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CLINICAL FEASIBILITY OF LAPAROSCOPIC LEFT LATERAL SEGMENT LIVER RESECTION WITH MAGNETIC ANCHOR TECHNIQUE: A PRELIMINARY CLINICAL STUDY

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Introduction

Magnetic anchor technique (MAT) has been applied in laparoscopic cholecystectomy and laparoscopic appendectomy, but has not been reported in laparoscopic partial hepatectomy. This study is to evaluate the feasibility of the MAT in laparoscopic left lateral segment liver resection.

Materials and methods

Retrospective analysis was conducted on the clinical data of eight patients who underwent laparoscopic left lateral segment liver resection assisted by MAT in our department from July 2020 to November 2021. The Y-Z magnetic anchor devices (Y-Z MADs) was independently designed and developed by the author of this paper (Xiaopeng Yan and Miaomiao Zhang), which consists of the anchor magnet and magnetic grasping apparatus. Surgical time, intraoperative blood loss, intraoperative accidents, operator experience, postoperative incision pain score, postoperative complications, and other indicators were evaluated and analyzed.

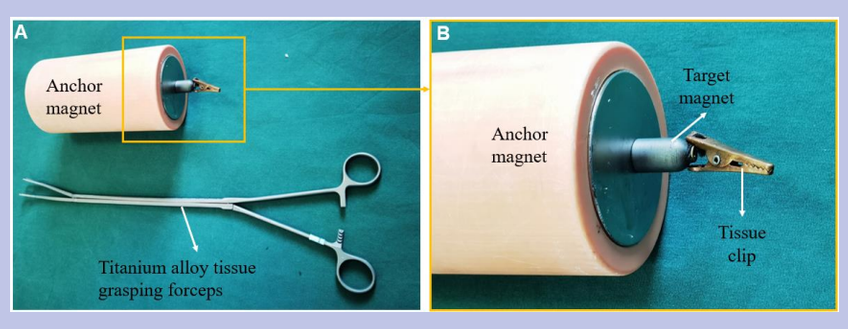

Fig. 1 Y-Z magnetic anchor devices. A: Anchor magnet and the titanium alloy tissue grasping forceps; B: Magnetic grasping apparatus.

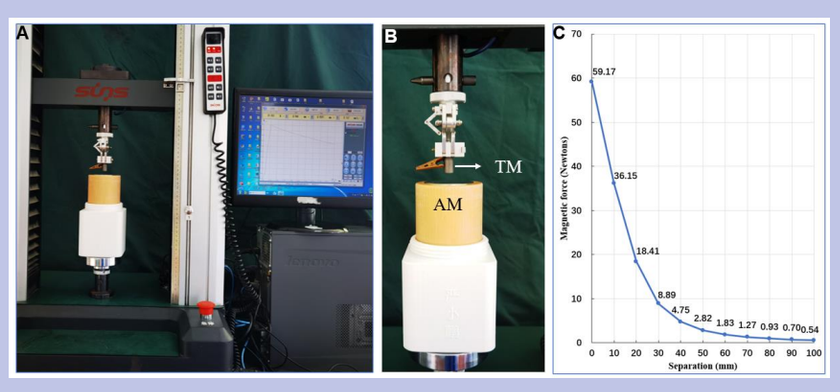

Fig. 2 Magnetism test of the Y-Z magnetic anchor devices. A: Magnetism test equipment; B: The anchor magnet and target magnet in the test state; C: The magnetic force-displacement curve of the anchor and target magnet. AM: anchor magnet; TM: target magnet.

