INTESTINAL DECOMPRESSION*

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"Chubes", he whispered, "Chubes".

Kipps by H. G. Wells

Tubes for use in the gastro-intestinal tract have been designed for a number of different purposes and have undergone many modifications. Their development and routine application has mainly paralleled advances in abdominal surgery in this century, although there were much earlier attempts at intubation of the gut.

John Hunter (1790) with an ingenuity one would have expected of him, used a fresh eel skin for intra-gastric feeding in the management of a patient suffering from bulbar palsy and unable to swallow. For introduction the eel skin was drawn over a probang.

Alexander Munro (1797) of Edinburgh recalled that his father used a flexible tube of coiled wire covered with leather to remove fluid and gas from the stomach of cattle in which there had been excessive fermentation.

For the treatment of persons who had taken poison, a Philadelphia surgeon, appropriately named Philip Physick (1800) advocated the use of a tube to wash out the stomach.

Apart from being used as a means of sampling gastrointestinal secretions and contents for physiological study, gastrointestinal tubes have been mainly used for aspiration of the gut and for feeding purposes.

Aspiration of gut contents is carried out following abdominal surgery to prevent accumulation of fluid and gas and resultant distension and also in the management of patients suffering from intestinal obstruction, whether mechanical or paralytic, to reduce established bowel distension.

The importance of distension as a lethal factor in intestinal obstruction and ileus was emphasised by Wangansteen (1931). He considered the sequence of events was as follows. Intestinal stasis and accumulation of gas and fluid in the gut-distension of the bowel lumen-thinning of the intestinal wall-increased intraluminal pressure-decreased absorption from the gut-vascular stasis in the bowel wall-increased permeability-migration of noxious substances through the damaged bowel wall and consequent toxaemia from transperitoneal absorption.

Wangansteen and Rea (1939) showed that when distension was prevented, experimental animals could survive long periods of intestinal obstruction. In their experiments the cervical oesophagus was transacted in dogs and the distal end closed. Abdominal section was then performed, and the bowel obstructed by dividing it at a chosen site after stripping the gut clear of its contents. The animals were then kept alive by parental feeding. Survival times were 35 days for the average and 57 days for the longest when the dogs were examined post mortem there was only a small amount of gas in the lumen of the gut. Excluding swallowed air had allowed the dogs to survive. By not becoming distended, the gut continued to reabsorb its secretions and remained healthy.

Intestinal distension is the cause of many of the hazards in the surgical management of intestinal obstruction. During the operation it may make the causative lesion difficult to see, can predispose to rupture of the thinned bowel wall and create technical difficulties in primary anastomosis between proximal distended and distal collapsed intestine. Subsequent closure of the abdominal wall is often under tension which may predispose to wound disruption and impede diaphragmatic movement. Accordingly, it is not surprising that throughout the development of the surgical treatment of intestinal obstruction, methods have been sought to relieve distension at operation. The need for enterotomy and decompression has been lessened but by no means abolished by intestinal intubation before and during operation with various devices.

Monks (1908), Van Den Burgh (1920) and Holden (1926) all recommended enterotomy and intestinal decompression by siphonage. Mcynihan (1926) maintained that enterotomy was an almost essential feature in cases of acute intestinal obstruction. The hazards of enterotomy intestinal decompression is mainly that of peri-

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toneal contamination. However, there are many advantages in relieving intestinal obstruction at the time of operation. When bowel is obstructed and becomes distended with accumulated fluid and gas, peristaltic activity is initially stimulated but later, as distension increases, tone in the bowel is lost until eventually transportation movements become weaker and paralysis of the gut results. The reversal of this sequence is essential for return to normality with restoration of normal dynamics and absorption capability of the gut, that is to say distension must be relieved by the removal of the obstruction and accumulated gut contents permitting shortening of the muscle fibres of the bowel wall, return of tone and normal transportation movement. The relief of distension precedent to the return of tone and movement is a common treatment objective whether the obstruction is due to dynamic (mechanical) or adynamic (paralytic ileus) causes.

The worth of the principle of decompressing obstructed gut has been accepted for a number of years. To this end have been introduced naso-gastric intubation of the stomach (Wangansteen 1931), the Miller-Abbott tube and its several variants for suction decompression of the small bowel and more recently the use of a metal suction decompressor introduced into the small bowel at operation as designed by Savage.

Lowdon (1951) introduced a method of aspiration by the use of an aspirating needle, but suggested that it is often advisable to aspirate at more than one point using a fresh needle for each puncture. He pointed out however that with his method only the gaseous contents of the bowel could he removed since fluid blocked the needle so rapidly that no useful reduction of distension could be obtained.

