



## The Diagnosis of Intestinal obstruction by Small Bowel Enterography through Nasointestinal Decompression Tube

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### ABSTRACT

To investigate the clinical value of small bowel enema through nasointestinal decompression tube in diagnosis of small-bowel obstruction, Thirty-five patients with small-bowel obstruction, who had no sign of emergency operation, were catheterized with 300 cm tube to superior segment of jejunum under X-ray observation. The tube was put to approach to the lesion as far as we can due to progressive decompressing, so that selective enhanced contrast could be performed. 20-100 mL 76% meglucamine diatrizoate was infused through the tube under X-ray fluoroscopy, then 50-200 mL air was infused for double contrast. Local dynamic multiple position observation was conducted and spot films were taken. The tube was pumped back to superior segment of jejunum if necessary. The results showed that the tube was successfully inserted in all cases. After the decompression of intestine, remission of obstruction were found in 20 cases, palliation in another 15 cases with 10 cases of surgical treatment. The local images of 35 cases by small bowel enema through nasointestinal decompression tube were clear, no overlapping, with prominent key focus. No significant abnormal X-ray sign was observed in 6 cases, adhesive intestinal obstruction in other 15 cases, and cancer of small intestine in another 4 cases (metastatic tumor in 3 cases, carcinoma of small intestine in 1), Crohn's disease 3, radial enteritis 3 (one of the patients had been misdiagnosed as having metastatic cancer), intussusception 2, polyposis 1, carcinoma of ascending colon 1. It is concluded that the transnasal decompressive catheterization was effective in both decompressive treatment and selective enhanced contrast of small intestine, which was available in ascertain obstructive site, grade, and cause providing reliable information for surgical operation.

**Key words:** Obstruction of small intestine; Diagnosis; Pneumography

### INTRODUCTION

Small-bowel obstruction is one of the most common surgical diseases [1-2]. Although its diagnosis and treatment continue to evolve, X-ray has been demonstrated to be accurate in assessment of position and nature of obstruction of small intestine [3-5]. In this article, 35 patients with small-bowel obstruction were recruited and layed with nasal intestinal decompression tube with full length of 300 cm under X-ray monitoring. Here, we report this method that selective enhanced contrast of small intestine was conducted when intestinal decompression treatment for small-bowel obstruction.

### CLINICAL INFORMATION'S

#### GENERAL DATA

All cases were diagnosed as having small obstruction according to clinical history, abdominal plain X-film in standing, lying position, B type ultrasound and CT, and they had no emergency operation sign. Of them, 22 were male and 13 female with an average age of (49±10.2) years (ranging from 18 to 82 years old). Of all patients, 13 cases were free from abdominal surgical or associated with medical history, another 20 cases had had been operated in abdominal, (stomach-duodenal 8, colon 4, uterus-ovary 3, appendicitis 2, hernia 1, spleen 1, small intestine 1) the other 2 cases had some relevant medical history. (esophagus carcinoma Crohn's disease, 1 respectively). Five patients had a history of radiotherapy in abdomen.

### MATERIALS AND METHODS

**Materials** Hydrophilic catheter (CREATE MEDIC Japan), it's roentgenopaque, with a length of 300cm, 16-18F, with a 350cm wire, The catheter had three chambers and two balloons, the posterior balloon was of use in selective enhanced contrast of small intestine.

**Methods:** To set catheter and decompression. Under X-ray guiding, the catheter was inserted to stomach through nose, with the tip of catheter towards gastric antrum, and moved through pylorus, then pulled back 5cm, and forward placed 5cm, repeated this process. The catheter was set to jejunum 10 cm or