Results

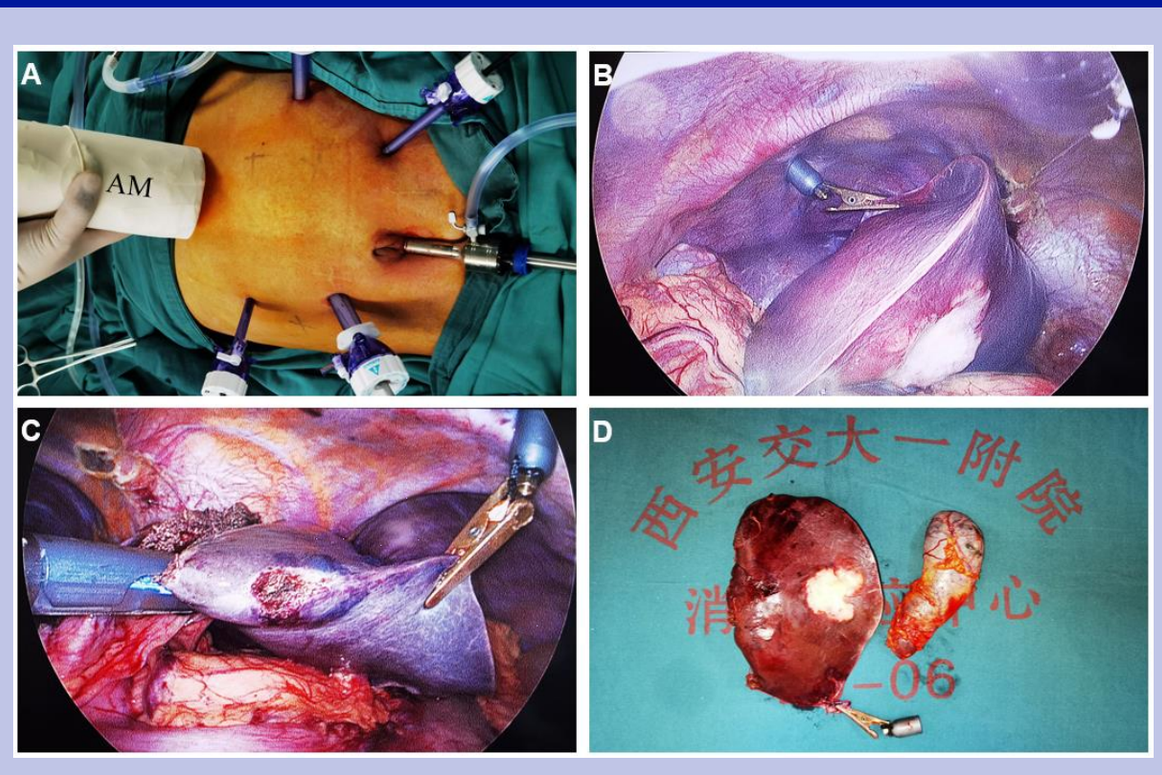

Fig. 3 Magnetic anchor-assisted 5-port left lateral hepatic lobectomy operation procedure (patient 2). A: The layout of the abdominal wall port and the position of the anchor magnet; B: The magnetic anchoring device pulling the left lateral lobe of the liver to reveal the tumor lesion and the hepatogastric ligament; C: The left lateral lobe of the liver is shown under the magnetic anchoring device, which is transected at the hepatic pedicle of the left lateral lobe of the liver with a linear cutting and closure device; D: The left lateral hepatic lobe and gallbladder specimens that are resected.

