

Supplementary material

First group

Case 1. Figure 7. A two-year-old girl was admitted to the hospital with severe constipation that began after birth. Rectal examination revealed a 1.5 cm rectal pouch. She underwent a loop sigmoidectomy with postoperative proximal and distal irrigation to remove massive tarry stool. Postoperative distal loop colonography revealed a membrane protrusion with a tiny hole (**Figure 7**) [1].

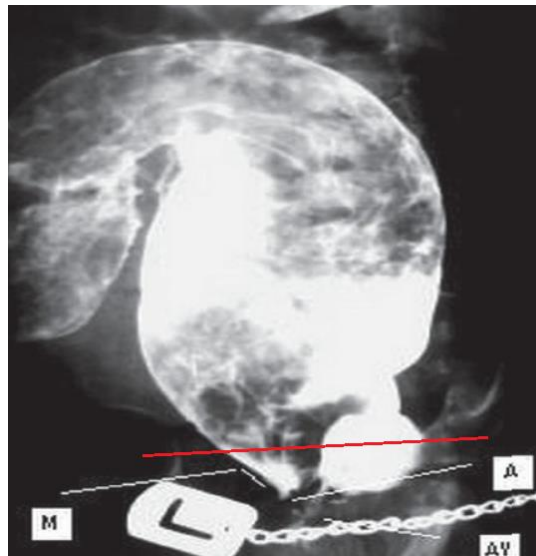


Figure 7. The authors' caption to the figure reads: - "M-membrane, A-aperture, AV-anal verge." The figure shows severe megacolon. The membrane with the opening is located above the anal verge, but clearly below the pubococcygeal line (red), i.e., in the anal canal. Passing the tube through the opening of the membrane using a clamp from the anal approach confirms the opinion that the membrane was close to the anus, in the middle of the anal canal.

A small clamp was passed through tiny central aperture via anal canal, and a large rectal tube was easily pulled through the central hole, which made the membrane rupture [1]. The radiographic appearance is consistent with severe stenosis of the membrane in the middle of the anal canal.

Second group

Case 2. A one-day-old male was born with a weight of 980 g. and with multiple defects. Meconium had not passed since birth, and abdominal distention was noted on the first day. The anus was in the normal position. A feeding tube inserted in the anal canal met resistance at approximately 1.5 cm from the anal opening (Figure 8a). The patient was diagnosed with rectal

atresia, and a sigmoid colostomy was created. At the age of 10 months the preoperative distal colostogram showed a blind-ended rectum without any evidence of a fistula, as seen (Figure 8b). PSARP was performed. An atretic chord measuring several centimeters between the blind end of the anal canal and the blind pouch of the rectum [2]. **(Figure 8 ab).**

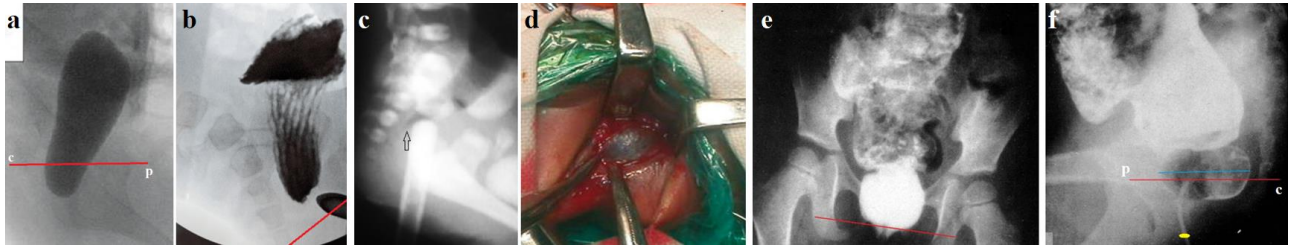


Figure 8 ab. In a newborn, the cecum was located below the pubococcygeal line, i.e., in the anal canal. At 10 months of age, the tip of the Hegar dilator was above the pubococcygeal line. This can only be explained by the doctor's efforts to elevate the pelvic floor muscles and the membrane itself.

Case 3. Figure 8cd. A three-day-old girl was hospitalized with moderate abdominal distension and there was no meconium passage. On examination, the anus was normal, but a red rubber catheter could not be inserted beyond 3 cm from the anal verge. An X-ray revealed the catheter was resting on an air column in the intestine (Figure 8c). An endoscopy was done with a 7.5F cystoscope. About 3 cm from the anal verge, the anal canal ended blindly, and a membrane was visualized at the blind end (Figure 8d). A transanal membranectomy was performed [3].

Figure 8cdIn **Figure 8c**, the arrow shows that the tip of the red rubber catheter is positioned above the gas-filled intestine, deforming it. This provides compelling evidence that the rigid catheter lifted the membrane and pelvic floor muscles more cranially than they actually are. In this case, this is confirmed by the ability to visualize and resect the membrane through the anal approach (**Figure 8d**). Therefore, the membrane was located in the anal canal, but its exact location could not be determined.

