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LARGE BOWEL SURGERY FOR SIGMOID DIVERTICULAR DISEASE.

This guide is designed to provide background information to the operation that you will shortly undergo. It aims to supplement verbal discussion, to answer common questions and to be readily available as an *aide memoir*. It cannot cover in detail every aspect of your individual operation and may not deal with some areas that are of particular concern to you. These can be dealt with individually.

You should feel free to ask about any aspect of your care. All your questions will be answered fully, honestly and in as much detail as you wish. In the heat of the moment it is easy for questions that you intended to ask to slip from your mind. You should note on paper any questions that you may have.

Further information is available at the web site above. This site also provides links to other sites that may provide additional information.

What is diverticular disease?

Diverticular are small out pouches of the colon. They occur through the muscle (like a hernia).

The often used term diverticular disease is unhelpful term as the word 'disease' implies an abnormal pathological process. The reality is that the development of diverticular are part of the normal ageing process. Diverticular in the sigmoid (left) colon are very common in people over 50 years, and in those over 70 years more than half the population will have some diverticular.

Why have an operation?

The diverticular themselves are not an indication for surgery. The indications for surgery are the complications of the diverticular. The most common complication is acute inflammation (acute diverticulitis). That in turn may be further complicated by perforation or abscess. Other less common complications include chronic pain, bleeding and strictures (narrowing).

Simple, uncomplicated acute diverticulitis is not usually a life threatening condition. Patients are treated with antibiotics. Less severe cases can be managed at home with oral antibiotics. The more serious receive intravenous antibiotics in hospital and most settle and go home after four to seven days. Very occasionally some patients require emergency surgery because the inflammation does not settle. More usually emergency surgery is because of an abscess or perforation (see below).

The only way to prevent further episodes of acute diverticulitis is by surgical resection of the diseased colon. Although inconvenient, the development of simple, acute diverticulitis is not normally life threatening, whereas an elective bowel resection does carry a small risk.

On the other hand some patients who develop further episodes of acute diverticulitis will develop an abscess or perforation and may require emergency surgery. The associated sepsis greatly increases the risks of emergency surgery. Normally emergency surgery means that a stoma is required and although the intention is that such stomas are temporary about one third become permanent.

Ideally it would be possible to identify those who are going to have a complicated course and offer them elective surgery before they had a complication and required high risk emergency surgery. Unfortunately, there is no way of knowing which patients will develop further episodes of acute diverticulitis, nor who will present with a perforation or abscess and require emergency surgery.

The medical literature on this subject is not of good quality and is conflicting. Further, it only offers data on a population, not an individual, basis. The following recommendations would constitute a conservative view:-

- Patients who settle rapidly with their first or second episode of uncomplicated acute diverticulitis only have a small risk of a subsequent episode of acute diverticulitis and only a small proportion of those will be complicated. In these circumstances the risks of prophylactic elective bowel resection are greater than doing nothing. So elective surgery is not usually recommended.
- Patients presenting with their third episode of uncomplicated acute diverticulitis have an increased risk of a subsequent episode of acute diverticulitis. Some of these patients will need to consider elective surgery.
- Patients who present with a small abscess that settles with antibiotics or radiological drainage, or who have contained perforation, are considered to have had a complicated episode of acute diverticulitis. There is evidence to suggest these patients are at greater risk of another episode of complicated acute diverticulitis. Some of these patients will need to consider elective surgery, even after the first episode of acute diverticulitis.
- Some patients may have individual, specific indications for surgery after an episode of uncomplicated acute diverticulitis. These indications include a stricture (narrowing), obstruction, frequent recurrences, failure to completely settle, drugs that suppress inflammation (steroids and anti-inflammatories), large abscesses, medical co-morbidities (e.g. diabetes) and age.

Chronic pain alone is rarely of sufficient intensity to require surgery. Diverticular disease is a benign disease and although the pain may be uncomfortable it carries little risk to life. The discomfort has to be balanced against the risks of major surgery (see below).

Bleeding secondary to diverticular disease is usually self limiting. A very small number continue to bleed and emergency surgery is required.

What is involved?

