

## CASE REPORT

## Magnamosis: a novel technique for the management of rectal atresia

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**SUMMARY**

We report a case of rectal atresia treated using magnets to create a rectal anastomosis. This minimally invasive technique is straightforward and effective for the treatment of rectal atresia in children.

**BACKGROUND**

Rectal atresia is a rare congenital malformation that accounts for 1% of all anorectal malformations.<sup>1 2</sup> These children typically have a short stenosis or fibrous band in the distal rectum without other anorectal abnormalities and the anal opening is located within the center of a normal sphincter complex. We propose the use of magnetic compression as a minimally invasive technique to treat rectal atresia.

**CASE PRESENTATION**

A 1680 g twin males, born at 30 weeks of gestation secondary to fetal distress was transferred to our tertiary referral centre with concern for bowel obstruction. Clinical examination revealed a normal appearing anus and external genitalia but there was failure to pass meconium. On digital rectal examination there was a blind ending rectum 2 cm above the dentate line. A plain abdominal X-ray revealed dilated loops of bowel, and a contrast enema demonstrated rectal atresia (figure 1). The child had no associated cardiac, spinal or urinary malformations.

**TREATMENT**

On his first day of life, the infant was treated with a diverting end colostomy and mucous fistula. At 4 months of age, fluoroscopy was used to deliver an 8 mm magnet through the mucous fistula and a second magnet through the anus to create a magnamosis between the distal and proximal pouches (figure 2). As an outpatient, he had minor discomfort and fever lasting 2 days. On the fourth day he passed the two magnets per rectum with a disc of tissue between them (figure 3).

**OUTCOME AND FOLLOW-UP**

Three weeks later following passage of the magnets, a contrast enema demonstrated an intact anastomosis without stricture (figure 4). The parents performed daily rectal dilations to prevent anastomotic stenosis. At 7 months of age, the colostomy and mucous fistula were closed, restoring gastrointestinal continuity, without complication. The child is now 4 years old with normal bowel function.



**Figure 1** Preoperative contrast enema showing rectal atresia.

**DISCUSSION**

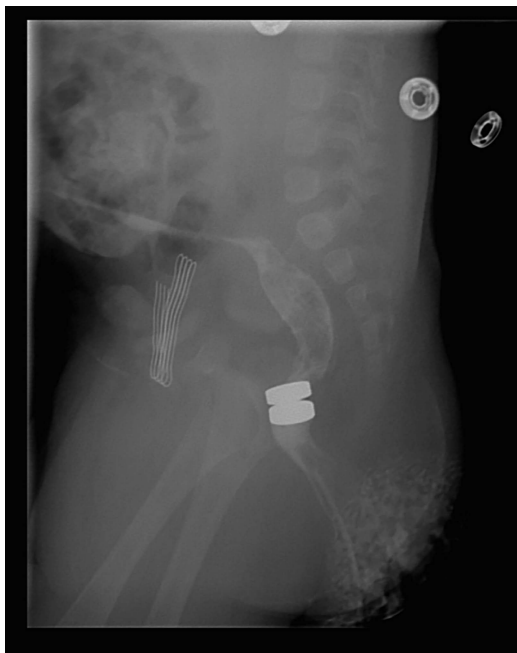
Magnamosis has been shown to be a safe and effective method of performing gastroenteric and vascular anastomoses in animal models,<sup>3-5</sup> and has been used successfully in humans for the treatment of bile duct strictures,<sup>6 7</sup> and to create a biliary-enteric anastomosis.<sup>8</sup> Magnamosis has also been suggested as a technique for creating an oesophageal anastomosis in children born with oesophageal atresia.<sup>9</sup> There may be additional applications for magnamosis that have not yet been realised.

Multiple reports have described intestinal fistulas resulting from accidental magnet ingestion.<sup>10</sup> This observation led to the idea that rectal atresia could be treated with an anastomosis formed by rare earth magnets (magnamosis). Rectal atresia is a rare defect that typically requires staged operative management. Several operative techniques including various pull-through procedures, transanal rectorectal anastomosis,<sup>11</sup> posterior sagittal repair<sup>1 2 12</sup> and endoscopic techniques<sup>13</sup> have been described for



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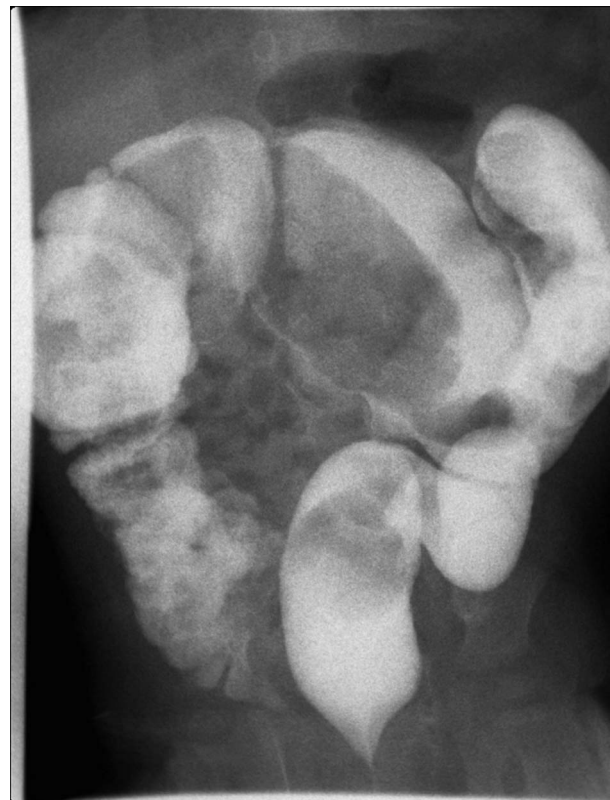
**Figure 2** Opposed magnets following passage of one magnet through the mucous fistula and one per rectum.

management of this condition, but there is no clear consensus on best management.

Depending on the experience of the surgeon, this defect may be definitively repaired in the newborn. However, the conservative approach is to create an end colostomy and mucous fistula and perform the definitive repair at several months of age after optimal preoperative imaging has been obtained. By using magnet therapy, any disruption to the sphincter mechanism and associated nerves may be avoided. Magnamosis offers a minimally invasive technique as an option for repair of this congenital



**Figure 3** Extruded magnets with disc of tissue.



**Figure 4** Post-treatment contrast enema demonstrating the absence of stricture.

anomaly. In anorectal malformations with favourable anatomy, this procedure may avoid an operative repair such as posterior sagittal reconstruction.

We propose that magnamosis can be considered as an alternative option for the treatment of rectal atresia in certain children. Anastomotic stricture is a primary concern when using this technique and we recommend scheduled anastomotic dilations per rectum similar to those performed in children with other anorectal malformations repaired using the traditional posterior sagittal anorectoplasty.

#### Patient's perspective

"We were so lucky that we had the best care! The technique sounded really interesting to say the least, but non-invasive and we agreed to do anything that is best for our son. We hope other kids can benefit from this procedure. Our son is 4 years old now and very healthy and happy." *Patient's mother*

#### Learning points

- ▶ Rectal atresia is a rare congenital anomaly that frequently requires staged operative repair.
- ▶ Children born with rectal atresia have a normal anal canal and anal sphincter mechanism.
- ▶ We propose that magnamosis can be considered as a less invasive treatment for rectal atresia in infants.

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**Competing interests** None.

**Patient consent** Obtained.

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