis.

These are interrupted mattress sero-muscular sutures.

They stitch the adjacent sides of the ileum and the colon.

They should not go through the mucosa to prevent leaks.

#### 2 The back of the inner full thickness layer.

These are continuous sutures through the full thickness of the bowel.

They stitch the adjacent sides of the ileum and colon, nearer the bowel ends than the sero-muscular sutures.

Use a 2 needled suture to sutured the layer in two halves.

The suturing starts in middle of the back of the anastomosis.

The suturing continues round the two ends of the adjacent bowel wall to the front.

#### 3 The front of the inner full thickness layer.

This is a continuation of the previous suture line.

One half of the continuous suture stitches round one half of the front of the bowel walls.

The other half of the suture stitches round the other half of the front of the bowel walls.

## SECTION 10.00 THE TWO LAYER ANASTOMOSIS

### STEP

### NUMBER

10.04 continued

The suturing ends in the middle of the front of the bowel where the two ends of the continuous suture are tied off.

This technique avoids difficult starting and finishing of the suture line at the folded corners of the bowel.

4 The front of the outer layer of the anastomosis. These are interrupted sero-muscular sutures as in the first part of the anastomosis.

They stitch over the front of the inner layer of the anastomosis.

10.05

### INSERT THE FIRST OF THE OUTER SEROMUSCULAR SUTURES

Use 2/0 Vicryl (Ethicon W9136) and non-toothed dissecting forceps.

These outer sutures go into the sero-muscular tissue of adjacent sides of the ileum and colon.

Place the first suture at the end of the adjacent sides of ileum and colon which is furthest from you. This will act as a stay stitch.

You will feel the needle bite into the muscle layer and not pop through into the lumen.

Insert the needle 10mm. from the edge of the bowel.

Run the needle for 5mm. parallel to the cut ends of the bowel and bring it out through the muscle.

Tie with a triple knot.

Use no more than 100gm. pull on the first throw of these knots, to prevent the stitches pulling through the tissues.

Clip the ends 8cm. long with an artery forcep.

Cut off redundant suture.

Place the forcep so as to keep the suture ends from becoming slack.

10.06

### INSERT THE SECOND OF THE OUTER SEROMUSCULAR SUTURES

Place the second suture at the end of the adjacent sides of ileum and colon which is nearest to you.

## **SECTION 10.00 THE TWO LAYER ANASTOMOSIS**

### **STEP NUMBER**

10.06 continued

As for the first stitch, insert the needle 10mm. from the edge of the bowel.

Run the needle for 5mm. parallel to the cut ends of the bowel and bring it out through the muscle.

Tie with a triple knot.

Clip the ends 8cm. long with an artery forcep.

Cut off redundant suture.

Place the forcep so as to keep the suture from becoming slack.

10.07

### **PLACE INTERVENING INTERRUPTED SUTURES**

Start 7mm. from the first stitch.

Place subsequent sutures 7mm. from the last, in the sero-muscular layer of adjacent sides of ileum and colon, parallel to the cut ends of the bowel.

Tie each with a triple knot.

Cut the ends 3mm. long.

Make sure each stitch is inserted under direct vision.

Mop the tissues as needed with pledgets or swabs on sticks.

There will be between 4 and 8 stitches, in all, in this part of the outer layer.

There should be no gaps to see between the stitches.

10.08

### **START THE INNER LAYER**

Use a suture with a needle at each end Vicryl (Ethicon W9636).

Start in the centre of the adjacent bowel walls which you have just sutured with the sero-muscular stitches.

Under direct vision as always, insert the first stitch through both layers of bowel wall 5mm. from the edges of the bowel.

Pull the suture through the bowel walls to the half way point.

Tie the suture with a triple knot, the first throw being a 100gm. pull.

Tuck one half of the suture behind a corner of a drape.

## SECTION 10.00 THE TWO LAYER ANASTOMOSIS

### STEP NUMBER

10.08 continued

Use the other half of the suture to make the distal half of the inner suture layer.

Take 5mm. bites of the edges of the bowel wall 7mm. apart.

Estimate the relative lengths of the back walls of the ileum and colon.  
e.g. 1: 1.5.

Space the distances between successive stitches accordingly.  
i.e. 7mm. on the ileal wall and 10.5mm. on the colon wall. This should allow for unequal lengths of bowel and prevent gaps occurring.

Reestimate and correct for inequalities as you continue the anastomosis.

Have your assistant follow the suture and also dab the tissues with a swab on a stick to keep a clear view.

Make sure you pick up mucosa and muscle from the ileum, and then muscle and mucosa from the colon with each stitch.

Continue until you reach the distal end of the adjacent edges of bowel.

At this corner, the bowel edges are no longer adjacent, but separate to form the rest of the circumference of the ileum and colon.

Continue stitching, so that the separate edges of ileum and colon come together to form the beginning of the front wall of the anastomosis.

