

News Release

Title

The goal of intraoperative blood loss in major hepatobiliary resection for perihilar cholangiocarcinoma: saving patients from a heavy complication burden

Key Points

- The amount of intraoperative blood loss can negatively affect the postoperative course, and complicated hepatobiliary resection for perihilar cholangiocarcinoma carries a considerable risk of bleeding.
- An actual association between intraoperative blood loss and postoperative course remains poorly understood.
- Adjusted blood loss (blood loss per body weight) had a non-linear aggravating effect on the postoperative course after hepatectomy for perihilar cholangiocarcinoma.
- The primary goal of adjusted blood loss should be less than 10 mL/kg to minimize the postoperative complications.

Summary

Dr. Shoji Kawakatsu (Assistant Professor, Division of Surgical Oncology, Department of Surgery, Nagoya University Graduate School of medicine) and Prof. Tomoki Ebata (Division of Surgical Oncology, Department of Surgery, Nagoya University Graduate School of Medicine) explored the adverse impact of intraoperative blood loss on the postoperative course after major hepatobiliary resection for perihilar cholangiocarcinoma. This study depicted the association of the intraoperative blood loss and the postoperative course and propose the primary goal to save patients from the heavy complication burdens in this demanding hepatectomy.

Perihilar cholangiocarcinoma is an intractable disease and surgical resection is the only way to cure this disease. However, complicated nature of this surgery due to the time-consuming tasks and potential risk of bleeding carries considerable morbidity and mortality. Although several previous studies have demonstrated that increased blood loss significantly deteriorates the surgical outcome, volume-dependent relationship between blood loss and morbidity was unclear. In this study, we successfully visualize a bit sigmoid-shaped association between intraoperative blood loss and postoperative course and set the primary goal of blood loss at approximately 10 mL/kg to minimize the adverse impact on the postoperative course. This work was published online in *Annals of Surgery* on April 13, 2023.

Research Background

Although surgical resection is the only curative treatment option for perihilar cholangiocarcinoma, the complicated hepatectomy still remains the most difficult challenge for hepatobiliary surgeons and carries a considerable risk of bleeding. To date, no studies have revealed the real association between the intraoperative blood loss and the postoperative outcomes and a safety limit of blood loss to minimize postoperative complication has been unknown. Therefore, we attempted to disclose the relationship between blood loss and postoperative outcomes by the restricted cubic spline analysis.

Research Results

This study involved 425 patients who underwent major hepatobiliary resection for perihilar cholangiocarcinoma between 2010 and 2019. We reviewed individual electronic health records, and all postoperative complications were evaluated according the CCI, which quantify the whole postoperative complications on a continuous scale ranging from 0 to 100. Intraoperative blood loss was adjusted for body weight, termed adjusted blood loss. The restricted cubic spline model illustrated a bit sigmoid-shaped association between adjusted blood loss and CCI (Figure 1). The model line remained flat until 10 mL/kg, increased from 10 to 20 mL/kg, and minimally rose over 20 mL/kg.

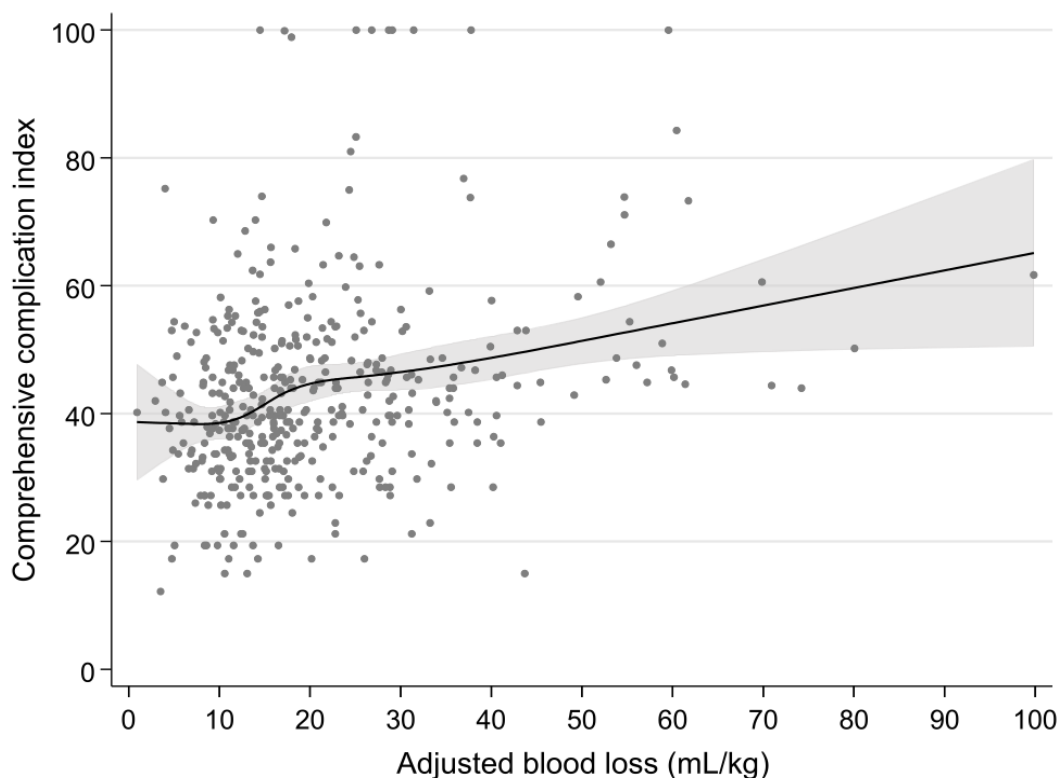


Figure 1. The restricted cubic spline model for the relationship between adjusted blood loss and CCI

Next, the multivariable restricted cubic spline analyses with adjustment for other risk factors for high CCI (age, gender, future remnant liver function, preoperative cholangitis, type of hepatectomy, combined portal vein resection, and combined hepatic artery resection) to demonstrate the independent impact of adjusted blood loss on CCI. The results also showed similar model (Figure 2).

