



### INTRODUCTION

Large bowel obstruction is a condition that most practitioners will have to deal with in their careers. It is a serious condition which can be associated with significant morbidity and mortality if not diagnosed promptly and treated correctly. Despite the seriousness of the condition it is often poorly treated and the gravity of the patient's situation is underestimated.

### PATHOPHYSIOLOGY

The pathophysiology of bowel obstruction whether it be small or large bowel depends to a certain degree on the cause of the obstruction and how rapid the onset of obstruction. A common pathway of all intestinal obstruction is described. Once the bowel is completely obstructed it begins to distend. Air that is swallowed accounts for some of the increased gas and bacterial overgrowth with gas forming organisms the rest especially in the colon. A constant stream of enteric fluids also contributes to the distension of the bowel. This increase in the luminal content results in increased luminal pressure. Once this pressure is greater than the pressure in the venules, the pressure in the capillary bed increases resulting in oedema and fluid sequestration further contributing to the luminal distension. Once the pressure rises to the point that perfusion can no longer take place ischaemia sets in which will if not reversed result in infarction, necrosis and eventually perforation. La Place's law explains to us that as the radius increases with a constant pressure the tension exerted on the wall will increase. Put differently if one has two bits of bowel with an equal pressure the bit of bowel with the greatest diameter (presuming equal wall thickness) will have the most force exerted on its wall. This would explain why if the colon is obstructed distally

and the ileo caecal valve is competent, the caecum tends to perforate as it has a wide diameter and a thin wall.

### ETIOLOGY

In the western world colorectal cancer is the most common cause of large bowel obstruction followed by diverticular strictures and sigmoid volvulus. However in parts of Africa sigmoid volvulus is common and colorectal cancer and diverticular disease less frequent. Although colonic pseudo obstruction is not strictly one of the causes of large bowel obstruction it must always be considered as part of the differential diagnosis. Hernias, caecal and transverse volvulus, adhesions, foreign bodies, faecal impaction, radiation strictures and carcinomatosis are all possible although unusual causes of large bowel obstruction.

Cause	Incidence
Colorectal cancer	53%
Volvulus	17%
Diverticular stricture	12%
Other Causes	18%
• Fecal impaction	
• Foreign body	
• Hernia	

### DIFFERENTIAL DIAGNOSIS

Although the diagnosis of large bowel obstruction is usually straight forward it can be challenging. Having a wide differential when faced with dilated loops of bowel on an Xray will aid an intelligent clinical examination, investigation and diagnosis.

Table 2 Differential diagnosis of large bowel obstruction
Small bowel obstruction
Illeus
Hirschsprung's disease
Colonic pseudo obstruction
Congenital leiomyopathy
Toxic Megacolon

## CLINICAL FINDINGS

Patients with large bowel obstruction generally present with early onset obstipation (failure to pass faeces or flatus) and abdominal distension. Abdominal pain is usually mild and vomiting occurs late. Important clues in the history as to the aetiology are duration of onset, change in bowel habit, previous episodes of left iliac fossa pain, episodes of PR bleeding and loss of weight. A patient who can pin point the exact time at which the obstruction occurred is invariably suffering from a volvulus.

On examination the patient will usually have a degree of abdominal distension which can range from subtle to massive. The abdomen can be completely non tender and soft or if perforation is imminent, tender. An acute abdomen is an ominous sign and mandates emergency laparotomy once pancreatitis has been ruled out. Bowel sounds can be increased or absent and do not add a great deal to the clinical picture in my opinion. A PR examination is absolutely essential in the clinical examination of anyone with suspected bowel obstruction as a low rectal tumour is easy to miss with special investigations and embarrassing to discover at laparotomy.

## INVESTIGATIONS

On history and clinical examination one can suspect that the patient is suffering from bowel obstruction but an

abdominal X Ray is required to confirm the diagnosis. Differentiating between large and small bowel obstruction can be difficult and while it is occasionally blatantly obvious it can be impossible to tell without further investigation. Small bowel obstruction can generally be recognised by distended loops of bowel with a central distribution and the presence of linea coniventes (lines that run across the entire width of the bowel). Large bowel has a more peripheral distribution and haustral markings (indentations along the border of the bowel). It is worth noting that both the sigmoid colon and the transverse colon can lie in the centre of the abdomen and it is not unusual to have lines that traverse the entire width of the large bowel as a result of over distension and kinking.

Once the diagnosis of large bowel obstruction is being entertained or cannot be ruled out further investigation is mandatory. The reason for this is that the differential diagnosis for large bowel obstruction includes colonic pseudo obstruction which can be indistinguishable from colonic obstruction on abdominal X Ray. The treatment of sigmoid volvulus is different to that of left sided colonic obstruction or for that matter right sided obstruction. It is thus essential to confirm that there is indeed colonic obstruction and at what site.

