Novel Hartmann reversal
(a simple and safe method using magnetic anastomosis)

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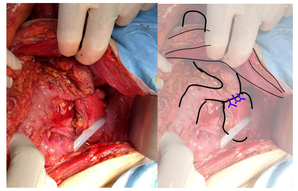
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Objective of the technology

- Hartmann's operation is the standard urgent treatment for left-sided colonic obstruction or perforation. In this procedure, the sigmoid colon is resected, the rectal segment is closed, and single-hole colostomy is performed.
- Hartmann reversal has a complication rate of 50% and a mortality rate of 5%.
- Therefore, Hartmann reversal is infrequently performed, ranging from 26% to 61%.
- To address these challenges, we developed a novel Hartmann reversal method, using magnetic anastomosis, which prevents anastomotic leakage and simplifies subsequent surgical procedures.

The technic and method

1. Point of Emergency Hartmann's procedure



The proximal colon of the end stoma and the serosal musculature near the rectal transection are sutured with five stitches and brought into anterior proximity. This procedure may require derotation of the splenic flexure but can be performed in a relatively short time in an open view.

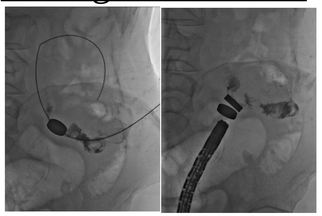
After acute recovery, proceed to the Magnet Anastomosis Stage

2. Determining the absence of inclusions

Contrast is injected through the colostomy and a colonoscope is inserted through the anus to confirm that there are no inclusions at the planned anastomotic site.



3. Magnet Insertion



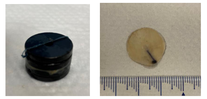
Colostomy side: A guide wire and catheter are used to deliver the magnet to the planned anastomosis site.

Rectal segment: The magnet is delivered using an endoscope and forceps.

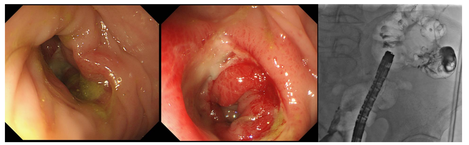
4. Completion of magnet anastomosis



Magnetic anastomosis is completed after approximately 7-10 days.
Changes in the position of the magnet can be confirmed with X-rays.

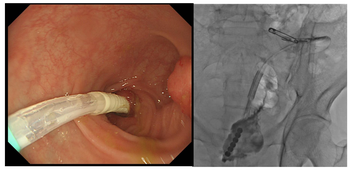


Magnets that have completed intestinal anastomosis and have fallen out.



The anastomosis is gradually completed by magnetic compression.

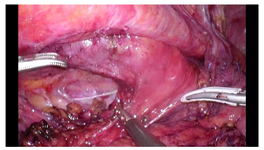
5. Tube insertion for stenosis prevention

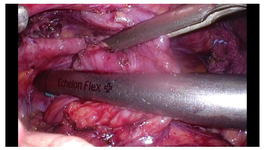


A tube is then inserted through the colostomy to prevent stenosis.

After one month of tube placement, surgery is performed.

6. The operation - This is quite simple





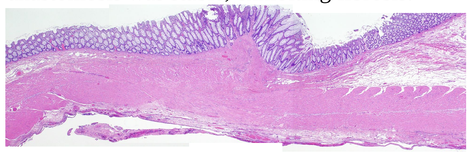
1. The mesentery of the colon is cut using an energy device along the intestinal tract up to the stoma.
2. The colon between the anastomosis and the colostomy is separated using a stapler.
3. The stoma is removed by separating the colostomy from the abdominal wall.

Case presentation

A Japanese man in his 50s with no previous history of diverticular perforation of the sigmoid colon underwent emergency laparotomy and Hartmann's operation. The patient had a good postoperative course and was discharged from the hospital, after the magnet had been inserted. The anastomosis was completed in 10 days, and a Hartmann's reversal was planned a month after bougienage.

During this process, colorectal cancer was detected in the lower rectum, and endoscopic submucosal dissection was performed; however, additional resection was indicated. Miles' operation, including the resection of the magnetic anastomosis site, was performed.

Pathology revealed that the anastomosis was stable, exhibiting fibrosis.



Conclusion

Reversal of Hartmann's operation is associated with high complication, high mortality, and low reversal rates. Therefore, a simpler and safer Hartmann reversal method is required. Magnetic anastomosis has very few suture failures because of its time efficiency.

Exploiting this advantage, a stable anastomosis can be performed in advance, streamlining the subsequent reversal surgery. Although the magnetic anastomosis requires bougienage due to inevitable stenosis, it is considered less painful for the patient compared to a permanent colostomy.

In conclusion, the new Hartmann's reversal technique with magnetic anastomosis is safe and simple and has the potential to increase the reversal rate and improve outcomes.

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