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## The high pressure distal colostogram in anorectal malformations: technique and pitfalls

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### ABSTRACT

The importance of technically adequate high pressure distal colostogram in planning management for patients with anorectal malformations and how technically inadequate examination could delay management and affect the outcome cannot be over emphasized as shown in this article.

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High pressure distal colostogram is an essential element during the investigation of patients with Anorectal Malformation (ARM) [1–7]. It is of utmost importance to perform the exam adequately. It is readily available almost anywhere, can be done quickly and provides valuable information to the surgeons. There are other potential alternatives like MR colostogram [2], but this is more expensive, less easily available, some patients are unable to hold still, are claustrophobic, need sedation or have metal implants. Voiding cystourethrogram (VCUG) is also mandatory in all patients with ARM who have renal or vesical abnormality detected by US. Most authors recommend VCUG for all patients with ARM regardless of the ARM type [7].

### 1. Case example

A 3 month old male patient with hypospadias and imperforate anus post colostomy. This is a good example of how a technically adequate high pressure distal colostogram is important for careful evaluation and surgical planning. Fig. 1 shows how inadequate study could be misleading, Fig. 2 shows what an adequately performed study could reveal.

### 2. Technique to ensure an adequate high pressure distal colostogram

Place a radiopaque marker in the perineum where the anal sphincter or anal dimple is and place a ruler parallel to the patient's back. Introduce a Foley catheter through the distal stoma also named "mucous fistula". Inflate the balloon and pull back on it lightly to ensure a tight seal,

which is very important to avoid leakage and to obtain high pressure into the distal pouch. Inject the contrast (water soluble contrast, never barium) by hand and observe for abnormalities (e.g. areas of diameter sudden change, filling defects). Inject contrast while keeping pressure until the blind distal end of the colon distends and become convex. Unfortunately there is no way up to our knowledge that could measure the pressure real time (unlike the air system used to reduce intussusception), that is why the study must be done under fluoroscopy and the person in charge must notice the degree of distension and the resistance felt during injection of the contrast. Acquire images in straight lateral position and then in AP position.

What to look for?

1. Look for the distance between the most distal part of the fully distended colon "the convex part" and the radiopaque marker, this gives an idea regarding the distance between the distal pouch and the future anal orifice and how much colon is needed for the pull-through.
2. Measure the length of colon that was de-functionalized. It is the useful length of the distal colon pouch. This helps surgeons to evaluate if the distal colon is adequate for the pull-through, or it is short, and they need to perform an additional abdominal procedure to mobilize more colon to have the adequate amount of colon needed for the pull-through.
3. Determine if there is a communication or fistula between the rectum and other structure such as urethra or bladder. The maximum distension of the colon is extremely important in revealing a fistula.

Fig. 3 shows an example of a technically well done study.

Inadequate distension of the colon (no convex blind end obtained), could result in failure to reveal a fistulous tract causing a potential

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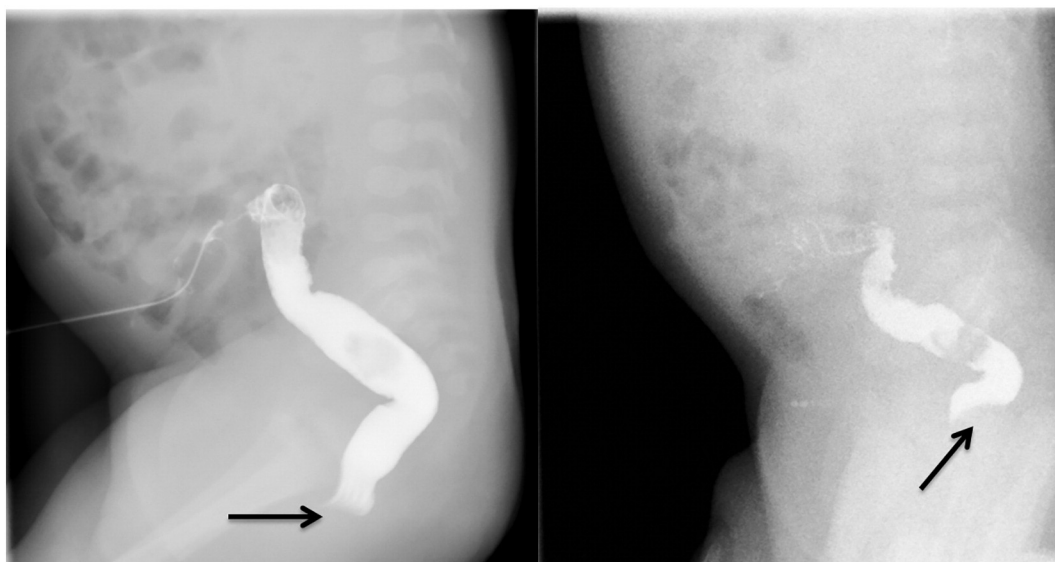


Fig. 1. The distal colon is not well distended throughout the study (no convexity of the colon blind end – arrows) and no fistula is identified.