Pass the needle through mucosa and muscle of the ileum to come out of the bowel. Say "Inside out" to remind yourself.

Then pass the needle from outside in, through the muscle and the mucosa of the colon. Say "Outside in".

Be delicate.

Get your assistant to maintain a 100gm. pull.

Control the bedding of each loop of the suture line with the dissecting forceps.

Hold the dissecting forceps down the lumen on the bowel to prevent stitches passing across the lumen.

Make a lock stitch when you have sutured 1/3 of the front of the anastomosis.

Tuck the suture out of the way under a corner of the drapes.

## SECTION 10.00 THE TWO LAYER ANASTOMOSIS

STEP  
NUMBER

10.08 continued

Retrieve the other half of the suture.

Make a similar line of sutures in the adjacent edges of the bowel coming towards you.

Hold dissecting forceps down the lumen on the bowel to prevent stitches passing across the lumen.

Turn the near corner with stitches.

The stitching becomes a little awkward to continue forehand as you round the corner.

Rather than stitching backhand, change to an easier forehand stitch by taking 2 bites instead of 1 bite on the colon (the longer side).

This will reverse the tendency of the needle to become backhand.

It will also help correct greater length of the colon wall.

Continue stitching until you reach the lock stitch of the other end of the suture.

This will close the front wall of the anastomosis.

Tie the two ends of suture together with a triple knot.

Cut off the needle from one end of the suture for easy and safe tying.

Do not worry if the suture ends come from inside or outside the bowel.

Cut the ends 10mm. long.

This completes the inner layer of the anastomosis.

The tissues should be pink and shiny, ideally with peristalsis showing.

If there is any doubt about the viability of the bowel or any tautness of the bowel:

Remove any doubtful tissue.

Redissect the tissues to free tightnesses.

If the tissues tear or the stitches pull through:

There is too much tension.

Release the tension.



## SECTION 10.00 THE TWO LAYER ANASTOMOSIS

STEP  
NUMBER

10.13 contiued

The ileum and colon are quite floppy.  
If tight, remobilise the bowel.

There is no tearing through of the sutures.  
If there is tearing, be wary of a tight bowel.

If there is no haematoma.  
If there is a haematoma, rarely a redo is needed.

If the bowel wall is glistening.  
If not glistening, be wary of an ischaemic bowel.

If you are lucky enough to see peristalsis in the bowel at the anastomosis.  
Despite no peristalsis, the bowel is probably viable.

You may need to re-mobilise the bowel, before you can safely redo the anastomosis.

## SECTION 11.00 PRECLOSURE PROCEDURE

### STEP NUMBER

- 11.01      **CLOSE THE MESENTERIC DEFECT**  
            Use continuous 2/0 Vicryl (Ethicon W9136).
- Start in the deepest part of the defect and run up towards the anastomosis.
- Pick up only peritoneum to avoid damaging mesenteric vessels.  
                    This will cause haematomas and damage the blood supply and drainage of the bowel.
- If there is an increasing haematoma which appears to be making the bowel ischaemic:  
                            Excise the affected mesentery and redo the anastomosis.
- 11.02      **CLOSE ANY LATERAL WALL DEFECT**  
            Use 2 layers of continuous 1/0 nylon (Ethicon W749) on the peritoneum and abdominal muscles.
- 11.03      **CLOSE ANY ILEOSTOMY DEFECT**  
            Use 2 layers of continuous 1/0 nylon (Ethicon W749) on the peritoneum and abdominal muscles.
- 11.04      **CHECK HAEMOSTASIS**  
            In the anastomosis.
- In the mesentery.
- In the paracolic gutter.
- In the pelvis.
- In the transverse colon and greater omentum.
- 11.05      **CHECK THE POSITION OF THE NASO-GASTRIC TUBE IN THE STOMACH**  
            If the naso-gastric tube is not in the stomach:  
                    Ask the anaesthetist to push the tube down further.
- If the tube will not pass into the stomach:  
                            Arrange for the tube to be passed when the patient is awake.
- 11.06      **CHOOSE A TUBE DRAIN**  
            Use a plastic tube drain 1cm. external diameter. E.g Portex
- Check the drain is long enough to reach the paracolic gutter from the skin of the right ilac fossa.
- Have 4 side holes cut in the inner end of the drain.

## SECTION 11.00 PRECLOSURE PROCEDURE

### STEP

### NUMBER

- 11.06 continued      Cut the external end of the drain at 45 degrees for ease of insertion.
- 11.07                  INCISE THE SKIN  
                            Use a no.22 Swann Morton scalpel for a 1cm. drain.  
  
                            Make the incision 1.5cm. long in the right iliac fossa.  
  
                            Avoid vessels in the subcutaneous tissues.
- 11.08                  DEEPEN THE INCISION  
                            Use an artery forceps to push through the skin incision into the peritoneum.  
  