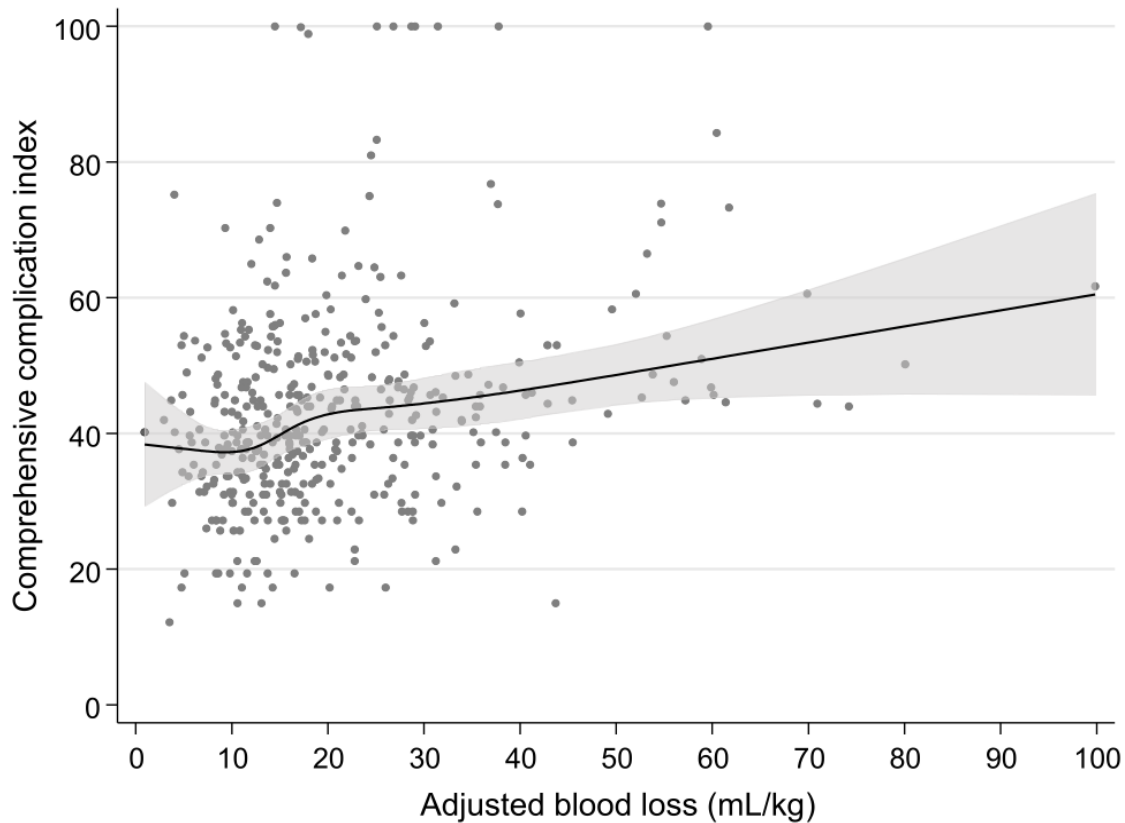


Figure 2. The multivariable restricted cubic spline model for the relationship between adjusted blood loss and CCI

Research Summary and Future Perspective

Adjusted blood loss was a robust deteriorator for CCI after major hepatobiliary resection for perihilar cholangiocarcinoma and would be a most distinct modifiable factor by surgeon's effort. The primary surgical goal of adjusted blood loss could be set at approximately 10 mL/kg to minimize its adverse impact, which may offer a major breakthrough in the surgical strategy for this intractable malignancy. We are ongoingly trying to reduce the amount of intraoperative blood loss to enhance safety of this surgery.

Publication

The goal of intraoperative blood loss in major hepatobiliary resection for perihilar cholangiocarcinoma: saving patients from a heavy complication burden
Shoji Kawakatsu¹, Takashi Mizuno¹, Junpei Yamaguchi¹, Nobuyuki Watanabe¹, Shunsuke Onoe¹, Masaki Sunagawa¹, Taisuke Baba¹, Tsuyoshi Igami¹, Yukihiro

Yokoyama¹, Takahiro Imaizumi², Tomoki Ebata¹

1. Division of Surgical Oncology, Department of Surgery, Nagoya University
Graduate School of Medicine

2. Department of Advanced Medicine, Nagoya University Graduate School of
Medicine

Annals of Surgery

DOI: 10.1097/SLA.0000000000005869

Japanese ver.

https://www.med.nagoya-u.ac.jp/medical_J/research/pdf/Ann_230510.pdf