Fluoroscopy-guided insertion of nasoenteric tubes with guiding catheters and wires past the Treitz ligament to resolve dilatation of small bowel

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Aims and objectives

Small bowel obstruction (SBO) from either adhesion by previous abdominal surgery or malignancy can cause from simple abdominal pain its mild form, to fatal condition such as bowel ischemia and sepsis in case of strangulation.

Decompression of gastrointestinal tract is the most important and effective way to treat the bowel obstruction without evidence of strangulation [1, 2]. Previously, surgical approach was chosen to treat the bowel obstruction including SBO; with the development of instruments, nasogastric tube (NGT) or nasointestinal or nasoenteric tubes have been introduced and widely used. Once, there was a report which addressed that there was no advantage of the long tubes over the ordinary NGT [3], but other reports insisted the effectiveness of long nasoenteric tubes for the treatment of adhesive SBO [4-6].

The purpose of our study was to evaluate the feasibility and effectiveness of insertion of nasoenteric tubes with guiding catheters and wires past the Treitz ligament for the treatment of SBO.
Methods and materials

From April 2010 to December 2013, all 60 patients were requested to insert the long nasoenteric tubes (M 37, F 23; Mean age 61.6 ± 12.3). The cause of SBO obstruction was postoperative adhesion (n=48; 19 from colectomy due to colon cancer, 15 from total or subtotal gastrectomy due to stomach cancer, four from hysterectomy with salpingo-oophorectomy due to gynecologic malignancy, two from cystectomy due to bladder cancer, one from distal pancreatectomy due to pancreatic cancer, seven from benign conditions) or peritoneal seeding (n=12; four from advanced gastric cancer, three from ovarian cancer, two from colorectal cancer, two from primary peritoneal carcinomatosis, and one from pancreatic cancer). For 50 patients, Miller-Abbott tube (Song-Lim Gastric Catheter, Fuji Systems) was inserted for the decompression of SBD, and for 10 patients the CLINY Ileus Tube suite (Create Medic, Tokyo, Japan) was used.

For the Miller-Abbott tube, before tube insertion, a sidehole was added using a scissor at the wall of the suction lumen (Fig 1) 50 to 70 cm away from the distal tip of the tube. The length of 50 to 70 cm was chosen for the sidehole to stay at least in the stomach and possibly in the duodenum past the pylorus to prevent regurgitation. The sidehole was made over the marker line to avoid hurting the balloon channel, and the diameter was about 0.5 cm, big enough to let two or three guidewires to pass through. With the patient in his or her supine position with his or her head turning right to the radiologists, a topical nasal anesthesia was applied. Then, a 260 cm stiff hydrophilic exchange guidewire (Radiofocus M, Terumo, Tokyo, Japan) was passed though the nostril and nasal cavity with the aid of a suitable 5 Fr catheter. The guidewire was advanced past the pylorus and Treitz ligament into the jejunum as far as possible. The stiff end of the exchange tube out of the patient was put into the endhole of the Miller-Abbott tube, the tube was advanced until the tip of the wire reached the new sidehole, and the wire was pulled out of the tube via the new sidehole (Fig 2). Then the tube was pushed through the nasal cavity and esophagus into the stomach. Sometimes the stomach was partially distended even if decompression was tried with insertion of the Levin tube prior to the procedure, and the tube and the wire twisted in the lumen of the stomach. In that case, another 260 cm stiff exchange guidewire was introduced through the new sidehole; the tip of the second guidewire stayed in the suction lumen near the tip and provided support in the lumen of the stomach. Uncommonly, we used a third guidewire to provide more solid support. Finally, the Miller-Abbott tube was pushed past the pylorus and The Treitz ligament into the jejunum.

For the Ileus tube, first, we inserted a 260 cm stiff exchange wire into the jejunum as deep as possible with exactly same way as that in case of the Miller-Abbott tube. The kind of the Ileus tube which we used didn’t have the endhole, so we had to pass the first guidewire which runs from the nose to the jejunum, from the distal endhole near the metal balls via the suction channel to the most proximal endhole (Fig 3). After this, for additional support,
the second wire was inserted into the funnel of the suction lumen to the blind end of the tube tip (Fig 4). Then the Ileus tube and the second wire was pushed into the nasal cavity to the jejunum past the Treitz ligament. If additional support was needed, a Lunderquist Extra Stiff (Cook Medical, Bloomington, Ind) was inserted in the same way as the second wire; for this third wire the body stayed in the stomach to avoid excessive friction with the tube which the complex curve of duodenum and jejunum would bring up.
Fig. 1: (1) grey area: a sidehole with 0.5cm diameter made over the marker line (2) solid line: a marker line on the one side of the Miller-Abbott tube (3) double dotted line: a balloon channel

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Fig. 2: (1) a new sidehole made with a scissor on the marker line (2) a 260cm stiff hydrophilic exchange guidewire which enters the endhole of the tube and escapes through the new sidehole (3) a additional 260cm stiff hydrophilic exchange guidewire which enters the suction channel via the new sidehole. The end of this wire stays in the distal end of the Miller-Abbott tube.

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**Fig. 3:** (1) a 260cm stiff exchange guidewire which runs through the most proximal and the most distal endholes.

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Fig. 4: (1) the first wire (2) the second wire, of which the tip should stay in the blind end of the Ileus tube

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Results

For 18 patients from 50 patients who underwent successful insertion of a Miller-Abbot tube, duration of treatment could not be evaluated because of surgery (n=8) before improvement of symptom and sign, spontaneous or iatrogenic retraction (n=6), malfunction (n=3), and hopeless discharge (n=1). For 32 with improvement of symptom and radiologic findings, mean duration of tube indwelling was 7.6 ± 5.2 days (1~24 days) (Fig 5, 6). Two patients from 10 patients with insertion of an Ileus tube were excluded from the study because the patient passed away after emergency surgery (n=1) or the tube failed to work properly because of obstruction (n=1). For eight patients with improvement, mean duration of tube indwelling was 7.9 ± 4.1 days (5~17 days) (Fig 7, 8).

There was no major complication related to the procedure; minor complications included mild pain and epistaxis. Duration of tube placement was one to two days shorter than the previous study [7].
Fig. 5: A case of a 60 year old male who underwent radical cystectomy for bladder cancer. Two weeks after the surgery, insertion of an MA tube was done to improve diffusely bowel dilatation

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**Fig. 6:** Resolution of previous small bowel dilatation was seen on the simple abdominal radiograph taken two days later.

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**Fig. 7:** A case of an 57 year old woman who underwent several sessions of surgical treatment including total hysterectomy, bilateral salpingo-oophectomy, left nephrectomy and right hemicolectomy for low grade endometrial sarcoma with recurrence and metastasis. Six months later after the last surgery, the patient visited emergency department because of abdominal pain. On 4th day of admission, an Ileus tube was inserted to decompress dilated bowels.

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Fig. 8: Six days after the insertion of an Ileus tube, dilation of small bowel resolved, and the tube was removed.

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Conclusion

Fluoroscopy-guided insertion of nasoenteric tubes with guiding catheters and wires is a feasible way to place the tube past the pylorus and the Treitz ligament without noticeable complication and clinical disadvantage compared to conventional insertion technique.
References


