Acute intestinal obstruction: diagnosis and management

Michael Burke

In acute intestinal obstruction, the clinician must distinguish between acute small bowel obstruction (ASBO) and acute colonic obstruction (ACO). In cases of ASBO, management depends on whether the patient has had previous abdominal surgery. Most cases of ACO require surgery, although mechanical causes must be distinguished from pseudo-obstruction for different management techniques.

Acute intestinal obstruction is a common surgical emergency, usually diagnosed clinically from the classical features of intestinal colic, abdominal distension, vomiting and absolute constipation.

The clinician must first distinguish between acute small bowel obstruction (ASBO) and acute colonic obstruction (ACO). ASBO, in the absence of previous abdominal surgery, requires laparotomy after fluid and electrolyte replacement, and nasogastric aspiration. In the previously operated abdomen, many cases of ASBO are caused by adhesions and these may respond to conservative management. The challenge is to identify those cases which require surgery and to predict strangulation early in the course of the condition, enabling an early operation. In ACO, mechanical causes must be distinguished from pseudo-obstruction, the level of the obstruction must be defined and an appropriate operative plan must be prescribed.

Mr Michael Burke is Consultant General Surgeon, Northwick Park Hospital, Harrow HA1 3UJ

This article discusses the role of imaging in selecting patients with acute intestinal obstruction who will require early surgery, the management of colonic pseudo-obstruction and operative strategy in mechanical large bowel obstruction.

TABLE 1.
Active conservative management of acute small bowel obstruction in the postoperative abdomen

Measure	Hourly	Fluid input, urine output, nasogastric aspirate
	Four-hourly	Temperature, pulse, blood pressure
Observe	Presence of colic, onset of constant pain, nature of nasogastric aspirate, passage of flatus, nature of bowel sounds, abdominal tenderness	
Successful management	Passage of flatus and stool, absence of pain, normal nasogastric aspirate	
Failed management	Failure to improve in 48 hours, onset of constant pain, localized tenderness, pyrexia, leucocytosis	

ACUTE SMALL BOWEL OBSTRUCTION

Aetiology

Bizer et al (1981) found that of 405 cases of ASBO, 74% were caused by adhesions, 8.6% by malignancy, 8.1% by hernia, 5.2% by inflammatory bowel disease and 4.1% were the result of other causes. Conservative management was successful in 85% of cases. Mortality was 6.7%; 44% of deaths were in malignant cases, and 22% were the result of strangulation. In the cases of strangulation, 33% were associated with hernias, 9% with adhesions and 3% with malignancy. Risk factors for strangulation were age >70 years, white blood cell count >18 000x10^9/litre and faeculent vomiting.

Conservative management

The conventional treatment of ASBO in the postoperative abdomen has been to institute fluid and electrolyte replacement and nasogastric suction, and to actively observe the patient (*Table 1*). Sarr et al (1983) have shown that the clinical prediction of strangulation is imprecise. In a prospective study of 51 patients about to undergo surgery, 21 had strangulation (10 detected by the senior assessing surgeon and 9 irreversible). Twenty-five of 36 diagnoses of simple obstruction were correct. Overall, only 35 of 51 preoperative assessments were correct. Radiology can predict the failure of conservative management and detect strangulation.

Prediction of failure of conservative management

Chung et al (1996) used a prospective, blinded study to investigate the use of water-soluble contrast medium follow-through radiology in 51 patients, of whom 67% had had previous surgery. They found that when the contrast medium did not progress to the caecum in 4 hours, 17 of 19 patients eventually required surgery. This compared with 1 of 32 patients where progress was seen, a highly significant difference ($P<0.0001$).

Detection of strangulation

The signs of intestinal strangulation on contrast-enhanced computed tomography (CT) have been defined by Donckier et al (1998) as a high attenuation of the bowel wall, asymmetrical enhancement of the bowel wall, wall thickening, mesenteric congestion or fluid in the mesenteries, and the whirlpool sign in volvulus.

CT has been found to have a high sensitivity and specificity in the diagnosis of ischaemia in ASBO (*Table 2*). CT has a positive predictive value of about 79% and a negative predictive value of 95% in detecting strangulation, with the ability to show the level and nature of the obstructing lesion and to distinguish between mechanical obstruction and ileus.