                            Make sure you do not damage any structures in the peritoneal cavity.
- 11.09                  CATCH THE DRAIN IN THE ARTERY  
                            FORCEPS
- 11.10                  PULL THE DRAIN INTO THE WOUND
- 11.11                  CUT THE DRAIN TO FIT INTO THE  
                            PARACOLIC GUTTER  
                            Use stitch scissors.
- 11.12                  TUCK THE DRAIN INTO THE  
                            PARACOLIC GUTTER  
                            Make sure the drain does not kink, or press on delicate structures.
- 11.13                  CUT THE BEVEL OFF THE  
                            OUTER END OF THE DRAIN  
                            Use stitch scissors.  
  
                            Fasten the drain temporarily to the drapes with the artery forcep
- 11.14                  STITCH THE DRAIN TO THE SKIN  
                            Use No.1 silk (Ethicon W799).  
  
                            Tie with 4 half hitches at skin level.  
  
                            Wrap the silk tightly around the drain 4 times at skin level to make a waist in  
                            the drain.  
  
                            Then tie 4 more half hitches to finish.  
  
                            Cut the silk ends 4 cms. long.

## **SECTION 11.00 PRECLOSURE PROCEDURE**

### **STEP NUMBER**

- 11.15      CHECK THE SWAB, NEEDLE  
              AND INSTRUMENT COUNTS
- 11.16      CLOSE THE WOUND FROM ANY  
              EXCISED STOMA  
              Use 2 layers of continuous 1/0 nylon (Ethicon W749) on the peritoneum and  
              rectus sheath.  
  
              Use continuous 2/0 Vicryl (Ethicon W9251) on the subcutaneous fat.  
  
              Use continuous 3/0 Vicryl (Ethicon W9890) to the skin.
- 11.17      CHECK THERE IS NO OTHER  
              PROCEDURE TO DO
- 11.18      REMOVE ALL PACKS, SWABS, AND  
              INSTRUMENTS FROM THE ABDOMEN

## SECTION 12.00 CLOSING THE ABDOMEN

### STEP NUMBER

- 12.01 DECIDE ABOUT DEEP TENSION SUTURES  
Put in deep tension sutures for:  
Expected prolonged abdominal distension.  
  
Sepsis.  
  
Expected excess coughing.  
  
Steroid treatment.  
  
Any other risk factor for poor wound healing.
- 12.02 REMOVE THE FINOCHIETTO RETRACTOR
- 12.03 REMOVE SKIN EDGE TOWELS AND CLIPS
- 12.04 CHECK THE ABDOMEN IS FULLY  
RELAXED  
Bowel pushing out of the wound is a sign of inadequate relaxation.  
  
Wait for the anaesthetist to get full relaxation before continuing.
- 12.05 PICK UP THE PERITONEUM  
Use 4 Moynihan's cholecystectomy forceps:  
1 on each side of the wound and 1 on each end.  
  
Get your assistant to lift his side of the wound with the forceps.
- 12.06 FOR CLOSURE WITHOUT DEEP  
TENSION SUTURES  
GO TO STEP \*\*\* (CLOSE THE PERITONEUM)
- 12.07 FOR CLOSURE WITH DEEP TENSION  
SUTURES - READ ON  
Use 0 nylon on a 50mm. hand needle, with a segment of plastic tube and an  
artery clip on the loose end (Ethicon W\*\*\*).  
  
Insert the stitches 5cm. from the wound edge, through all layers at 5cm  
intervals.  
  
Lay the sutures across the abdomen, with artery clips dangling on each end  
to maintain a steady pull.  
  
Cut off the needles.  
  
Make sure you do not damage the structures inside the peritoneum with the  
needles.

## SECTION 12.00 CLOSING THE ABDOMEN

### STEP

### NUMBER

- 12.07 continued      Make sure the stitches stay under tension to prevent bowel or omentum getting caught in a slack loop of nylon.
- 12.08      **CLOSE THE PERITONEUM AND LINEA ALBA  
(OR POSTERIOR RECTUS SHEATH  
FOR A PARAMEDIAN INCISION)**  
    Use 1 layer of continuous no.1 nylon (Ethicon W749).
- Start at the upper end of the wound.
- Tie the ends of the nylon with 5 throws.
- Take 1cm. bites, 1cm. apart.
- Cut the ends nylon 10mm. long.
- Check all the time that you are avoiding needle damage to the structures inside the abdomen.
- If the peritoneum will not close or the single stitches are tearing:  
        Take 4 bites and pull the stitches through en masse.
- If you are still unable to close:  
            Call a more experienced surgeon.
- 12.09      **CLOSE THE ANTERIOR RECTUS SHEATH  
(FOR A PARAMEDIAN INCISION ONLY)**  
    Use 1 layer of continuous no.1 nylon (Ethicon W749).
- Start at the upper end of the wound.
- Tie the end with 5 throws.
- Hold the loose end in the line of the wound with an artery so that the next stitches will bury the knot.
- Take 1cm. bites, 1cm. apart.
- Cut the buried end 3cm.long.
- Bury the ends of the final knot back in the wound.
- Cut the ends of the knot where they protrude from the closed rectus sheath.
- 12.10      **CHECK HAEMOSTASIS IN THE FAT**

## SECTION 12.00 CLOSING THE ABDOMEN

### STEP NUMBER

- 12.11 PUT 1G AMPICILLIN POWDER  
IN THE SUBCUTANEOUS FAT  
Use a 10sec. burst of Povidone iodine spray if there is an ampicillin hypersensitivity.
- 12.12 CLOSE THE SUBCUTANEOUS FAT  
Use continuous 2/0 Vicryl (Ethicon W9251).  
  