Naso-gastric tube aspiration of the stomach merely serves to keep the stomach empty and does not effectively decompress the small intestine. Miller-Abbott tubes are extremely difficult to introduce and require a degree of cooperation of the patient that the really ill patient cannot muster and is not regarded universally with favour while a critism of the last method which is the Savage Metal Intestinal Decompresser is that while it is effective in decompressing the obstructed small bowel, the method which involves concerteenering the small bowel over a rigid sucker-head appears unnecessarily traumatic to the gut.

Another application of intestinal intubation and decompression has been advocated by White (1956) and more recently by Luck and Eascott (1961).

Recurrent small bowel obstruction consequent upon adhesions following peritonitis due to any cause is a problem that can cause much anxiety to the surgeon. One's impression is that such a sequence of events is more common nowadays since the advent of antibiotics as more patients survive generalised peritonitis to encounter post-peritonitic adhesions. Furthermore, by the use of antibiotics, a state may be reached in the peritoneal cavity best described by the expression 'subacute adhesive peritonitis' with here and there pockets of sterile pus, a state of affairs which used to be referred to by my old chief Charles Wells as 'empyema peritonei'. Opening the abdomen and division of the offending adhesions is all too liable to lead to the formation of further adhesions and another episode of obstruction again necessitating surgical intervention.

Noble (1937) has successfully practised what he calls 'bowel plication' in the management of these patients. This technique consists of freeing the bowel of the adhesions at laparotomy for small bowel obstruction and returning it to the abdominal cavity with the loops sutured together in an orderly disposition. The principle accepts the inevitability of adhesion formation in such circumstances and holds that it is better to deliberately create adhesion by sutures in an orderly manner than to take the chance of random adhesions forming with the attendant risk of causing angulation of loops of bowel and resultant recurrent intestinal obstruction.

To produce controlled adhesion in patients operated on for post-peritonitic intestinal obstruction, White (1956) internally splinted the small bowel by manipulating a Miller-Abbott or Cantor tube down into the terminal ileum at operation. The tube was inserted through the nose or via a high jejunostomy if there was difficulty in coaxing it round the duodeno-jejunal flexure. Of 16 patients treated in this way 12 out of 14 followed up for periods of one to six years progressed satisfactorily.

Luck and Eascott (1961) reported three patients on whom a similar technique was used successfully with the added refinement that the dilated bowel was evacuated by suction aspiration through an enterostomy at operation and low pressure suction applied to the Miller-Abbott tube which was left insitu for 8 to 9 days.

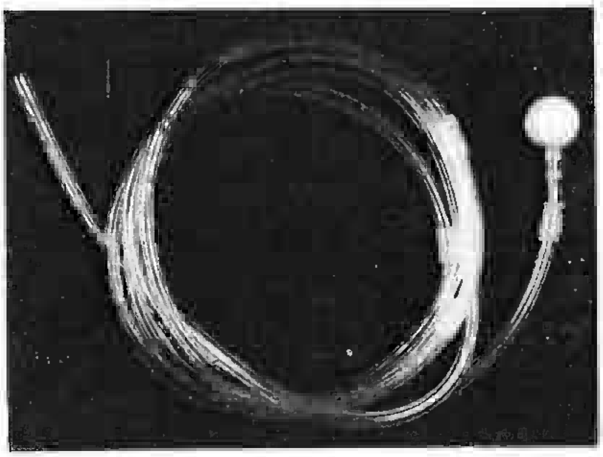

Fig. 1. Small bowel decompression tube.

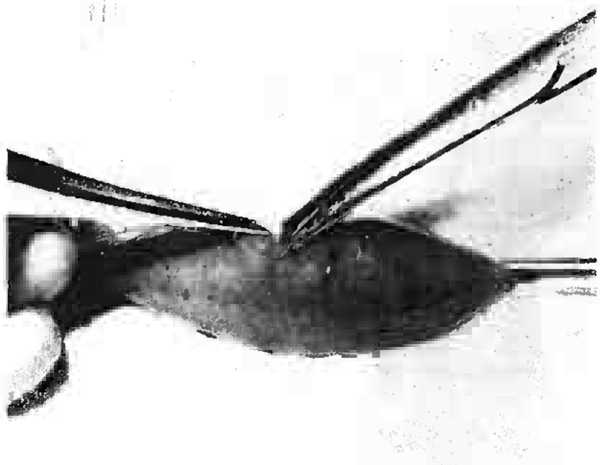

Fig. 4. Insertion of jejunostomy tube.

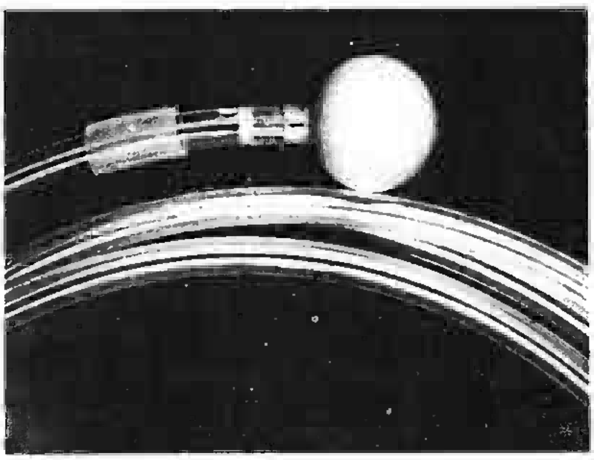

Fig. 2. Small bowel decompression tube.