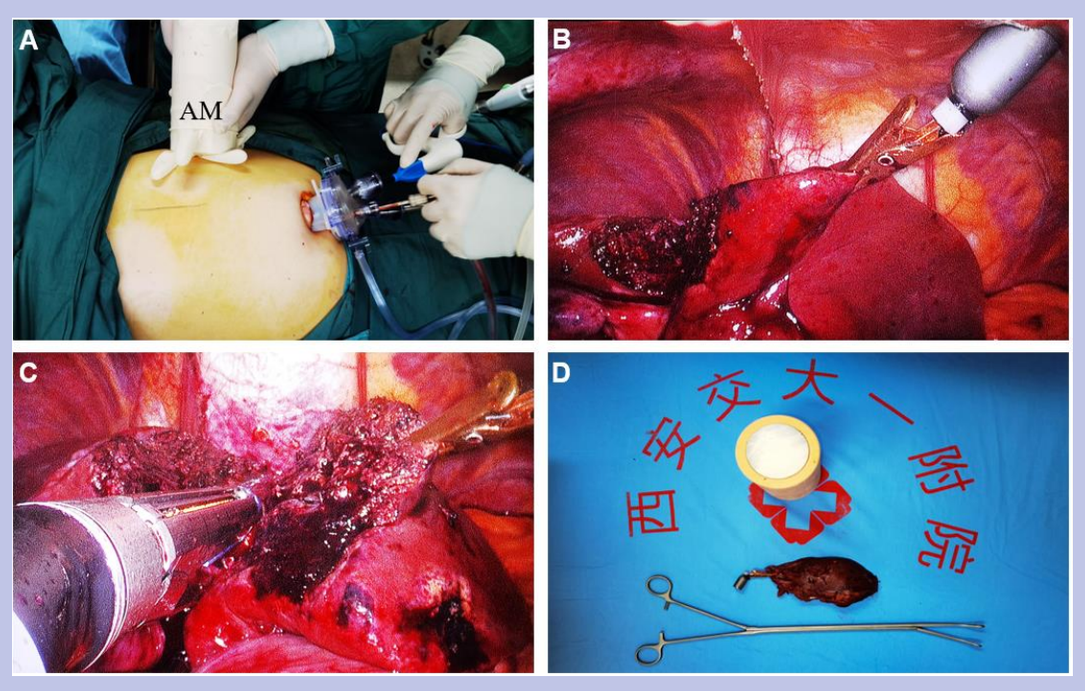

Fig.4 Figure 4 Magnetic anchoring-assisted transumbilical single-port laparoscopic left lateral hepatic lobectomy process (patient 5). A: The subumbilical single-port and the anchor magnet; B: The Y-Z magnetic anchor devices pulling the left lateral lobe of the liver to reveal the liver section; C: The linear cutting and closure device was used to cut off segment II and part of segment III of the left lateral lobe of the liver; D: The resected segment II and part of segment III of the left lateral lobe of the liver.

Patient no.	Gender	Age (yr)	BMI (kg/m²)	Diagnosis	Child-Pugh scoring	Extent of resection	Tumor size	Number of ports	Operative (min)	Bleeding volume (mL)	Pain score[1]	Drainage tube retention time (d)	Postoperative hospital stay (d)
1	Male	61	26.30	Primary liver cancer	5	Left lateral lobe	45 mm × 45 mm × 32 mm	5	100	100	2/3/3	5	5
2	Male	51	21.67	Primary liver cancer, gallstone	5	Left lateral lobe + gallbladder	40 mm × 35 mm × 40 mm	5	170	110	3/3/3	4	5
3	Female	42	19.26	Hepatic hemangioma	6	S2 + partial S3	82 mm × 60 mm × 45 mm	5	110	100	3/3/2	4	6
4	Female	23	21.88	Focal hepatic steatosis	5	Left lateral lobe	25 mm × 23 mm × 20 mm	1	185	300	1/1/2	0	4
5	Male	48	24.91	Hepatic hemangioma	5	Left lateral lobe	62 mm × 50 mm × 43 mm	1	150	100	2/2/2	2	5
6	Male	75	24.24	Liver metastases	5	S2 + partial S3	55 mm × 45 mm × 60 mm	1	165	200	2/2/2	5	6
7	Male	37	22.65	Hepatic hemangioma	5	Left lateral lobe	72 mm × 55 mm × 45 mm	1	130	50	1/2/2	3	3
8	Male	57	23.72	Primary liver cancer, gallstone	5	S2 + gallbladder	25 mm × 20 mm × 13 mm	1	95	20	2/1/1	0	2

Conclusion

This study preliminarily shows that the MAT can assist multiple-port as well as single-port laparoscopic left lateral hepatic lobectomy. The MAT indeed undermined the single-port-related “chopstick” and “sword-fight” effects so that it improved the surgeon’s operating experience and contributed to abating postoperative pain at incisional sites.