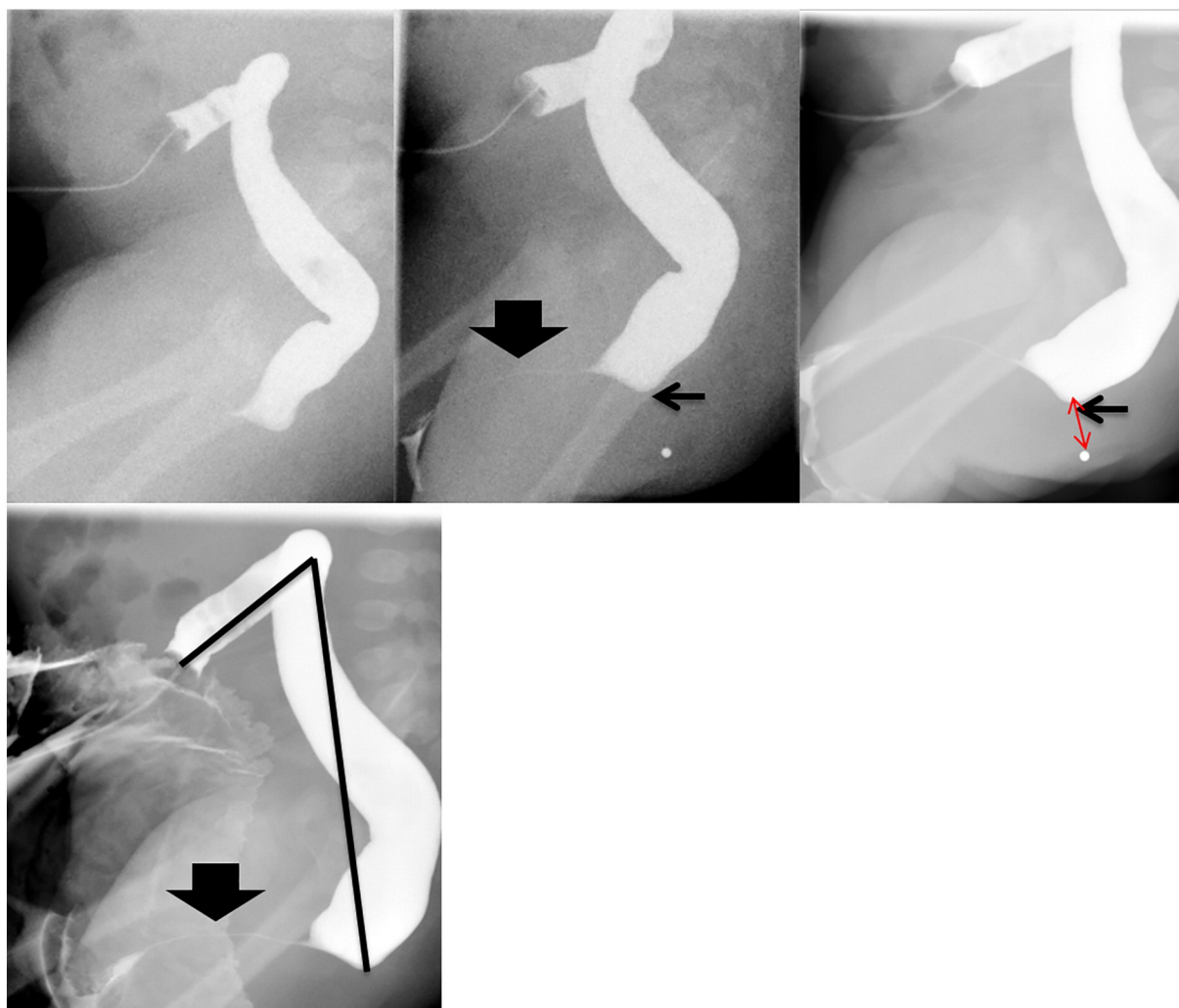
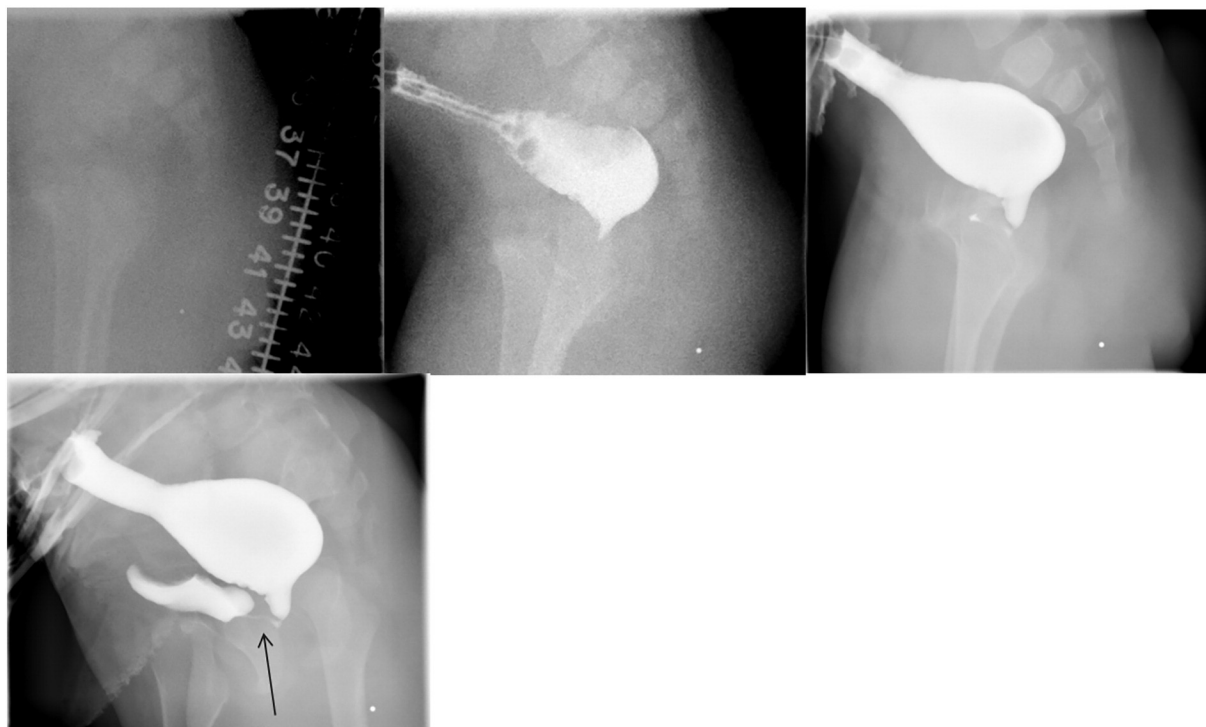


