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New procedures

Improved technique for placement of intestinal feeding tube with the fibreoptic endoscope

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SUMMARY A feeding tube can be rapidly introduced into the small intestine through a makeshift 'external channel' of the fibreoptic endoscope. To prevent dislodgement of the feeding tube upon withdrawal of the endoscope, the former may be stabilized by means of the biopsy forceps introduced through its regular channel.

Endoscopic intubation of the small intestine employing a guiding string passed through the biopsy channel of the endoscope has been previously reported (Keller, 1973). This technique is based on the theory that, after the endoscope has been manoeuvred into position, traction on the guiding string (tied to the intestinal tube outside of the endoscope) would move the tube towards the tip of the endoscope. In our experience, many difficulties are encountered with this method. The high resistance met by the intestinal tube in negotiating the curvatures of the upper gastrointestinal tract causes extreme tension in the string. The 'bow-stringing' that ensues has led to cutting and sawing into the mucosa with either bleeding or breaking of the string. Upon withdrawal of the instrument, the friction between the tube and the endoscope is such that the former is frequently dislodged despite inflation of the balloon of the intestinal tube with air or water. The authors have therefore developed an alternative endoscopic technique to carry out intubation of the jejunum for institution of tube feeding.

Methods

EQUIPMENT

The instruments employed are shown in Figs. 1-3. The paediatric panendoscope Olympus GIF-P was modified by attaching a polyethylene tube (PE-360, ext. diameter 4·7 mm, int. diameter 3·8 mm) alongside it, wrapped with Parafilm so as to function as an 'add-on large channel'. The cross-section of the modified instrument measures 8·6 mm × 14 mm. The range of movement, as is demonstrated in Fig. 2, is not impaired. The intestinal tube to be used for intubation is made of polyethylene tubing (PE 240, ext. diameter 2·4 mm, int. diameter 1·6 mm) with an optional 5 cm long mercury chamber made of silastic tubing glued to the tip. Silk sutures (4-0) are tied at 10 cm intervals from the tip, for a distance of 60-80 cm (Fig. 3B). This tube measures 250 cm in length, and is preinserted into the larger polyethylene tube before performing endoscopy.

PROCEDURE

Endoscopy with this modified instrument is performed as usual. Rotation of the instrument may be rendered slightly more difficult because of the polyethylene tubing attached alongside. Upon reaching the desired location in the small intestine, the intestinal tube is advanced for a distance of about 20 cm (Fig. 3A). The endoscopic biopsy forceps is then passed *via* the forceps channel, and a firm grasp of the nearest ligature on the tube is obtained with the forceps. With the forceps kept stationary, withdrawal of the endoscope is carried out slowly, a few centimetres at a time, sliding the endoscope over the biopsy forceps (Fig. 3B). When the handle of the biopsy forceps prevents further withdrawal of the endoscope, the forceps are withdrawn for a short distance to obtain purchase on the next higher ligature. By this process the endoscope is withdrawn

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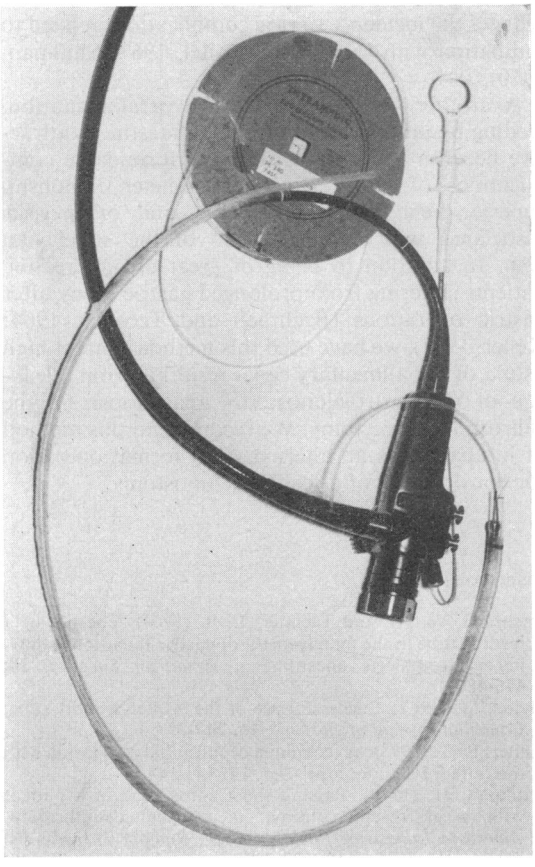