The aim of the operation is to remove the left (sigmoid) colon that contains the diverticular disease and join the proximal colon onto the upper rectum. This is called an anterior resection. A general examination will then be performed to determine the exact extent of the disease and to ensure there are no other abnormalities in the abdomen. The involved bowel will then be resected and the two ends joined together. The wound is then closed. There may or may not be skin sutures that have to be removed some 8-10 day later.

Open or laparoscopic (keyhole) surgery?

Large bowel surgery has traditionally been by open surgery. The incision was either a low transverse incision or an 'up and down' incision in the middle of the abdomen. It is now

possible to offer selected patients laparoscopic (key hole) surgery. Laparoscopic surgery means the incisions are small, but once inside the abdomen a laparoscopic operation is almost identical to open surgery. That is why it is often called 'minimal access surgery'. The advantage of laparoscopic surgery is that the post-operative recovery is quicker.

There is now general agreement that surgery for diverticular disease can be undertaken laparoscopically. If your operation is undertaken laparoscopically one incision will have to be larger than the others in order to extract the bowel. Some operations that commence laparoscopically cannot be completed and have to be converted to an open operation. The operation is then completed in the normal manner.

For the avoidance of confusion, the remainder of this document refers to an open operation. If your operation is undertaken laparoscopically your management will be the same, but progress will be faster and discharge earlier.

Before the operation.

You will have a number of routine blood tests and a heart trace (ECG). You may also have a scan. The exact type will be determined on the basis of your individual requirements. Depending on when you last have a colonoscopy you may need to have another. The anaesthetist who will advise you on the various ways of controlling post-operative pain will assess you. Prior to the operation you may be given a bowel preparation to empty and clean the bowel.

It is important that we know every medical issue that might affect you. What may appear unimportant to you may be essential for us to know. In particular, we need to know all the drugs you are taking. You should bring them to the hospital in their original packet. Unless advised specifically to the contrary you should take all your drugs up to and including the morning of surgery. The exceptions to this are blood thinning agents, such as aspirin, plavix or warfarin, and diabetic drugs. These require special arrangements and must be discussed on an individual basis.

Once you are anaesthetised various tubes and lines will be inserted into your veins, the bladder and through your nose into your stomach. These will be removed during the first 2-4 days following surgery.

Will a colostomy be required?

A stoma (colostomy or ileostomy) is when part of the bowel is brought up onto the abdominal wall and a bag has to be worn. A stoma is frequently required after an emergency operation for diverticular disease. A stoma may sometimes be required as part of an elective operation. Sometimes it is clear prior to surgery that a stoma may be required and you will be so advised. On other occasions it may be deemed prudent during the operation to raise a temporary stoma. This does not necessarily mean there has been a problem and is undertaken as a precaution. Such stomas are normally closed six to ten weeks later with a second small operation.

Pain relief.

Proper pain relief is very important for both holistic and physiological reasons. Your post-operative recovery will be slower if you do not have adequate pain relief. Patients often have an understandable reluctance to take pain relieving drugs. This is a mistake and may increase post-operative complications. The principle that underlies all methods of pain relief is that the drugs work best if you anticipate the pain. A small quantity of the drug taken regularly (even if pain free at that time) will work better than waiting for the pain to occur and then taking a larger dose.

Before the operation the anaesthetist will offer you two types of pain relief. The first is an epidural anaesthetic. This requires a needle to be inserted into your back and drugs are

given through a fine catheter. The alternative is 'Patient Control Analgesia (PCA). With this technique you press a button as and when you feel the pain and a small dose of the pain relieving drug is administered. The advantage of these techniques is that a small quantity of the pain relieving drug can be administered on an on-going or regular basis and prevent the pain rather than treat it after it occurs. This is by far the most effective form of pain relief. Alternatively, regular injections can be administered. This is not as effective as they are usually administered after the pain has occurred.

After a couple of days adequate pain relief can normally be achieved by oral medication. Regular Panadol, regardless of whether you have pain or not, is the foundation on which other medications are given. You should use this to provide background pain relief for a week after your operation. Additional, stronger painkillers and/or anti-inflammatory drugs can then be taken on top of the Panadol for break through pain. Many strong painkilling medications contain morphine, codeine or a derivative of these drugs. One of the side effects of these drugs is constipation.

