

# Prophylactic antibiotics and abdominal drainage in early recovery pathway for hepatectomy

Jizhou Wang, Lianxin Liu

Key Laboratory of Hepatosplenic Surgery, Ministry of Education, Department of Hepatic Surgery, The First Affiliated Hospital of Harbin Medical University, Harbin 150001, China

*Correspondence to:* Lianxin Liu. Key Laboratory of Hepatosplenic Surgery, Ministry of Education, Department of Hepatic Surgery, The First Affiliated Hospital of Harbin Medical University, Harbin 150001, China. Email: liulianxin@ems.hrbmu.edu.cn.

*Provenance:* This is an invited Letter to the Editor commissioned by Editor-in-Chief Yilei Mao (Department of Liver Surgery, Peking Union Medical College Hospital, Chinese Academy of Medical Sciences, Beijing, China).

*Response to:* Warner SG, Jutric Z, Nisimova L, *et al.* Early recovery pathway for hepatectomy: data-driven liver resection care and recovery. *Hepatobiliary Surg Nutr* 2017;6:297-311.

Submitted Feb 04, 2018. Accepted for publication Mar 16, 2018.

doi: 10.21037/hbsn.2018.03.09

**View this article at:** <http://dx.doi.org/10.21037/hbsn.2018.03.09>

Enhanced recovery after surgery (ERAS) protocols have been pioneered by Kehlet and include multimodal perioperative care to reduce complications rate, cost and hospital stay. The paper “*Early recovery pathway for hepatectomy: data-driven liver resection care and recovery*” by Warner and colleagues attempt to formulate a pathway for practice based on data to allow creation of rational order sets for efficient and superior practice (1).

Liver surgery is classified as clean-contaminated surgery because the bile duct is dissected. The Table 7 in the protocol suggests single dose antibiotics within 30 minutes of incision. However, there is no clear evidence for the use of antimicrobial prophylaxis in liver surgery (2,3). An Cochrane meta-analysis including 7 RCTs showed that no antimicrobial method could improve outcomes after hepatectomy (4). Indeed, preoperative antibiotic prophylaxis is administered routinely in many liver surgery centers. However, most of these results were based on uncontrolled retrospective studies (5). A recent prospective RCT showed that prophylactic antibiotics resulted in no statistically significant benefit for total infections, surgical site infection and remote site infection (5). The findings may attribute to the progressively improved surgical technique and other non-antibiotic-based physical prophylactic procedures, as infectious complications are usually related to technical pitfalls rather than the use of prophylactic antibiotics.

Long operation time, blood transfusion and bile leakage are independent risk factors for infectious complications.

The development of techniques for liver parenchymal transaction in recent years has dramatically improved the previous risk factors. Pneumonia is the most common remote site infection after hepatectomy and routine nasogastric decompression is an independent risk factor (6). In ERAS protocol, the abandoning of post-operative nasogastric tube will also decrease the risk of infectious complications of liver surgery. Thus, we believe pre-op prophylactic usage of antibiotics is not an essential part to prevent infection in selective hepatectomy. Even for patients undergoing hepatectomy with extrahepatic bile duct resection, two-day administration of antimicrobial prophylaxis is sufficient (7).

A meta-analysis published in 2004 provided the strongest evidence to omit routine prophylactic drainage after major abdominal surgery (8), although only 3 RCTs on liver resection with low sample size were included in this meta-analysis. Furthermore, several retrospective cohort studies and randomized controlled trials have suggested that abdominal drainage after liver resection may increase the risk of complications such as wound infection, retrograde abdominal infection, and ascitic fluid leakage. The protocol in Warner’s paper also suggests no routine abdominal drainage in both minor and major liver resection. However, many hepatic surgeons still continue to use routine drainage after hepatic resection for early detection of hemorrhage or bile leakage and reduce need for re-intervention in clinical practice. A retrospective cohort study including 1,269

consecutive elective liver resections assessed the value of prophylactic drainage and found that prophylactic drainage could reduce the frequency of subphrenic abscess and biliary fistula or biloma formation (9). Inoue *et al.* found that 20.9% of patients in the non-drainage group underwent postoperative percutaneous drainage insertion which was considerably high (10).

