Robotic platform da Vinci Xi is feasible and beneficial both in colon and rectal surgery

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Background

Laparoscopic colorectal surgery has gradually accepted as a safe minimally invasive procedure and wildly used. Although the data from the randomized controlled trial (the ROLARR trial), did not confer definitely superior outcome in rectal resection. The rational are not only the problem of learning effect, but also facing the difficulty of mechanical limitation such as dimensional rotation limit of the formerly used robotic system (the da Vinci Si system) before 2014. Few studies reported they used new da Vinci Xi system as the robotic platform, but these data still focused on the robotic-assisted rectal resection. The role of robotic-assisted colonic resection remains unclear. In this study, we aim to evaluate the benefit and feasibility of using robot-assisted method with the da Vinci Xi system both in colon and rectal surgery

Method

Data was retrospectively collected in Taichung Veterans General Hospital between the period of March 2020 and December 2021. The da Vinci Xi system was setup in our hospital in the late 2020, and less than 5 cases was performed before this. All patients received robotic-assisted colorectal surgery were enrolled. Robotic-assisted colorectal surgery was carried out using da Vinci Xi system. The patients underwent laparoscopic colorectal surgery in the same period were also been collected for comparison. The major indication for operation is neoplasm, other disease such as diverticulitis, polypoid tumor, lipoma, and so on benign disease were also included.

Result

A total of 418 patients undergoing elective colorectal resection were included for analysis, of which 67 patients received robotic-assisted colectomy, and 151 patients received laparoscopic colon resection surgery. 136 patients received laparoscopic rectum resection and 64 patients operated with robotic-assisted rectal resection.

No significant differences between robotic-assisted versus laparoscopic colectomy group in Age, BMI, abdomen surgery history, preoperative chemotherapy and preoperative radiotherapy.

The mean length of stay (LOS), tolerated solid food were significantly shorter in the robotic-assisted group, either in colectomy group (LOS: 8.45 vs 6.66, $p<0.01$; Tolerated solid food: 4.62 vs 2.48, $p<0.01$) or in rectum resection group (LOS: 10.23 vs 6.98, $p<0.01$; Tolerated solid food: 5.18 vs 2.59, $p<0.01$). No difference found in overall complication rate, re-operation within 30-days rate and re-admission rate between robotic-assisted and laparoscopic group.

Discussion

In our study, shorter tolerated solid food, and LOS indicated better post-operation recovery. Both robotic-assisted colonic and rectal resection has lower overall complication rate(24.5%; 27.2% in Lap vs 16.4%; 21.9% in Robot). Take the shorter length of stay and lower readmission rate(though did not reach statistic difference) in the robotic-assisted group in to consideration, this result may be explained by reduced complication operated with robotic-assisted modality.

Conclusion

Equipped with slimmer arms, extended instrument length and patient clearance technology to avoid external collision, the da Vince Xi provide extend working area, and enhanced surgeon autonomy. The reduced complication, shorter length of stay and reliable outcomes, the new generation of the da Vinci Xi system should be recommended both in the colon and rectal surgery.