Fig 1

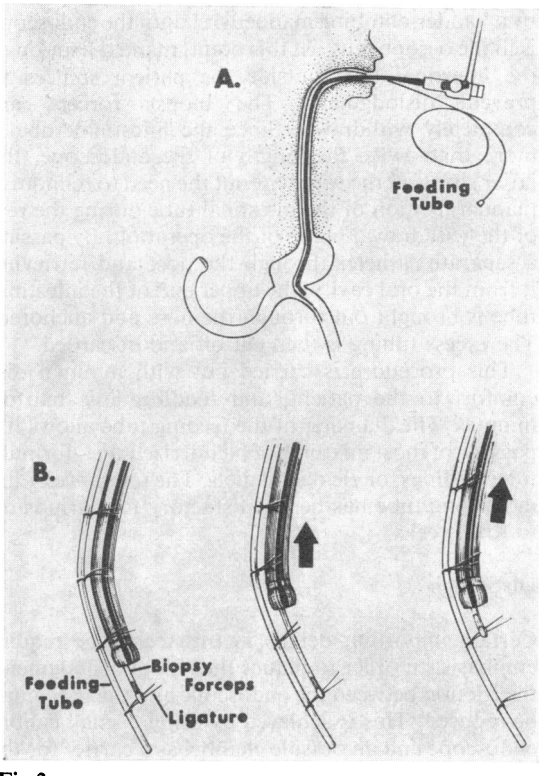

Fig 3

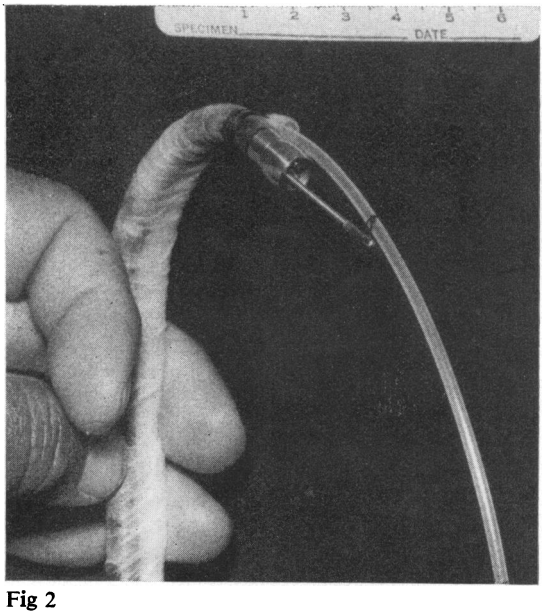

Fig 2

Fig. 1 *Assembled instruments. Olympus GIF-P endoscope modified by attaching alongside it a polyethylene tubing serving as a large 'channel'. The intestinal feeding tube is shown pre-inserted with the tip exposed.*

Fig. 2 *Details of the modified instrument showing the unimpaired range of flexion attainable, the biopsy forceps holding a ligature on the feeding tube, and the manner of attachment of the large 'channel'.*

Fig. 3 A. *Diagram of intubation of the jejunum across a Billroth II gastrojejunostomy.* B. *Diagrams, from left to right, showing stages of withdrawal of the endoscope. Notice that for the sake of clarity, the large polyethylene tube attached alongside the endoscope serving as 'channel' has been omitted from the figures.*

by a 'ladder-climbing manoeuvre' until the endoscope is in the oesophagus. At this point, manual fixation of the intestinal tube outside the patient suffices to prevent dislodgment. The biopsy forceps are completely withdrawn. Since the intestinal tube is more than twice the length of the endoscope, the latter slides off the tube without the need to relinquish manual fixation of the intestinal tube during the rest of the withdrawal phase of the operation. By passing a separate catheter through the nose and retrieving it from the oral cavity, the upper end of the intestinal tube is brought out through the nose and anchored. The excess tubing is then cut off and discarded.

This procedure is carried out with minimal discomfort to the patient, and requires less than 30 minutes. The diameter of the feeding tube allows the passage of most mixtures of blenderized diet, formula tube feedings, or elemental diets. The tolerance of the indwelling tube has been satisfactory for periods up to four weeks.

Discussion

Certain important details in this technique require emphasis. In order to reduce the risk of dislodgment, the friction between the endoscope and the tube must be reduced. This is achieved by using a small calibre endoscope and an outside channel as a carrier for the actual feeding tube. We find that a mercury-weight is unnecessary unless intubation of the distal small bowel is desired. The use of a finer and longer tube without a balloon or weight at the tip theoretically reduces the incidence of rare complications related to intubation with long tubes (Deitel, 1967; Shulman, 1970).

As an alternative to intravenous hyperalimentation, feeding by intubation of the small intestine is attractive because it does not carry the formidable complications of sepsis, phlebitis, catheter embolism, superior vena cava obstruction, and other risks associated with catheterisation of the subclavian vein. In addition to being of great use in treating patients suffering from prolonged gastric atony after gastric operations (Bachrach and Tecimer, 1964; Keller, 1973), we have used this method to treat high fistula of the alimentary canal resulting from a leakage of the gastrojejunostomy anastomosis in the Billroth II gastrectomy. We recommend this method of intubation as an alternative to formal operation for construction of a feeding jejunostomy.

References

Bachrach, W. H., and Tecimer, L. B. (1964). The use of a feeding tube in the management of gastric retention following gastro-enteric anastomosis. *American Surgeon*, **30,** 476-480.

Deitel, M. (1967). Successful use of the Miller-Abbott tube. *Canadian Journal of Surgery*, **10,** 245-257.

Keller, R. T. (1973). A technique of intestinal intubation with the fibreoptic endoscope. *Gut*, **14,** 143-144.

Shulman, H. (1970). Passing the Cantor tube in a patient with a gastro-enterostomy, an unusual complication. *American Journal of Roentgenology, Radium Therapy and Nuclear Medicine*, **110,** 332-333.