Cut the ends 3mm. long.
- 12.13 CHECK THE SWAB, NEEDLE,  
AND INSTRUMENT COUNTS AGAIN
- 12.14 CHECK THERE IS NO OTHER  
PROCEDURE TO DO
- 12.15 CLOSE THE SKIN  
Use continuous 3/0 Vicryl (Ethicon W9890).  
  
Make a 5 throw knot at the end of the Vicryl to act as an anchor when burying the first stitch.  
  
Take six 5mm. bites before pulling on the Vicryl to close the skin edges.  
  
Bury the final end with a loop stitch.
- 12.16 TIE THE DEEP TENSION SUTURES  
Use 5 throws to tie the sutures.  
  
Cut the ends 10mm. long.
- 12.17 CLOSE ANY ILEOSTOMY WOUND  
Close the fat and the wound as for the main wound.
- 12.18 SPRAY THE WOUND  
Use an acrylic spray (Nobecutine).
- 12.19 DRESS THE WOUND  
Use a compliant dressing (Mepore).
- 12.20 CONNECT THE DRAIN TUBE  
Use a closed system of drainage with a drainage bag.

## SECTION 13.00 FINAL TOUCHES

### STEP NUMBER

- 13.01 WRITE LEGIBLE OPERATION DETAILS
- 13.02 FILL IN THE AUDIT FORM
- 13.03 PRESCRIBE CALCIUM HEPARIN  
Give 5000 units b.d. subcutaneously until the patient leaves hospital.
- 13.04 ARRANGE A STEROID PROGRAMME  
If the patient has been taking steroids for more than 4 weeks.
- 13.05 ARRANGE POSTOPERATIVE  
MEDICATION PROGRAMME  
If the patient needs drugs that are normally taken orally.
- 13.06 DICTATE A LETTER TO  
THE GENERAL PRACTITIONER  
AND REFERRING PHYSICIAN

END OF OPERATION

## SECTION 14.00 EQUIPMENT AND MATERIALS LIST

### RIGHT HEMICOLECTOMY

**READ CODE:RIGHT 77130  
EXTENDED RIGHT 77121**

<b>INSTRUMENT PACK</b>	MAJOR GENERAL RESECTION EXTRAS	
<b>DRAPES</b>	UNIVERSAL II	
<b>EXTRAS</b>	SUCTION TUBING 20ML SYRINGE LUBRICATING JELLY GOING RED TOWEL ORTHO GAUZE X 1 GREEN NEEDLE 2 SIDE TETRAS	CATHETER 16FG BLADDER BAG 18 X 24 DIATHERMY POUCH MCKEOWNS S.R.R. 2 PEYR'S 4 END TETRA'S
<b>SUTURES</b>	<b>NO</b>	<b>MATERIAL</b>
TIES	W9025	2/0 VICRYL
FASCIA	W768	1 LOOP ETHILON
PERITONEUM		
SKIN	W93890	3/0 VICRYL
DRAIN	W2793	1 MERSILK
OTHERS	W9136 W9636	2/0 VICRYL 2/0 VICRYL
<b>BLADES</b>	22A X 2	10 X 2
<b>DRAINS</b> CATHETER BAG	PORTEX TUBE (KEPT IN TOP OF OT.1 GEN	CUPBOARD) &
<b>DIATHERMY EXTRAS</b>	LONG FORCEPS	
<b>PATIENT POSITION</b>	SUPINE	
<b>WOUND ANTIBIOTIC</b>	1g AMPICILLIN	
<b>WOUND INFILTRATION</b>	20ML X 0.25% MARCAIN (PLAIN)	
<b>WASH OUT</b>	1g TETRACYCLINE IN 1L SALINE	
<b>WOUND SPRAY</b>	NOBECUTAINÉ	
<b>DRESSING</b>	3M Primapore	

# **Hemicolectomy - Right**

## **Your Bowel Operation - some information**

These notes give a guide to your stay in hospital. They also give an idea about what it will be like afterwards. They do not cover everything. If you want to know more, please ask.

### **What is the bowel?**

The bowel is a tube of intestine which runs from the stomach to the back passage. It is much longer than the inside of your belly (tummy). It fits in by coiling up in a loop. The upper part of the bowel (small bowel) joins the lower part of the bowel (the colon) just to the right of the waistline. This is where your appendix pouches out from the colon.

