Laparoscopic surgery is expanding in the treatment of liver metastases from gastrointestinal cancer due to its growing acceptance in safety, feasibility and efficacy in recent years. Surgical robotic systems have recently supplemented and improved laparoscopic techniques. In this study, we compared the outcomes of robotic and laparoscopic combined resection for rectal cancer and liver metastases. This retrospective study used data from a prospective database at the Chinese People’s Liberation Army General Hospital. From January 2009 to December 2016, 133 rectal cancer patients with liver metastasis accepted laparoscopic or robotic rectal cancer resection, combined with simultaneous or staged hepatectomy or radiofrequency ablation (RFA) for liver metastases. The 133 patients enrolled in the study were divided into two groups: a robotic surgery group (n = 18) and a laparoscopic group (n = 115) which included three-dimensional laparoscopic (n=12) and two-dimensional laparoscopic (n=103). Primary endpoints were duration of surgery, intraoperative blood loss, conversions to an open procedure, resection margin status, in-hospital mortality and other postoperative recovery-related parameters.

Forty-five patients underwent a simultaneous rectal and liver resection (mean operating time (robotic vs. laparoscopic): 426min vs. 378min, P=0.029), thirty patients had a simultaneous resection of primary rectal cancer and RFA of liver (mean operating time (robotic vs. laparoscopic): 382min vs. 315min, P=0.046), twenty-one patients underwent a staged rectal and liver resection (mean operating time (robotic vs. laparoscopic): 594min vs. 530min, P=0.057), and thirty-seven patients had a staged resection of primary rectal cancer and RFA of liver (mean operating time (robotic vs. laparoscopic): 521min vs. 484min, P=0.142). There were 9 conversions to an open procedure in the laparoscopic group. No in-hospital mortality occurred. An R0 resection margin was achieved in 98 %, with 3 positive cases in the laparoscopic group. Estimated blood loss, time to first flatus and postoperative complications, postoperative in-hospital days and 30-day readmission rates were similar in the two groups. On multivariate regression analysis, longer operation time and more conversion rates were not associated with the choice of minimal invasive techniques.

**Conclusion**

Robotic combined resection for rectal cancer and liver metastases was a safe and feasible minimal invasive approach for the management of rectal cancer with liver metastases. Although it has a longer operation time, its low mortality rate, conversion rate and comparable postoperative outcomes describes its bright prospect.