Other imaging modalities have been investigated for the detection of ASBO. Plain films have the same sensitivity and specificity as CT in the diagnosis of ASBO. Regan et al (1998) found that magnetic resonance imaging confirmed the diagnosis in 26 of 29 patients, diagnosed the level of obstruction in 19 of 26 patients and determined the cause in 13 of 26 patients. Ultrasound is more operator-dependent. Schmutz et al (1997) found that ultrasound had a specificity of 82%, sensitivity of 93% and accuracy of 81% in diagnosing ASBO. The aetiology of the obstruction was diagnosed in 54% of cases of ileus and in 11% of mechanical obstructions.

ACUTE COLONIC OBSTRUCTION

In contrast to ASBO, most cases of ACO will require surgery. The surgeon must distinguish pseudo-obstruction from mechanical obstruction, and in the latter determine the level of obstruction, as operative strategies are different in proximal and distal ACO.

Colonic pseudo-obstruction

In one of the largest studies of this condition, Geller et al (1996) found that 66% of cases were post-surgery or trauma and 34% were associated with acute medical illness. They found that 38% of patients had severe medical comorbidity and 30% died in hospital. Surgery is inappropriate in these high-risk patients. Eighty-eight per cent of these patients can be managed successfully by colonoscopic decompression, which may need to be performed more than once. Flatus tube placement appears to increase the efficacy of colonoscopic decompression.

Problems in mechanical ACO

In right-sided ACO, segmental resection and primary anastomosis is usually easily accomplished once the diagnosis has been confirmed. In left-sided colonic obstruction, the surgical options are staged procedures, segmental resection with on-table lavage and primary anastomosis, or extended colonic resection with ileo-colic anastomosis.

Decision making is complicated by the need to exclude pseudo-obstruction, the high incidence of colonic malignancy (perhaps with synchronous tumours) and the possibility of ischaemia as a result of closed loop obstruction if the ileocaecal valve is competent. Patients are often elderly with comorbidity and are associated with mortality rates up to 13% and permanent stoma rates up to 60%.

Stent placement has been investigated as a means of temporarily relieving left-sided colonic obstruction while patients are prepared for elective surgery (Canon et al, 1997; Binkert et al, 1998; Choo et al, 1998). Although the procedure may give palliation where comorbidity excludes surgery, at present it seems to have no advantage over one-stage operations in fitter patients because of stent migration, reobstruction and perforation.

TABLE 2.
Sensitivity and specificity of a computed tomography diagnosis of ischaemia in acute small bowel obstruction

	Sensitivity	Specificity
Balthazar et al (1997)	83%	93%
Frager et al (1996)	100%	61%
Donckier et al (1998)	100%	92%

Management consists of the correction of fluid and electrolyte loss, nasogastric suction, optimisation of coexisting medical problems and rapid diagnosis of the nature and level of obstruction before early surgery.

CT in colonic obstruction

In a prospective evaluation of CT in colonic obstruction in 75 patients, Frager et al (1998) found the diagnosis was correct in 45 of 47 cases of obstruction (with the correct level in 44 of 47) and in 26 of 28 cases of pseudo-obstruction. Contrast enema was correct in 20 of 25 cases where it was performed. Thus, CT may be preferable to contrast enema, especially as it may show the occasional extraluminal cause of obstruction.

Surgery in left-sided colonic obstruction

Unless there is clinical or CT evidence of closed loop obstruction or ischaemia, surgery can usually be deferred to an elective or daytime emergency list when senior surgeons and anaesthetists may be present. Staged procedures should be avoided unless complications are present.

There is little comparative evidence on the advantages of segmental resection with on-table lavage and primary anastomosis *vs* extended resection with ileo-colic anastomosis. Results from the Scotia Study (Anonymous, 1995), which is the only randomized trial on this subject, showed a significantly higher incidence of diarrhoea and night-time evacuation after the latter procedure, but no other significantly different outcomes. However, numbers were relatively small, many patients did not have the randomized operation and a high proportion of operations were performed by junior surgeons. Therefore, the evidence remains inconclusive. Within the study, 12% of patients had synchronous cancers or polyps.

Non-randomized prospective studies of extended colectomy *vs* segmental resection have shown similar outcomes, but with a lower incidence of diarrhoea and significantly shorter operating times in the patients who had undergone extended colonic resection, and significantly more complications in those who had had segmental resection (Torralba et al, 1998).