The right half of the colon then runs in a big loop towards your right ribs, and across towards your left ribs. It runs on as the left colon, down your left side to your pelvis. It then runs deeply in the pelvis, as the rectum, to the back passage.

### **What is the problem?**

The right side of your colon or the end of your small bowel is diseased. Common cause are bowel cancer and Crohn's disease. Disease of the end of the small bowel, or the right side of the colon, or even the appendix, can give you crampy tummy pains, swelling and anaemia.

If you do not have the operation, the bowel is likely to become blocked completely. There may be bleeding into the bowel. The bowel may leak internally or into other organs. If there is cancer, it may spread around your body from the bowel.

The diseased part of the bowel has to be taken out. The ends of the rest of the bowel are joined up inside the tummy.

### **What does the operation consist of?**

A cut is made in the skin to the right of the navel about 25 cm (10 inches) long. The right side of the colon and the lowest part of the small bowel are freed. The diseased bowel is taken out with a margin of healthy bowel. The cut ends of the small bowel and of the middle of the colon are joined together.

The cut is then closed up. You will not end up with a colostomy or need to wear a bag to collect the bowel waste.

### **Are there any risks?**

Overall, more than 95% of patients get over the operation. Patients under 70 years old, who are not overweight and who have no heart, lung or kidney conditions, do best.

The main danger is leakage from where the bowel ends have been joined. This may need second or more operations with a chance of a stoma (having to wear a bag to collect the waste) for a time. It is rare, happening in less than 10% of operations. Other complications are usually connected with

the stress of the operation, such as heart attacks or blood clots in the lungs. We do all we can to prevent such things happening.

### **Are there any alternatives?**

Simply waiting and seeing is not a good plan. The trouble you are having with the bowel will simply get worse and may well lead to very serious problems.

Keyhole operations to do this operation are being developed, but they are not widely used at present.

Tablets and medicine will not be helpful, neither will x-ray and laser treatment.

I am sure your best way forward is to have a planned operation.

## **What happens before the operation?**

If you come into hospital as an emergency, all the preparations listed below will be speeded up. You may well need special treatment including salt, sugar and water replacement in a vein. You may need blood transfusions.

Many hospitals now arrange preadmission clinics where the preparations below are done before you are come into the hospital ward.

### **Welcome to the ward**

You will be welcomed to the ward by the nurses or the receptionist. You will have your details checked. You will be shown to your bed and will be asked to change into your nightwear. You will have some basic tests done, such as pulse, temperature, blood pressure and urine examination.

You will be asked to hand in any medicines or drugs you may be taking, so that your drug treatment in hospital will be correct. Please tell the nurses of any allergies to drugs or dressings.

### **Visits by the surgical team**

You will be seen by the House Surgeon, who will interview and examine you. He, or she, will arrange some special tests such as x-rays and blood samples. The operation will be explained to you. You will be asked to sign your consent for the operation. If you are not clear about any part of the operation, ask for more details from the doctors or from the nurses, They are never too busy to do this.

You will have the operation site marked on you with a skin pencil.

You will be seen by the surgeon who will be doing the operation. He will check that all the necessary preparations have been made.

### **Visits by the anaesthetic team**

One or more anaesthetists who will be giving your anaesthetic will interview and examine you. They will be especially interested in chest troubles, dental treatment and any previous anaesthetics you have had, plus any anaesthetic problems in the family.

## **Visit by the physiotherapist**

The physiotherapist will show you how to keep your chest clear after the operation and how to keep moving about. You should not smoke.

## **Diet**

You will have your usual diet until 6 to 12 hours before the operation. Then you will be asked to take nothing by mouth. This will let your stomach empty to prevent vomiting during your operation.

## **Shaving**

You will be shaved from armpit to thighs to prevent hairs affecting the wound.

## **Periods**

The periods do not affect the operation.

## **Bowel preparation**

It is important that the bowel is as clean as possible before the operation. You will be given a variety of laxatives, enemas and washouts to help. These treatments are undignified, but not painful.

## **Timing of the operation**

The timing of your operation is usually arranged the day before. The nurses will tell you when to expect to go to the operating theatre. Do not be surprised, however, if there are changes to the exact timing.

## **Bladder catheters**

Female patients usually have a fine rubber tube passed into the bladder through the front passage an hour or two before the operation. This lets the bladder stay empty and small during the operation and helps control your body fluids afterwards.

Male patients may have similar tubing passed in the operating theatre when they are asleep.

## **Premedication**

You may be given a sedative injection or tablets about 1 hour before the operation.

## **Transfer to theatre**

You will be taken on a trolley to the operating suite by a ward nurse and a theatre porter. You will be wearing a cotton gown. Wedding rings will be fastened with tape. Removable dentures will be left on the ward. There will be several checks on your details on the way to the anaesthetic room where your anaesthetic will begin. You will then go to sleep.