Fig. 2. Same patient a week later; (A) without full distension of the distal colon, no fistulous tract is seen. (B) Progressive increased pressure distal colostogram produced a good distension of the colon (Note the convexity of the blind end, thin arrow) and a fistulous tract connecting the rectum to the urethra is revealed (Thick arrow). (C) Radio opaque marker is placed (double head arrow is the distance between the distal end of the colon and the location of the sphincter marked by the radio opaque marker). (D) The black lines measure the length of the distal colon; this enables the surgeon to decide if there is enough length for the pull through or not.



**Fig. 3.** Another example of a technically well-done high pressure distal colostogram and shows a recto-vesical fistula (Arrow). The sequence of images shows the significance of obtaining the maximum distension of the distal colon; otherwise, a fistula could not be revealed at all or overlooked.

incorrect surgical management. VCUG is an important part of fully investigating patients with potential fistula; however, in our experience the high pressure distal colostogram is more successful in revealing the fistulous tract. VCUG should not be performed at the same session with the distal colostogram, as this may cause confusion of the findings.

Possible complications of high pressure distal colostogram include stoma rupture by the distended balloon and the significantly less likely bowel perforation. Once there is significant distension of the distal pouch, further contrast administration must be done under extreme caution to avoid bowel perforation.

### 3. Conclusion

It is crucial when doing a distal colostogram to ensure that an adequate technique is used, otherwise a fistulous tract may not be visualized, which will affect the management plan of the patient.

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