A water soluble contrast enema provides an excellent road map of the colon and will establish if there is obstruction, at what site and if sigmoid volvulus is the cause (classical birds beak appearance at the site of the twist). A CT scan with rectal contrast can also provide a colonic road map with the added advantage of giving extra luminal information eg. The presence of liver metastasis. Both investigations are excellent and depend on local logistics and patient factors as to which is best. It is important to note that barium should be avoided at all costs as it impedes diagnostic and therapeutic

colonoscopy.

## **Management**

The management of large bowel obstruction is intrinsically related to the aetiology of the obstruction. It is thus essential to have investigated the patient adequately in order to make a diagnosis and initiate the correct treatment. However all patients who present with large bowel obstruction will require certain basic treatment. Large bore IV access should be established and the patient resuscitated as clinically indicated. A urinary catheter is vital to monitor urine output and assess end organ perfusion. A nasogastric tube may be used if the patient is vomiting but in early large bowel obstruction is often pointless. A blood sample should be sent to assess renal function and electrolytes and these should be adjusted accordingly. Patients with large bowel obstruction will often appear relatively well and are not prioritised as they should be. The condition has a high morbidity and mortality and should not be taken lightly. The further management depends on the cause and site of the obstruction.

### ***Right sided obstruction***

Any obstruction proximal to the splenic flexure can usually be dealt with by doing a midline laparotomy and a right hemi colectomy or extended right hemi colectomy. A primary anastomosis can be performed unless there is a clear argument against this for example a patient who is hemodynamically unstable or the presence of overt peritoneal sepsis.

### ***Left sided obstruction***

In left sided colonic obstruction the management is complicated by the nervousness of surgeons to undertake a primary colon to colon anastomosis after performing a segmental resection, due to the perception of a

high risk of anastomotic leak. This risk is perceived to be increased because of the high bacterial load of the effluent in the obstructed segment, the poor perfusion of distended colon and a patient that is often elderly, frail and suffering from comorbid disease. As a result the surgeon has a number of options to choose from.

- *Three stage procedure*

Stage 1: A proximal stoma is created to decompress the colon.

Stage 2: The obstructing lesion (usually a cancer) is removed.

Stage 3: The stoma is closed.

A 3 stage procedure would classically be used in an obstructing rectal cancer. It has the advantage that the initial emergency operation is small and does not require a high degree of skill and is thus considered safe, however the patient is obliged to undergo 3 separate operations.

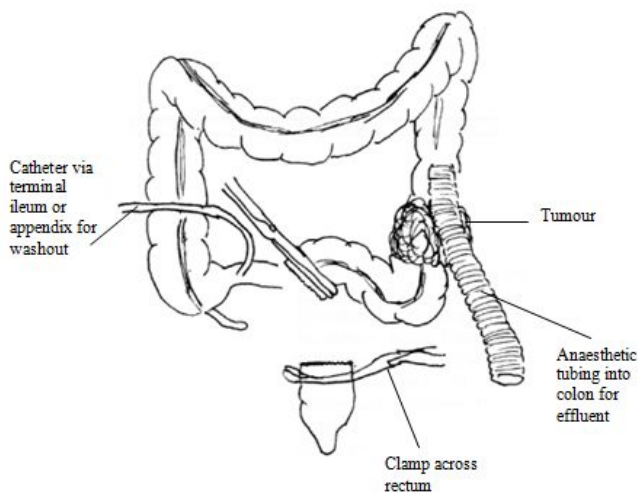
- *Two stage procedure*

- Stage 1: Resection of obstructing lesion and creation of a colostomy
- Stage 2: Closure of colostomy

A 2 stage procedure would commonly be used for an obstructing sigmoid carcinoma. A Hartmann's procedure would be performed to resect the obstructing lesion, the proximal end brought out as a stoma and the distal stump oversewn to create a Hartmann's pouch. This is a very safe operation that requires a moderate amount of skill and is probably the most commonly performed procedure for malignant left sided obstruction. The disadvantage is that to close the stoma a second laparotomy is required.

- *One stage procedure*

After it was noted that up to 60% of stomas created in the emergency setting were never closed interest was piqued in the possibility of treating obstruction without the need for a stoma at all. There are 2 possibilities for one stage procedures. Subtotal colectomy and ileorectal anastomosis. This is ideal for younger patients with good sphincter tone and a high chance of developing metachronous tumours. The dilated portion of colon is removed with all of its effluent and an ileo rectal anastomosis performed with relative safety. Segmental colectomy, on table wash out and primary repair. A segmental colectomy is performed and with the use of prograde irrigation the proximal colon is decompressed and the effluent is washed out allowing for an anastomosis between decompressed bowel without the dangers of a large amount of effluent with high bacterial load passing over it.