The first 24 hours.

You may be nursed in a High Dependence Unit (HDU) where you are kept under constant observation. You will be attached to various monitors and numerous observations will be performed. The physiotherapist will visit you and will ensure your lungs are clear and free of secretions and exercise your legs.

The second 24 hours.

Much as day one, but you will be sat in a chair during part of the day.

Days three to five.

Some of the tubes may be removed. You may be permitted some fluid by mouth and you may pass some flatus (wind) through the anus.

Days five to ten.

You will start eating, moving around the ward, have a bath and generally return to normal, but limited, activities. Your bowel will start to work but maybe a little erratic and you may have some diarrhea. You may have an episode of incontinence. Patients recover at different speeds and you should not be concerned if your progress appears slower than you anticipated.

Going home.

You will normally return home 8 - 12 days after your surgery. After laparoscopic surgery you may get home in 5 – 7 days. You will obviously be tired and you should plan to rest during each day. You should avoid domestic activities for at least the first three weeks. Sitting in a high backed chair can reduce the strain on your abdominal wound as it is easier to get up out of.

Recovery over the first six months.

Over the first six weeks you should gradually increase the exercise you take. You should avoid strenuous exercise for four weeks. 'Little but often' should be your aim and a short walk two or three times a day is better than one long walk. Gradually increase the distance you walk over the next few weeks. The surgical wound has almost returned to full strength at ten days, so it is almost impossible to 'over exercise' yourself to the extent that you damage the surgical area. If you feel comfortable doing a particular activity then it is very unlikely you will do yourself any harm. In general it is sudden, unplanned movements that cause problems.

At six weeks you will be only 80% fully recovered (95% laparoscopically). As you start to feel better the likelihood is that you will overdo it and at this stage a couple of days of feeling well (and overdoing it) will be followed by a bad day as your body compensates. You have been warned! In general you should stop if you feel tired or if you feel pain. To fully recover to the point that you feel you have not had an operation will take three to six months, depending on your age and pre-operative fitness.

For medico-legal reasons you must not drive for four weeks.

Bathing and showering.

It is quite safe to get your wound wet with a shower or quick bath two or three days after your operation. However, long soaking baths with a Jeffery Archer novel should be avoided for at least three weeks as the wound will become soft and the scab may become infected. Adding salt to the bath will not help heal the wound and may make your skin dry and tight. After washing, pat the wound dry with a clean towel. A bath mat helps prevent slipping and a towel hooked around the bath taps can be a helpful lever when you try to get out. It can also be reassuring to have someone else in the house the first time you have a bath, even if you do not need help.

Sleep.

Changes in your routine, restricted movement, lack of exercise and wound discomfort will interrupt your normal sleep pattern or wake you during the night. Uninterrupted sleep is more valuable than 'cat-napping' so you may find it helpful to take a pain killer before you go to bed.

You can resume sexual activity when this feels comfortable.

Eating.

Your appetite will not be good for some weeks after surgery and you may feel aches, bloating and indigestion after meals. These symptoms usually disappear as you become more active. You should take small, frequent meals with a good intake of protein (lean meat, dairy produce, fish *etc.*). A small amount of alcohol can improve your appetite and is not usually harmful.

Work.

Your return to work depends on many factors, including your occupation, age and general health. You will definitely require one month off work, and some will require up to two months. It is better to feel completely well before you return to work rather than have to take more time off a few weeks or days later because you have returned to work too early.

The wound.

A major concern to patients is that they will strain the wound and that it will rupture. With today's suture materials this very unlikely. On the very few occasions that a wound does rupture it will be before you leave hospital. This would require an operation to repair the rupture. Once you have gone home a rupture is almost unheard of. If you 'over do it' the worse that will happen is that wound will be very sore.

Wounds progress through several stages of healing. You may experience:-

- unusual tingling, numbness or itching sensations.
- a slightly hard or 'lumpy' feeling as new tissues form.
- pulling around the stitches or staples as the wound heals.