## **The operation is then performed.**

## **What happens after the operation?**

### **Coming round after the anaesthetic**

Although you will be conscious a minute or two after the operation ends, you are unlikely to remember anything until you are back in your bed on the ward.

You will have a drip tube in an arm vein connected to a plastic bag on a stand containing a salt solution or blood.

You will have a fine plastic tube coming out of your nose and connected to another plastic bag to drain your stomach. Swallowing may be a little uncomfortable.

You will have a dressing on your wound and a rubber drainage tube nearby, connected to yet another plastic bag.

You may be given oxygen from a face mask for a few hours if you have had chest problems in the past.

### **Warning after a General Anaesthetic**

The drugs we give for a general anaesthetic will make you clumsy, slow and forgetful for about 24 hours. This happens even if you feel quite alright.

For 24 hours after your general anaesthetic:

Do not make any important decisions.

### **Will it hurt?**

The wound is painful and you will be given injections and later tablets to control this. Ask for more if the pain is still unpleasant.

You will be expected to get out of bed the day after operation despite the discomfort. You will not do the wound any harm, and the exercise is very helpful for you.

The second day after operation you should be able to spend an hour or two out of bed.

By the end of four days you should have little pain.

### **Drinking and eating**

The operation causes the bowel to stop working for a day or two. Until the bowel starts up again, you will be given water, salts and sugar solutions into your arm vein. The tube in your nose will be used to draw off any build-up of stomach juices.

The first signs of returning bowel activity are noises in your tummy and passing wind out of your back passage. Once these have happened you will be able to start drinking - a little at a time.

When you are able to drink freely, the arm drip tubing is removed.

You should be eating normally after 4 or 5 days.

## **Opening bowels**

It is quite normal for the bowels not to open for 3 or 4 days after the operation. Often there is diarrhoea for up to a week, but this settles down by itself.

If you have not opened your bowels after two days and you feel uncomfortable, ask the nurses for a laxative.

## **Passing urine**

Because of the drainage tube (catheter) in the bladder, passing urine is not a problem. Sometimes there is a feeling that there is a leakage all the time. This is just an irritation by the tubing and it passes off. Once you can walk about in reasonable comfort, the catheter is taken out.

## **Sleeping**

You will be offered painkillers rather than sleeping pills to help you to sleep. If you cannot sleep despite the painkillers please let the nurses know.

## **Physiotherapy**

The physiotherapist will check that you are clearing your lungs of phlegm by coughing. You can help your circulation by continuous movement of body and limbs.

## **The wound and stitches**

The wound has a dressing which may show some staining with old blood in the first 24 hours. The dressing will be removed and the wound will be sprayed with a cellulose varnish similar to nail varnish. You can take the dressing off after 48 hours. There is no need for a dressing after this unless the wound is painful when rubbed by clothing.

Usually there are no stitches in the skin. The wound is held together underneath the skin and does not need further attention. Sometimes, however, 7 or 8 stitches are put across the wound to add strength. They are removed after 8 days.

The rubber drain tube is removed after 4 days.

There may be some purple bruising around the wound which spreads downwards by gravity and fades to a yellow colour after 2 to 3 days. It is not important.

There may be some swelling of the surrounding skin which also improves in 2 to 3 days.

After 7 to 10 days, slight crusts on the wound will fall off. The cellulose varnish will peel off and can be assisted with nail varnish remover.

Occasionally minor matchhead sized blebs form on the wound line, but these settle down after discharging a blob of yellow fluid for a day or so.

## **Injections**

You will be given tiny injections into the skin of the tummy twice a day to keep the circulation going.

## **Washing**

You can wash the wound area as soon as the dressing has been removed. Soap and warm tap water are entirely adequate. Salted water is not necessary. You can shower or bath as often as you want.

## **What about informing my relatives and contacts?**

With your permission, the nurses and doctors will keep your relatives and contacts up to date with your progress.

## **How long in hospital?**

You should plan to leave hospital 10 days after the operation.

The nurses will talk to you about your home arrangements so that a proper time for you to leave hospital can be arranged.

You will be given an appointment to visit the Out Patient Department for a check up about one month after you leave hospital. The results of the examination of the bowel will be discussed with you. There is a chance of further treatment being needed.

## **Sick notes**

Please ask the nurses for sick notes, certificates etc.

## **After you leave hospital**

You are likely to feel very tired and need rests 2 or 3 times a day for a month or more. You will gradually improve so that by the time 3 months has passed you will be able to return completely to your usual level of activity.

## **Driving**

You can drive as soon as you can make an emergency stop without discomfort in the wound, i.e. after about 3 weeks.

## **What about sex?**

You can restart sexual relations within 2 or 3 weeks when the wound is comfortable enough.

## **Work**

You should be able to return to a light job after about 6 weeks and any heavy job within 12 weeks.