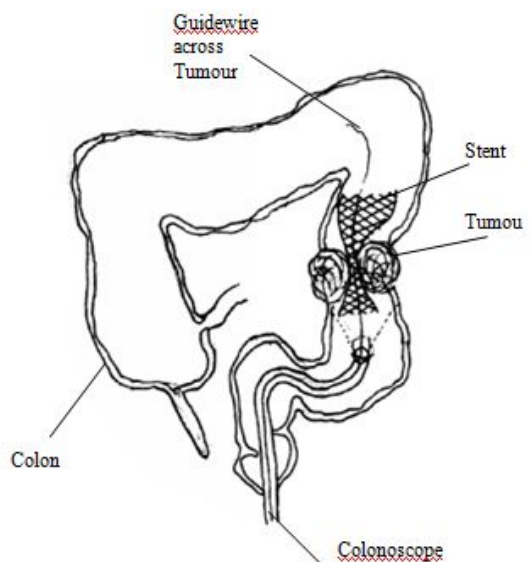
*Figure 1 Colon washout*

Excellent results with this technique have been achieved in published series, showing it to be the equivalent of a 2 stage procedure however the popularity

of the 2 stage procedure attests to surgical scepticism.

### *Endoscopic Stent placement*

The advent of the self expanding metal stent (SEMS) has resulted in a re think in the management of colonic obstruction. A stent can be placed at colonoscopy with the help of fluoroscopy across an obstructing lesion resulting in decompression over the next 24 — 48 hours. This can be used in the palliative setting where for example a patient with an obstructing sigmoid lesion who has irresectable liver metastasis can be decompressed and avoid surgery altogether. Stents can also be used as a bridge to surgery where for example a patient with an obstructing sigmoid lesion can be stented decompressed and then in the following week or two under go an elective resection and primary anastomosis. This is an extremely attractive option, however long term data is not yet available and despite wide acceptance of this technique early randomised controlled trials have been unconvincing.



*Figure 2 SEMS across tumour*

## **Sigmoid Volvulus**

Sigmoid volvulus refers to the rotation of the sigmoid colon on its mesentery resulting in a closed loop obstruction of the colon and frequently an occlusion of the blood supply to the obstructed loop. Sigmoid volvulus has a wide geographic variation. Africa, Eastern Europe, Middle East, India and Latin America are high incidence areas while Northern America, and Western Europe are low incidence areas. In low incidence areas sigmoid volvulus usually occurs in older patients often on constipating medication. In high incidence areas the patients are often younger and otherwise healthy. The common factor amongst high incidence areas is a large amount of dietary fiber.

### **DIAGNOSIS**

Patients usually present with a combination of obstipation, abdominal pain and abdominal distension, with or without vomiting. An abdominal Xray is always indicated. The most prominent feature on Xray is the breathtaking distension of the bowel which is usually massive. The sigmoid may look like a giant coffee bean with its apex seen to overlap the liver, sit above the transverse colon and above the T10 vertebrae. A summation line represents the 2 medial walls of the volved segment lying together and creating a thick line which usually points at the liver. The diagnosis always needs to be confirmed either endoscopically or with a contrast enema which will reveal a smooth tapering at the rectosigmoid junction, a so called birds beak appearance. CT scan can also demonstrate the volvulus showing a whirled soft tissue mass.

## **TREATMENT**

The first priority is to detort the volvulus. This can be attempted endoscopically if the patient shows no features of perforation or infarcted bowel in which case the patient should proceed to laparotomy. Emergency reduction should be attempted with a flexible sigmoidoscope or if not available with a rigid scope. The patient can be placed prone hugging knees to aid detorsion. The sigmoidoscope is passed up to the point of obstruction and under direct vision passed gently through the twist. This usually results in a spectacular deflation. One should look specifically for the presence of infarcted tissue when trying to detort the volvulus and if any is seen abort the procedure immediately and proceed to laparotomy. The use of a flatus tube is controversial and certainly not essential. If endoscopic detorsion fails the volvulus needs to be detorted at laparotomy followed by resection and anastomosis or Hartmans procedure.

Once endoscopic detorsion has succeeded, in a patient that is fit, one needs to ensure that the volvulus does not recur. This can be achieved through a small "appendix" incision in the LIF, allowing for delivery of the redundant sigmoid, resection and primary anastomosis. One would normally allow at least 48hrs between detorsion and resection.

### **COLONIC PSEUDO OBSTRUCTION**

Acute colonic pseudo obstruction, also known as Ogylvie's syndrome, refers to a condition characterised by clinical and radiological features of large bowel obstruction without any mechanical obstruction. In other words it could be considered

an ileus of the colon. It accounts for up to 20% of patients presenting with large bowel obstruction. It usually occurs in elderly patients who often have multiple co morbidities and have recently been hospitalised for trauma, infection or elective surgery. 1% of patients develop colonic pseudo obstruction after joint replacement surgery. Ruling out a mechanical obstruction with CT or water soluble contrast enema is imperative along with correcting electrolyte abnormalities (particularly potassium) and normalising hydration. Opiates, anticholinergics and calcium channel blockers must be stopped. Treatment with neostigmine has been shown in randomised trials to decompress the colon but must be used with care in a frail population. Colonoscopic decompression has also been shown to have a high rate of success and once decompression has been achieved judicious use of laxatives can help prevent recurrence.



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