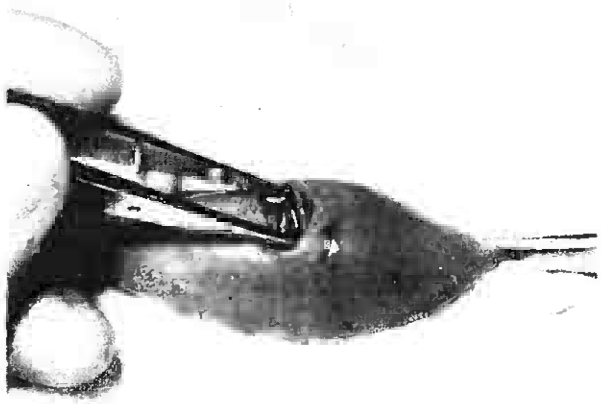

Fig. 5. Insertion of jejunostomy tube.

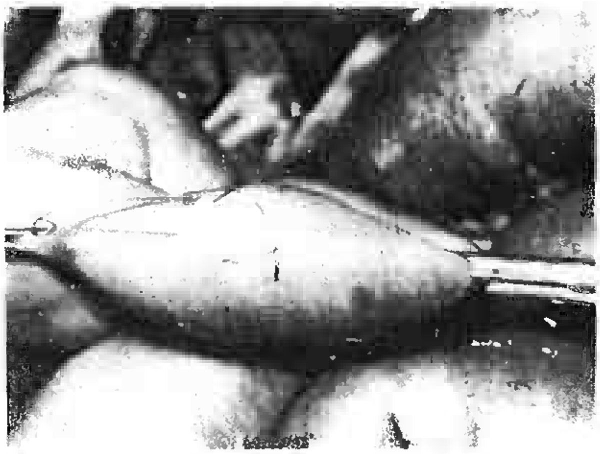

Fig. 3. Insertion of jejunostomy tube.

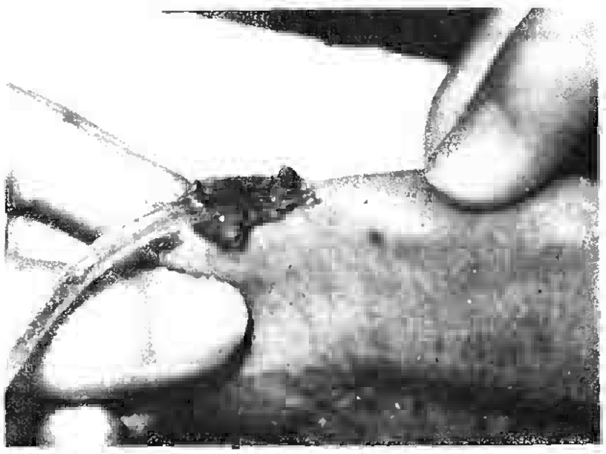

Fig. 6. Insertion of jejunostomy tube.

A NEW TUBE

A tube that has been devised personally and successfully used in practice during the past 12 months and which has the dual capacity of decompressing distended obstructed small bowel at operation with minimal trauma to the bowel and which can be left insitu for postoperative management for continued postoperative small bowel suction and internal splinting to avoid recurrent bowel obstruction will now be described.

The device is made of transparent vinyl NT/13 shore hardness 80, diameter 8 mm., is 180 cm. long with a trumpet proximal end and at its distal end bears a plastic bobbin screwed on by means of a tapping (Fig. 1). The tube has a terminal orifice and a lateral port just proximal to the bobbin (Fig. 2). It is supplied in a plastic envelope, pre-sterilised by gamma radiation and is used as follows:

At operation the first presenting distended loop of obstructed bowel is controlled by means of a Doyen intestinal clamp. A purse-string suture is then inserted into the bowel wall (Fig. 3) and a small enterotomy made (Fig. 4). The bobbin end of the decompression tube is then put into the bowel lumen and the purse-string suture drawn snugly around the tube to control spillage of gut contents (Figs. 5 and 6). Suction is then applied to the trumpet proximal end of the tube; the intestinal clamp is released, and the decompression tube drawn along the bowel by manipulating the bobbin through the bowel wall with fingers (Fig. 6). To prevent bowel mucosa being sucked into the orifices and obstructing the tube from time to time, suction aspiration is carried out intermittently and the obstructed bowel decompressed a segment at a time. As the distended bowel is progressively decompressed more gut is withdrawn from the peritoneal cavity and the deflated exteriorised bowel protected by a warm moist pack. If it is not intended to leave the tube insitu, it is withdrawn after bowel decompression is considered to be sufficient and the enterotomy closed by tying the purse-string suture and covering the site by means of the few transversely placed sero-muscular sutures. Alternatively, if the tube is required to be left insitu for postoperative small bowel aspiration and to internally splint the bowel, the bobbin is manipulated down to the region of ileal-caecal junction, unscrewed from the tube (Fig. 7) by manipulation through the bowel wall and cast off into the bowel lumen to be subsequently passed in the patient's stool.