This is normal. Do not pull at any scabs as they act as a natural dressing and protect the new skin underneath. They will fall off when no longer required. You should seek help if any of the following occur:-

- the wound pain increases
- the wound becomes more reddened or swollen
- there is any discharge from the wound

Your post-operative bowel habit.

This operation removes the left colon and joins the proximal colon onto the upper rectum. It is inevitable that your bowel habit will be disrupted in the post-operative period and this may include increased frequency (up to six times per day and again at night), urgency and occasional episodes of incontinence of either flatus (wind) or faeces. Understandably patients find these problems distressing, but they do improve enormously over the first three months and even further over the next six months. Some patients notice an ongoing improvement for up to two years. Depending on your individual circumstances it may be necessary to prescribe some tablets to help you.

Detailed information on how to improve your post-operative bowel habit is available on a separate advice sheet.

Surgical trainees

Some patients may have their anterior resection undertaken by a surgical trainee. A trainee performing an anterior resection is normally, but not always, under the direct supervision of the consultant. It is important that, as part of their training, trainees gain independent experience whilst consultant cover is still immediately available. There is a substantial body of surgical literature that shows the outcome of operations undertaken by properly supervised trainees is no worse than those performed by the consultant. This literature specifically includes anterior resections.

Follow-up.

You will be reviewed about six weeks after your surgery. You will then be reviewed six months later. If you have any concerns you should arrange for your next appointment to be brought forward.

What can go wrong?

You will be undergoing a major operation. Major operations are sometimes complicated by adverse events. That said, the surgeons, anaesthetists and nurses caring for you have an extensive experience in what is, to them, a routinely performed operation.

However, it is important that you appreciate that major surgery does carry risk and complications can and do occur. The table below summarises the potential risks and complications. This table is not exhaustive and if you have any concerns you should ask before you sign the consent form. It is not intended to alarm as most patients will not have a serious complication. However, one third of patients having an anterior resection will have an event that delays their recovery. Although everything possible will be done to prevent the development of any complication, it is only possible to reduce, not eliminate, these events.

The majority of complications tend to occur in two groups. The first group is a direct effect of that particular operation. There are two potential major problems specific to anterior resection. The first is a leak where the bowel was joined (the anastomosis). This is a serious complication (<5% chance) and usually requires a second operation as an emergency. Normally this second operation will require a stoma. It may be possible to close this stoma at a second operation some months later. Up to one third of those developing an anastomotic leak will die as result of the leak.

The second potential problem is damage to the nerves in the pelvis that supply the bladder and genitals. The whereabouts of these nerves is known and every effort is made to avoid them. However, sometimes they are intimately involved with the diverticular disease and

may have to be sacrificed in order to obtain a complete clearance (the prime objective of the operation). On other occasions their post-operative function appears compromised even though there was no evidence that they were damaged during the operation.

If the nerves are damaged there may be problems with micturition and, in men, impotence. The available data regarding the risk of nerve damage is not of high quality. The best available information suggests that in men under 50 years the risk of partial or complete impotence is probably less than 10%. For those aged 50-60 years the risk of partial impotence is 40% and total impotence is 10%. For men aged over 60 years the risk of partial impotence is 10% and total impotence is 40%. These figures are over and above the pre-existing incidence of impotence in the general population. They will be further increased in men with specific risk factors such as vascular diseases, smoking, diabetes *etc.* Studies have shown that even if the nerves are shown to be working at the end of the operation, patients may still be impotent.

The equivalent problem in women is vaginal dryness. In addition, some women may have discomfort or pain during intercourse. This occurs because the dissection separates the back of the vagina from the front of the rectum. When this heals the scar tissue may be firm or rigid.

Less commonly, damage to these nerves can lead to problems emptying the bladder.

The second group are general complications that can occur after any operation. The risk of these complications is greatly influenced by pre-existing medical conditions such as a previous heart attack, chronic illnesses such as diabetes, and smoking.

The best way to manage potential complications is to prevent them occurring in the first place. Hence the use of preventative, or prophylactic, treatment. It is important to correct any underlying medical conditions. For this reason it is essential you advise your doctors of all earlier operations and previous or ongoing medical illness. All your drugs should be brought to the hospital and shown to your doctors.