## **Complications**

Complications are unusual but are rapidly recognised and dealt with by the nursing and surgical staff.

If you think that all is not well, please ask the nurses or doctors.

Chest infections may arise, particularly in smokers. Co-operation with the physiotherapists to clear the air passages is important in preventing the condition. Do not smoke.

Occasionally the bowel is slow to start working again. This requires patience. Your food and water intake will continue through your vein tubing. Rarely a second operation is needed to correct a blockage at the site of joining the bowel or to free adhesions.

Sometimes there is some discharge from the drain by the wound. This stops given time.

Wound infection is sometimes seen. This settles down with antibiotics in a week or two. Rarely this can lead to some weakness in the wound. Very rarely the wound gives way and needs to be restitched.

Aches and twinges may be felt in the wound for up to 6 months.

Occasionally there are numb patches in the skin around the wound which get better after 2 to 3 months.

Because of loss of some of the bowel you may need some vitamin replacement. This will be discussed with you.

The underlying disease in the bowel may cause trouble in the future. We can give more details once the bowel has been examined in the laboratory.

### **General advice**

The operation should not be underestimated. Some patients are surprised how slowly they regain their normal stamina - but virtually all patients are back doing their normal duties within 3 months.

If you have any problems or queries, please ask the nurses or doctors.

## **Any Questions?**

If you have any questions, jot them down here and ask the doctors or nurses for answers.

## **Any complaints?**

If you have any complaints, please contact the doctors or nurses straight away. If this does not solve the problem, please write to me at:

Woodlands Hospital, Darlington, County Durham DL1 4PL

Michael H Edwards  
Consultant Surgeon

## **Acknowledgement**

We gratefully acknowledge the generous support for the development and launching of SCALPEL Information Systems for patients, from:

Northallerton Red Cross Society

The crew of the Royal Fleet Auxiliary 'ARGUS'

If you would like to help towards other ventures to benefit patients, please send donations to:

The Chairman  
British Red Cross  
62 Thirsk Road  
Northallerton DL6 1PN  
(Please make cheques payable to "British Red Cross")

## **Have you any comments?**

We welcome your comments and suggestions covering your illness, your treatment in hospital, and your recovery. Please write below any points you would like to make. If you prefer, you need not give your name.

Full name:

Hospital:

Ward:

Date of stay in hospital:

Operation:

Out patients department:

Your admission arrangements:

Your welcome on the ward:

Nursing staff:

General ward atmosphere:

Medical staff:

Ward orderlies:

Portering staff:

X-ray staff:

ECG staff:

Did you know who was who?:

Bedding:

Food and drink:

Privacy:

Locker space:

Toilets:

Bathrooms:

Other patients:

Noise:

Information:

Telephone/TV/radio/newspapers:

Timing of operation:

Preparations for your operation:

Going into the theatre:

In the operating theatre:

In the recovery room:

Coming back from theatre:

Intensive Care ward:

Recovery on the ward:

Pain control:

Sleeping:

Wound dressings:

Stitches, clips:

Progress reports:

Visiting hours:

Rest room:

Tablets, medicines, injections:

Going-home arrangements:

Out-patient follow up:

Anything else?

Continue comments overleaf if you wish.

Please send this questionnaire to:

Mr M Edwards, Woodlands Hospital, Darlington, County Durham DL1 4PL



**[NHS organisation name]  
consent form 1**

**Patient agreement to investigation  
or treatment**

**Patient details (or pre-printed label)**

Patient's surname/family name.....

Patient's first names .....

Date of birth .....

Responsible health professional.....

Job title .....

NHS number (or other identifier).....

Male

Female

Special requirements .....

(eg other language/other communication method)

**To be retained in patient's notes**

**Patient identifier/label**

**Name of proposed procedure or course of treatment** (include brief explanation if medical term not clear) Right hemicolectomy – see information leaflet for details

**Statement of health professional** (to be filled in by health professional with appropriate knowledge of proposed procedure, as specified in consent policy)

I have explained the procedure to the patient. In particular, I have explained:

The intended benefits: To remove the diseased part of the bowel and to minimise any recurrence of the condition.

Serious or frequently occurring risks: Leakage from the joined up bowel – see information leaflet for details

Any extra procedures which may become necessary during the procedure – see information leaflet

blood transfusion... Maybe.....

other procedure (please specify) **Removal of say small bowel or other organs which are affected by the disease**

I have also discussed what the procedure is likely to involve, the benefits and risks of any available alternative treatments (including no treatment) and any particular concerns of this patient.

The following leaflet/tape has been provided See attached Satisfax leaflet

This procedure will involve:

general and/or regional anaesthesia Yes

local anaesthesia Yes

sedation Yes

Signed:.....

Date .. ..

Name (PRINT) .....

Job title .....

**Contact details** (if patient wishes to discuss options later) .....

**Statement of interpreter** (where appropriate)

I have interpreted the information above to the patient to the best of my ability and in a way in which I believe s/he can understand.