deeper. If there was marked change in structure of small intestine from the operations, catheter should be placed by gastroscope to jejunum. After drawing out the wire, 10-15ml sterile purified water was infused to anterior balloon, and the catheter was linked with vacuum suction. At the beginning, the tube was moved forward to stomach 10cm through nose at every 30 min to avoid blocking. The site and situation of catheter should be checked by X-ray every 10h, while suction was being the tube moved to distal of small intestine until to the obstructive lesion. The suction was ongoing continually. Selective enhanced contrast When the catheter had gotten to the proper site, water balloon should be evacuated and 40-60ml air were infused to posterior balloon, and observation should be performed to make sure the air-balloon was pressing close to wall of small intestine, and to prevent inverse flow of contrast media. 20-100ml 76% meglucamine diatrizoate was infused and 50-200 ml air then was infused too, so double contrast was formed in peripheral of lesion. The radiography had been taken by multiple positions kinetic various directions. Contrast of all small intestine was done if necessary. Posterior balloon was evacuated and decompressive tube was draw out slowly till posterior balloon getting to the level Treitz's ligament, the posterior balloon was re-inflated, 100-200 ml 76% meglucamine diatrizoate and air in appropriate volume were infused, then double contrast of all small intestine was carried out. Carefully observation should be given to the patients, when who comes to have emergency operation signs such as bowel necrosis, perforation etc, transmission to surgical treatment should be done in time.

## RESULTS

All cases were succesful, the tube was set to jejunum by meantime  $15\pm 6(5-36)$ min. The decompressive tube might get to the lesion or terminal ileum(fig 1), that resulted in remission of enteric obstruction in 20 cases, improvement in 15 cases(10 cases were surgical operated, included 3 adhesive obstruction, 3 cancer, 2 intussusception, 1 polyposis ascending colon carcinoma respectively). Above cases had no emergency sign.

Selective enhanced contrast 6 cases had no significantly abnormal X-ray sign, 15 had adhesive obstruction, of which 8 had no stricture for contrast media passed through it fluently, 4 were flexion with media can pass but small intestine in part appeared incurved, 2 incomplete stricture, contrast media was claviform with a constrictive cavity, distended proximal segment and hypoactivity(fig 2), 1 complete obstruction with pencil tip-like medium from hindering, distended severe cavity in proximal segment, 4 cancer of small intestine (3 metastatic, 1 original) with stiff segment no peristaltic wave, interruption of mucous membrane, circular or eccentric filling defect(fig 3); 3 Crohn's disease, with expressions of irregular enteric wall and contour, thickened wall as pebble-like edge, hypoactivity; 3 were radial enteritis, thickened ruga as spike-like changes, thin cavity as lumbricoid, inactivated segment partly(fig 4). One patient was diagnosed as having metastatic cancer by surgical operation. Two intussusception had the appearance of giant filling defect in ileum, peripheral circular rugae, distended proximal segment, one of them had polyposis found by operation; 1 polyposis of small intestine, with varied filling defects in ileum; 1 carcinoma of ascending colon appearing distended small intestine, more retention of fluid, while the decompressive tube stopped, the fluid level still retained due to obstruction of small intestine by oncogenic mass oppressing.

## DISCUSSIONS

### Application of traditional contrast of small intestine for enteric obstruction

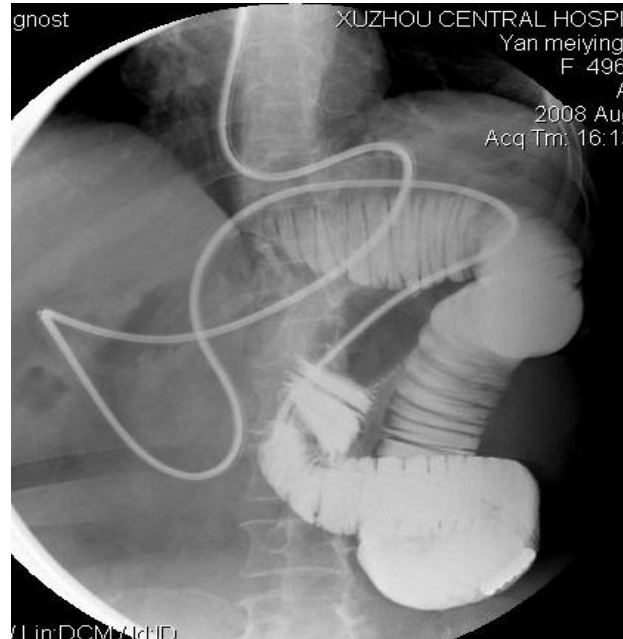
Traditional contrast included two ways, oral or infusing contrast. filling, mobility, obstruction, relation between lesion and peripheral part, enteric contour told the difference [6-7]. There were prominent shortages such as a lesion, the above cavity or total small intestine must be filled with contrast medium, the media in hypoosmotic fluid passed through small intestine was slow, filled media intestine was distended, bent, and overlapped, lower obstruction, the contrast media was diluted, the contrast was unclear[8], which caused limitation in application and value.