Case 4. (Figure 8ef). A 3.5-year-old girl had soiling since birth. On examination, she was found to have mild abdominal distention with palpable fecal masses in the abdomen. A hard fecaloma was palpated in the pelvis on rectal examination, while the rectum was empty. The fecaloma was in the proximal part of the rectum immediately above a diaphragm with a central hole about 3 cm from the dentate line. This was confirmed by a barium enema (**Figures 8e**) [4].

Figure 8ef. The dilated rectum is above the pubococcygeal line, suggesting that the obstruction is in the anal canal. Figure 8f. A Foley catheter was inserted into the rectum. Since the length

of the anal canal between the pubococcygeal line (red) and the approximate location of the anus (yellow) in children of this age is approximately 2.5 cm, the catheter balloon was inflated to a diameter of 4.2 cm. It is partially located below the pubococcygeal line (red), i.e., in the anal canal. However, this does not mean it is near the membrane, which the authors call the “diaphragm”. Chronic constipation causes stretching of the pelvic floor muscles, known as descending perineum syndrome. A large-diameter balloon cannot penetrate the anal canal. A perforated membrane was located in the anal canal, but its exact location could not be determined. The membrane was resected without damaging the anal canal.

The authors mistakenly refer to the mucocutaneous junction in the anal area as "the dentate line." They refer to the anal canal as the rectum, and consider rectal dilation to be the primary factor, not the result, of membranous stenosis of the anal canal. However, they used a unique treatment method in pediatric surgery, which resulted in the removal of the membrane without damaging the anal canal.

Third group

Case 5. A premature boy was admitted with clinical evidence of intestinal obstruction. Clinical examination revealed a normal-appearing anus, but there was failure to pass meconium. Digital rectal examination revealed a blind ending of the rectum 2 cm above the dentate line. A plain abdominal X-ray revealed dilated loops of the bowel, and a contrast enema demonstrated rectal atresia (**Figure 5**) [5].

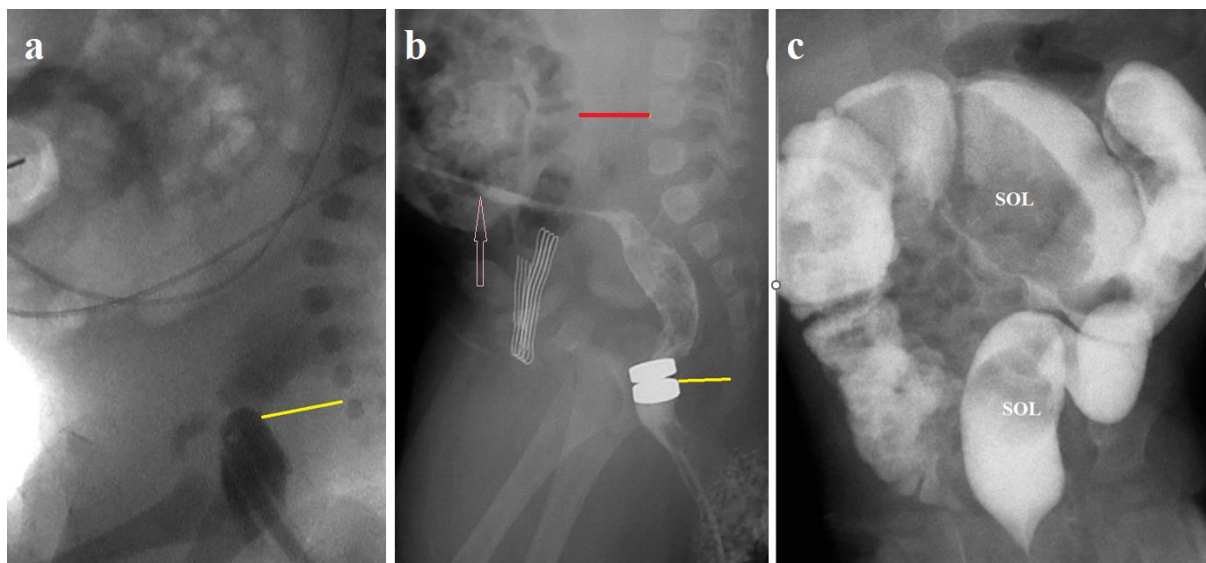


Figure 5. (a). The entire intestine is retracted into the upper abdominal cavity and is not dilated. The contrast medium injected into the rectum did not pass above the sacral region. The

rectum is sharply pushed anteriorly by the retrorectal mass. (b). The magnets met in the rectum. The contrast medium injected from the colostomy shows a narrow, inferiorly displaced sigmoid colon (arrow). The retrorectal space (yellow) and retroperitoneal space (red) are dilated. (c). After the magnets exit, an asymmetrical distribution of the contrast medium in the colon is visible, caused by pressure from the retroperitoneal masses.

Conclusion. The clinical and radiographic findings contradict the diagnosis of rectal atresia, as they revealed continuity of the intestinal lumen. Obstruction in the sigmoid colon was caused by a large space-occupying lesion located retroperitoneally, which caused bowel torsion.