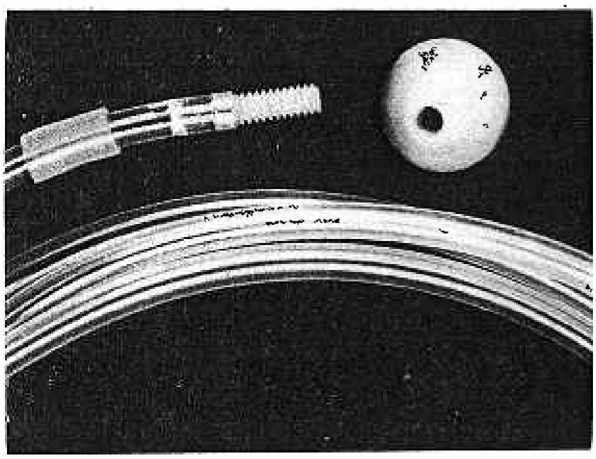

Fig. 7. Small bowel decompression tube — the bobbin unscrews if the tube is to be left indwelling to facilitate subsequent withdrawal.

The proximal end of the tube is then brought out via a separate stab incision appropriately placed in the abdominal parietes and the enterotomy site fixed at that point by means of two fine linen thread sutures. Release of the bobbin from the tube is necessary as otherwise it would impede subsequent withdrawal of the tube (after an interval of several days) when intestinal motility has returned, all distension disappeared and the patient has passed stools or flatus. During the postoperative management low pressure suction may be applied to the decompression tube.

The intestinal decompression tube is made by and can be obtained from Portland Plastic Limited, Hythe, Kent, U.K.

SUMMARY

The subject of operative decompression of distended obstructed bowel is reviewed and a new tube designed for intestinal decompression is described and its utilisation illustrated.

REFERENCES

1. Cantor, M.O. (1957): "Gastro-Intestinal Obstruction", William and William Co., Baltimore, p. 354.
2. Holden, W.B. (1930): "Surgical treatment of acute Intestinal Obstruction", Surg. Gynec. and Obst. 50, 184.
3. Holden, W.B. (1926): Arch. Surg. 13, 882.
4. Hunter, J. (1841): "A case of paralysis of the muscles of deglutition caused by an artificial mode of conveying food and medicines into the stomach", The complete works of John Hunter, F.R.S. edited by J.F. Palmer, Haswell, Barrington and Haswell, 4, Phila. p. 185.
5. Lowden, A.G.R. (1951): "Deflation of distended bowel at operation", Lancet, 1, 1,103.
6. Luck, R.J. and Eastcott, H.H.G. (1961): Brit. Med. J. 1, 1,200.

7. Monks, G.H. (1908): "Intestinal Obstruction", Ann. Surg. 47, 953.
8. Moynihan, B. (1926): "Abdominal Operation", Vol. 1, London.
9. Noble, T.B. (1937): "Plication of small intestines or prophylasis against adhesives", Am. J. Surg. 35, 41.
10. Physick, P.S. (1813): "Account of a new mode of extracting poisonous substances from the stomach", Electric Repertory and Analytical Rev. 3, 2.
11. Senn, N. (1889): "Intestinal Surgery", W.T. Kenner, Chicago.
12. Smith, G.A. and Brackney, E.L. (1950): "Preliminary report on a new method of intestinal intubation with the aid of a flexible stylet with controllable tip", Surg. 27, 817.
13. Vandenburgh, H.J. (1920): "Decompression of obstructed gut", J. Mich. Med. Soc. 19, 67.
14. Wangansteen, G.H. (1933): "Therapeutic consideration in the management of acute intestinal obstruction", Arch. Surg. 26, 933.
15. Wangansteen, O.H. and Rea, C.E. (1939): "Distension factor in simple intestinal obstruction: experimental study with exclusion of swallowed air by oesophagostomy", Surg. 5, 327.
16. Wangansteen, O.H. (1931): "The diagnosis and treatment of acute intestinal obstruction", Northwest Med. 30, 389.
17. White, R.R. (1956): "Management of Adhesion—Intestinal Obstruction", Ann. Surg. 143, 714.