### Selective enhanced contrast - advantages in diagnosis of enteric obstruction

Decompression transnasal catheterization shows satisfactory effects for enteric obstruction recently, but they focus on decompression therapeutic effect and final therapeutic effect[9]. We did selective enhanced contrast of small intestine after sending contrast medium to the lesion, which was especial advantage.



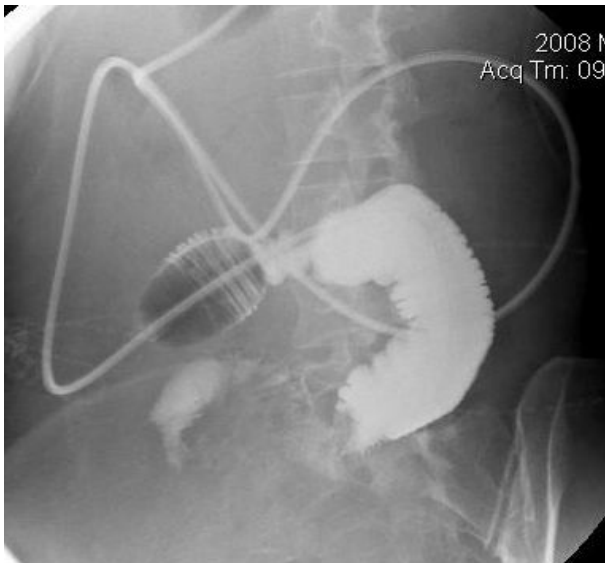
A



B

**Figure 1A-** The front of decompressive catheterization arrived at the end of ileum, and the Contrast agent come into ascending colon

**Figure 2B-** Flexion type has incomplete stenosis, arc bending present in local lumen, and the intestine diameter turn into narrow due to obstructed media



A



B

**Figure 3A-** Small Intestinal Carcinoma, irregular filling defect present in jejunum, musoca break, and tube wall turn rigor.

**Figure 4B-** Radiation enteritis, earthworm-like ileum.

First, the decompression tube may most closely get the obstructive point, which provided available condition for contrast. Decompression by drawing interrupted pathogenesis: increased enteric pressure-disturbance of circulation in enteric wall-exudate severe increased to promote recovery of enteric function. The balloon infused water moved forward continually, the obstructive site was the focus of contrast, the 300 cm tube may cross through 5-6m intestine because of enteric loop concentrated together. Second, selective contrast can prevent reverse flow of contrast medium, that directly get to lesion, so contrast was very clear, without overlap and interference. Chief changes were prominent. In our group, the incidence of obstruction was 100%, discriminated rate of obstructive site was 100%, identified rate of obstructive cause was 77% (27/35), the causes of 8 cases hadn't been checked, 6 cases had no significant X-ray abnormal sign, one with ascending colon carcinoma, another was metastatic cancer had been misdiagnosed as radial enteritis.

Selective contrast and ascertaining treatment program of enteric obstruction The patients without abnormal signs should take decompression continually while on diet with catheter, till obstructive symptoms disappeared. For static adhesive obstruction, decompression was the key measure, and retained catheter was useful for set tent, that may prevent recurrence of severe obstruction. For some patients with serious obstruction, decompression tube can't pass through, operation should be done timely. Other occupying obstruction and organic lesion, suitable palliative treatment chemical or surgical treatment were candidacy.

Enteric obstruction was a common disease, with complicated clinical findings and various causes, resulted in difficulties of diagnosis and treatment. Early decompression of small intestine may solve obstruction partly, and following selective contrast may evaluate therapeutic effect or show obstructive site or cause, and provide a image basis for surgical operation. The measure is a simple and effective technique for obstruction of small intestine.

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