Case 6. Description of the authors: In a two-day-old premature boy developed abdominal distension, bile vomiting, and no meconium. A rectal examination revealed a normal anus. Abdominal radiography revealed dilated bowel loops without gas in the distal portion. A contrast enema showed that the contrast medium did not pass more than 2 cm above the anus. Laparotomy was performed at the age of 3 days. The large bowel was massively dilated, and a rectal web was identified and opened through enterotomy in the rectum. Right transverse colostomy was performed. Follow-up distal loopography revealed persistent distal obstruction. Thus, transanal resection of the atretic rectum with primary anastomosis was performed at 7 months of age. Postoperative distal loopography was done (**Figure 6**) [6-1].



Figure 6. (Figure 6 ab). Dilation of only the colon is determined, which ends blindly above the pubococcygeal line (arrow) at a large distance from it. Bilious vomiting and the absence of gas in the small intestine indicate intestinal volvulus. **Figure 6b.** On the lateral radiograph, the anal canal and part of the rectum with a "forelock" are filled with contrast agent. The retrorectal space is dilated (blue line). **Figure 6c.** The authors wrote that they "opened the rectal membrane". But the radiographic picture has not changed. The same "forelock" is preserved. The anorectal axis (red) does not coincide with the axis of the sigmoid colon. **Figure 6 d.** This radiograph contradicts the description of the case: instead of a stoma on the transverse colon, a stoma is seen in the left iliac region. A significant part of the left half of the colon was

removed. A conduit, likely from the small intestine (between the arrows), is inserted into the shortened portion. The anal canal is not functioning.

Case 7. (Figure 9ef) The preterm male baby was hospitalized at the age of 3 days with progressive abdominal distention and failure to pass meconium. "A rectal catheter could not be inserted more than 2 cm above the dentate line". Further, study is described as follows: - "Contrast enema showed failure of the contrast to pass more than 2 cm above the anal verge" [6-2]. After colostomy, transanal endorectal anastomosis was performed at the age of 6 months. He gained complete bowel control around 5 years of age with intermittent constipation that was controlled well with laxatives. On further follow-ups, he was diagnosed with neurogenic bladder disorder. The cystourethrogram test showed dysfunctional posterior urethral valves.

Figure 6e. [6-2]. End of the catheter is located above the pubococcygeal line, i.e., in the rectum. The dilated intestine is visible above it. **Figure 6f.** The lateral radiograph reveals a marked widening of the retrorectal space (red line), with anterior displacement of the anal canal by the mass lesion. The axis of the dilated rectum (yellow line) is displaced posteriorly relative to the axis of the anal canal. Since the true length of the anal canal in premature infants is ≈ 1.5 cm, it is easy to calculate the location of the anus if the infant were normal. This location is marked with a yellow square. This indicates that the mass lesion not only displaced the anal canal anteriorly but also pushed the anus caudally. In this case, there are no signs of rectal atresia. Clinical and radiographic findings suggest intestinal volvulus. Given the widening of the retrorectal space, abdominal mass is the most likely cause of intestinal obstruction. The discrepancy between clinical history and radiographic findings makes this case questionable.

Case 8. Figure 7. Tiraschis et al. diagnosed rectal atresia and used magnets for treatment [7].

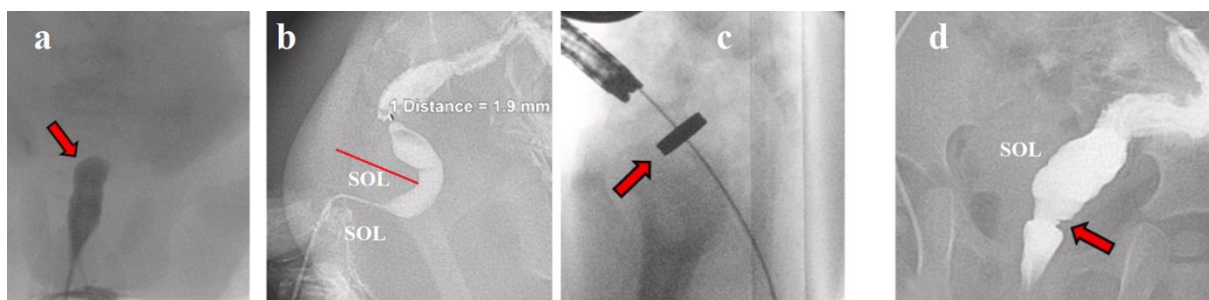


Figure 11. (a,b). A comparison of these images reveals that the contrast medium became trapped in the rectum due to the anal canal being displaced posteriorly and the rectum being displaced anteriorly. This resulted in a torsion in the upper rectum, which was misdiagnosed as rectal atresia. After magnet application (c), the supposedly restored lumen is shown (d). A large

mass is visible to the right of the rectum, displacing the upper rectum to the left and obscuring the contours of the pelvic bones.

Conclusion. There is no evidence of rectal atresia in this case. The obstruction of the digestive tract was caused by a mass that pushed the anal canal forward, leading to a kinking of the intestine and obstruction of its lumen. Analysis of the description suggests that the authors of this article, like some others in this review, mistakenly refer to the mucocutaneous junction of the anal verge as the dentate line.

References

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