Risk	What happens	What may be done (options)
<i>General complications that may occur after any surgery</i>		
Clot in legs (DVT)	A clot forms in the legs. This may make the legs swell. The clot may break away into the lungs. This is a pulmonary embolus.	Blood thinning drugs (heparin) started at the time of surgery. TED stockings.
Post-operative bleeding	Blood leaks into the abdomen or out through a drain	1. blood transfusion 2. re-operation
Wound infection	An infection, including the development of pus, occurs in the wound	Antibiotics started at the time of surgery. Drainage of any pus is required, and this may require another operation or drainage under radiological guidance
Intra-abdominal abscess	A collection of pus or infection blood in the abdomen	Drainage, either by surgery or under radiological guidance
Chest infection	A pneumonia develops	Antibiotics are required. A few patients require ventilation (in ICU)
Wound dehiscence	The wound opens up	Surgical repair within a few hours.
Incisional hernias through the wound	A weakness develops in the wound. The bowel then slips through the abdominal wall and a bulge appears. This usually occurs more than six months after surgery. The overall life time risk is >15%. This risk is increased in patients who have a wound infection or a chronic illness like diabetes or obesity.	A surgical repair, usually with mesh, is required.

Urinary tract infection	Bacteria enter the bladder	Antibiotics
Bladder may not empty	It is not possible to pass urine. As the bladder gets full, the patient gets uncomfortable.	The catheter is re-inserted and removed a few days later. Normally this solves the problem. Sometimes a catheter is required for 2-3 weeks. In men, prostate surgery may be required.
Vascular event	Stroke Heart attack	Each event managed on its own merits. Normally a period in ICU is required.
Death		In a fit person <1%. In other patients the risk is very dependent on pre-existing medical problems. A general estimate can be made by the use of risk prediction tables.

Complications that may occur after bowel surgery

Anastomotic leak	The join between the two ends of the bowel develops a leak. In this operation <3 - 8%.	<ol style="list-style-type: none"> 1. antibiotics alone 2. drainage under radiological guidance 3. further surgery, including an stoma if not already present
Post operative ileus	The bowel remains paralysed for longer than the usual 3-4 days	<ol style="list-style-type: none"> 1. a tube through the nose is inserted/ left in the stomach 2. various drugs may be given 3. although it normally resolves in 3-5 days an ileus can occasionally be so prolonged that intra-venous feeding (TPN) is required.
Bowel blockage (adhesions)	Scar tissue in the abdomen blocks the bowel. This can occur within a few days of surgery, or many years later (or any time in between). The life time risk is 15-20%	A NGT and IVI settles most. Some patients require further surgery.

<i>What increases the risk of surgery</i>	<i>Examples</i>	<i>Why is the risk increased</i>
Medical illness	Pre-existing general medical conditions such as endocrine disorders, heart attacks or strokes etc.	As far as possible pre-existing medical problems will be corrected prior to surgery
Previous surgery		Scarred tissue is normally of poor quality and does not heal well
Obesity	All risks increased	<ol style="list-style-type: none"> 1. poor quality tissue 2. poor mobilisation leading to increased risk of DVT, chest infection 3. poor blood supply so the risk of wound or anastomotic failure is much increased 4. extra strain on the wound, heart etc
Drugs	Examples include steroids, aspirin, blood thinning agents	Normally because they increase the risk of bleeding, infection or decrease the quality of wound healing
Diabetes		<ol style="list-style-type: none"> 1. ability to combat infection reduced 2. poor blood supply 3. slow healing
Smoking		Increased risk of anastomotic leak, infection, vascular events and thrombosis

Definitions

IVI	Intravenous infusion ('a drip')	
NGT	Nasogastric tube	A fine tube from through the nose into the stomach to drain the stomach and stop vomiting.
ICU	Intensive Care Unit	For very ill patients, or those requiring ventilation
Ventilation		Placing patients on a machine that does the breathing for them. A tube is placed through the mouth into the upper airway.