Till now, there is inconclusive evidence and no recommendation for the use of prophylactic drainage or against it after hepatectomy. Therefore, we think the prophylactic drainage should depend on the type of hepatic resection, the condition of the patients and the experience of the surgeons. Meanwhile, the timing of drain removal on the incidence of retrograde infection should also be considered. Several studies have illustrated the criteria for drain removal after liver resection based on fluid volume and drain fluid bilirubin level, and the time is mainly on post-operative day 3 (11-13).

### Acknowledgements

None.

### Footnote

*Conflicts of Interest:* The authors have no conflicts of interest to declare.

### References

1. Warner SG, Jutric Z, Nisimova L, et al. Early recovery pathway for hepatectomy: data-driven liver resection care and recovery. *Hepatobiliary Surg Nutr* 2017;6:297-311.
2. Melloul E, Hübner M, Scott M, et al. Guidelines for Perioperative Care for Liver Surgery: Enhanced Recovery After Surgery (ERAS) Society Recommendations. *World J Surg* 2016;40:2425-40.
3. Hirokawa F, Hayashi M, Miyamoto Y, et al. Evaluation of postoperative antibiotic prophylaxis after liver resection: a randomized controlled trial. *Am J Surg* 2013;206:8-15.
4. Gurusamy KS, Naik P, Davidson BR. Methods of decreasing infection to improve outcomes after liver resections. *Cochrane Database Syst Rev* 20119;(11):CD006933.
5. Zhou YM, Chen ZY, Li XD, et al. Preoperative Antibiotic Prophylaxis Does Not Reduce the Risk of Postoperative Infectious Complications in Patients Undergoing Elective Hepatectomy. *Dig Dis Sci* 2016;61:1707-13.
6. Nelson R, Tse B, Edwards S. Systematic review of prophylactic nasogastric decompression after abdominal operations. *Br J Surg* 2005;92:673-80.
7. Sugawara G, Yokoyama Y, Ebata T, et al. Duration of Antimicrobial Prophylaxis in Patients Undergoing Major Hepatectomy With Extrahepatic Bile Duct Resection: A Randomized Controlled Trial. *Ann Surg* 2018;267:142-8.
8. Petrowsky H, Demartines N, Rousson V, et al. Evidence-based value of prophylactic drainage in gastrointestinal surgery: a systematic review and meta-analyses. *Ann Surg* 2004;240:1074-84; discussion 1084-5.
9. Kyoden Y, Imamura H, Sano K, et al. Value of prophylactic abdominal drainage in 1269 consecutive cases of elective liver resection. *J Hepatobiliary Pancreat Sci* 2010;17:186-92.
10. Inoue Y, Imai Y, Kawaguchi N, et al. Management of Abdominal Drainage after Hepatic Resection. *Dig Surg* 2017;34:400-10.
11. Tanaka K, Kumamoto T, Nojiri K, et al. The effectiveness and appropriate management of abdominal drains in patients undergoing elective liver resection: a retrospective analysis and prospective case series. *Surg Today* 2013;43:372-80.
12. Yamazaki S, Takayama T, Moriguchi M, et al. Criteria for drain removal following liver resection. *Br J Surg* 2012;99:1584-90.
13. Hokuto D, Nomi T, Yasuda S, et al. The safety of the early removal of prophylactic drainage after liver resection based solely on predetermined criteria: a propensity score analysis. *HPB (Oxford)* 2017;19:359-64.

**Cite this article as:** Wang J, Liu L. Prophylactic antibiotics and abdominal drainage in early recovery pathway for hepatectomy. *HepatoBiliary Surg Nutr* 2018;7(2):156-157. doi: 10.21037/hbsn.2018.03.09