Diarrhoea after extended colectomy may be the result of the loss of water-absorbing colon or the exposure of distal colon to unabsorbed bile salts. Papa et al (1997) found that the incidence was related to the length of resected ileum and the residual colon. They recommended that <10 cm of ileum should be resected, and at least 10 cm of colon should be preserved above the rectosigmoid junction. In practice, trained colorectal surgeons should be able to retain all the ileum. Currently, as long as an appropriately trained surgeon is present, primary anastomosis should be the aim, but the choice between segmental resection and extended colectomy should depend on the surgeon's preference and aptitude, and the local facilities.

CONCLUSIONS

In ASBO, cooperation between the surgeon and the radiologist can lead to a rapid prediction of which patients need an early operation because of the high probability of failure of conservative management, and improve the accuracy of diagnosis of intestinal ischaemia in doubtful cases.

In ACO, such cooperation leads to the rapid exclusion of pseudo-obstruction and the accurate determination of the level and nature of the obstructing lesion, thus helping to determine operative strategy. With the involvement of senior surgeons and the availability of daytime emergency operating theatres, one-stage restorative surgery should be possible in most cases.

KEY POINTS

- Classic features of acute intestinal obstruction include intestinal colic, abdominal distension, vomiting and absolute constipation.
- Acute small bowel obstruction (ASBO), in the absence of previous abdominal surgery, requires laparotomy after fluid and electrolyte replacement, and nasogastric aspiration.
- In the previously operated abdomen, many cases of ASBO are caused by adhesions and may respond to conservative management.
- In acute colonic obstruction, mechanical causes must be distinguished from pseudo-obstruction, the level of the obstruction must be defined and an appropriate operative plan prescribed.
- Studies of the different imaging modalities are needed to determine their relative accuracy and cost-effectiveness.

Prospective studies comparing cross-sectional imaging with contrast follow-through radiology and enema examinations are needed to determine the relative accuracy and cost-effectiveness of these techniques. Colonic pseudo-obstruction can be accurately diagnosed by such techniques and successfully treated by colonoscopic decompression and tube placement in most cases. **HM**

Conflict of interest: none.

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In the Public's View...

Changing priorities: the price of life

Splashed across the newspapers on New Year's Day was the wonderful news that some brave resourceful scientist has found the fat gene. Now we can all carry on overeating as much as we like and not put weight on. What a miracle! What a supreme advance in modern medicine! Of course, the work so far is only on the fat gene in mice, and we still need to develop the drug to turn the gene off, and we don't yet know what nasty unsuspected side effects there may be. But don't be a party pooper: rejoice!

Some things bear repeating. Nearly 40 000 children die every day because they don't have clean water or simple medicines. The life expectancy in Ghana is 57 years; they have 11 000 cases of malaria per 100 000; 3.6% of their adults have acquired immunodeficiency syndrome (AIDS). Ghana is just an example, chosen because I have the numbers to hand. There are worse places. What countries like that need more than anything else is a drug to stop them getting fat because they're a greedy bunch who eat too much.

I know that I'm as guilty as anyone else. I live in a comfortable house, drive a smart car and take expensive holidays. Do I have a right to talk unless I choose to live a frugally comfortable life and give all surplus money to charity? That is the position of some philosophers, although I venture there are many in the Western world who have even less right to speak than I do.

The Americans, currently trying to sort out the world by dropping bombs on one of its poorest countries, donate 0.1% of their gross national product to foreign aid to the poor. That is the equivalent of a hospital consultant giving just £70 to charity in 1 year. The UK does a little better, but not much: we manage a little over 0.3%.

Those 40 000 children a day in faraway countries of which we choose to know little can be balanced against one of the biggest health stories of 2001: the revelation that statins 'are the new aspirin' (comparative cost just over £1 and just under 1p per day, but let that rest).

Putting ten million people worldwide on daily statins would 'save' 50 000 lives. Oh, sorry! That is 50 000 per year, not per day, and the people whose lives will be saved won't have had a chance to starve, or die of diarrhoea, but will, by virtue of their diets and lifestyles, have managed to clog their arteries.

Maybe, once the profits from statins in the drinking water come rolling in, the drug companies can turn their attention to that other scourge of humankind: male pattern baldness. **HM**

Dr Neville W Goodman is Consultant Anaesthetist at Southmead Hospital, Bristol