Signed .....

Date .....

Name (PRINT) .....

**Top copy accepted by patient: yes/no** (please ring)

**Statement of patient**

**Patient identifier/label**

Please read this form carefully. If your treatment has been planned in advance, you should already have your own copy of page 2 which describes the benefits and risks of the proposed treatment. If not, you will be offered a copy now. If you have any further questions, do ask – we are here to help you. You have the right to change your mind at any time, including after you have signed this form.

**I agree** to the procedure or course of treatment described on this form.

**I understand** that you cannot give me a guarantee that a particular person will perform the procedure. The person will, however, have appropriate experience.

**I understand** that I will have the opportunity to discuss the details of anaesthesia with an anaesthetist before the procedure, unless the urgency of my situation prevents this. (This only applies to patients having general or regional anaesthesia.)

**I understand** that any procedure in addition to those described on this form will only be carried out if it is necessary to save my life or to prevent serious harm to my health.

**I have been told** about additional procedures which may become necessary during my treatment. I have listed below any procedures **which I do not wish to be carried out** without further discussion. ....

.....  
 .....  
 .....

Patient's signature ..... Date.....  
 Name (PRINT) .....

**A witness should sign below if the patient is unable to sign but has indicated his or her consent. Young people/children may also like a parent to sign here (see notes).**

Signature ..... Date .....  
 Name (PRINT) .....

**Confirmation of consent** (to be completed by a health professional when the patient is admitted for the procedure, if the patient has signed the form in advance)

On behalf of the team treating the patient, I have confirmed with the patient that s/he has no further questions and wishes the procedure to go ahead.

Signed:..... Date ..  
 Name (PRINT) ..... Job title .....

**Important notes: (tick if applicable)**

- See also advance directive/living will (eg Jehovah's Witness form)
- Patient has withdrawn consent (ask patient to sign /date here) .....

## Guidance to health professionals (to be read in conjunction with consent policy)

### What a consent form is for

This form documents the patient's agreement to go ahead with the investigation or treatment you have proposed. It is not a legal waiver – if patients, for example, do not receive enough information on which to base their decision, then the consent may not be valid, even though the form has been signed. Patients are also entitled to change their mind after signing the form, if they retain capacity to do so. The form should act as an *aide-memoire* to health professionals and patients, by providing a check-list of the kind of information patients should be offered, and by enabling the patient to have a written record of the main points discussed. In no way, however, should the written information provided for the patient be regarded as a substitute for face-to-face discussions with the patient.

### The law on consent

See the Department of Health's *Reference guide to consent for examination or treatment* for a comprehensive summary of the law on consent (also available at [www.doh.gov.uk/consent](http://www.doh.gov.uk/consent)).

### Who can give consent

Everyone aged 16 or more is presumed to be competent to give consent for themselves, unless the opposite is demonstrated. If a child under the age of 16 has “sufficient understanding and intelligence to enable him or her to understand fully what is proposed”, then he or she will be competent to give consent for himself or herself. Young people aged 16 and 17, and legally ‘competent’ younger children, may therefore sign this form for themselves, but may like a parent to countersign as well. If the child is not able to give consent for himself or herself, some-one with parental responsibility may do so on their behalf and a separate form is available for this purpose. Even where a child is able to give consent for himself or herself, you should always involve those with parental responsibility in the child's care, unless the child specifically asks you not to do so. If a patient is mentally competent to give consent but is physically unable to sign a form, you should complete this form as usual, and ask an independent witness to confirm that the patient has given consent orally or non-verbally.

### When NOT to use this form

If the patient is 18 or over and is not legally competent to give consent, you should use form 4 (form for adults who are unable to consent to investigation or treatment) instead of this form. A patient will not be legally competent to give consent if:

- they are unable to comprehend and retain information material to the decision and/or
- they are unable to weigh and use this information in coming to a decision.

You should always take all reasonable steps (for example involving more specialist colleagues) to support a patient in making their own decision, before concluding that they are unable to do so. Relatives **cannot** be asked to sign this form on behalf of an adult who is not legally competent to consent for himself or herself.

### Information

Information about what the treatment will involve, its benefits and risks (including side-effects and complications) and the alternatives to the particular procedure proposed, is crucial for patients when making up their minds. The courts have stated that patients should be told about ‘significant risks which would affect the judgement of a reasonable patient’. ‘Significant’ has not been legally defined, but the GMC requires doctors to tell patients about ‘serious or frequently occurring’ risks. In addition if patients make clear they have particular concerns about certain kinds of risk, you should make sure they are informed about these risks, even if they are very small or rare. You should always answer questions honestly. Sometimes, patients may make it clear that they do not want to have any information about the options, but want you to decide on their behalf. In such circumstances, you should do your best to ensure that the patient

receives at least very basic information about what is proposed. Where information is refused, you should document this on page 2 of the form or in the patient's notes.

