News Release

Title

Early prediction of serious postoperative course in perihilar cholangiocarcinoma: trajectory analysis of the comprehensive complication index

Key Points

• Although Surgical resection is the only curative option for perihilar cholangiocarcinoma, complicated hepatobiliary resection for this disease carries a risk of postoperative complications.

• The daily CCI was successfully used to graphically illustrate the postoperative course of morbidity as a trajectory and could be categorized into 3 distinct courses.

• The CCI at postoperative days 1, 4, and 7 potentially predicted the subsequent postoperative course, particularly a most severe morbidity course.

• The trajectory of the daily CCI can be a novel indicator for postoperative management.

Summary

Prof. Tomoki Ebata (Division of Surgical Oncology, Department of Surgery, Nagoya University Graduate School of Medicine) and Dr. Shoji Kawakatsu (Graduate School Student, Division of Surgical Oncology, Department of Surgery, Nagoya University Graduate School of medicine) explored in detail every postoperative complication which occurred after hepatobiliary resection for perihilar cholangiocarcinoma. This study successfully depicted the chronological increase in the overall morbidity which categorized into 3 clinically distinct patterns.

Perihilar cholangiocarcinoma is a devastating disease and surgical resection is the only way to cure this disease. However, complicated hepatobiliary resection carries a high risk of postoperative complications, including surgical mortality. To date, no studies have focused on the developmental course of the overall morbidity, and the variation in the postoperative clinical course of patients with perihilar cholangiocarcinoma remains poorly understood. We successfully visualize the laborious postoperative course of this disease and categorize the developmental course of overall morbidity into 3 clinically distinct patterns. In addition, early CCI potentially predicted subsequent progression to serious postoperative course. This work was published online in Annals of Surgery on August 13, 2021.

Research Background

Perihilar cholangiocarcinoma is defined as the biliary tract cancer in which the main tumor is located in the perihilar region. Chemotherapy with or without radiation is less effective and surgical resection is the only way to cure this disease. However, perihilar cholangiocarcinoma is a devastating disease that still remains the most difficult challenge for

hepatobiliary surgeons. The extended nature of complicated hepatectomy carries a risk of postoperative complications, and evaluation of postoperative complications is essential for improving surgical quality.

To date, no studies have focused on the developmental course of the overall morbidity, and the variation in the postoperative clinical course remains poorly understood. Since the CDC indicating the peak extent of therapeutic intervention against complications was introduced, this 6-tier classification has been globally used for the assessment of postoperative complications. Recently, CCI, which integrates all postoperative complications into one single formula was introduced and quantify the overall morbidity on a continuous scale ranging from 0 to 100. Provided that the CCI is calculated every day after surgery, an increase in the daily CCI can be chronologically traced. Therefore, we attempted to graphically visualize the laborious postoperative course of this disease and to categorize the course into clinically distinct patterns under the concept of group-based trajectory modeling.

Research Results

This study involved 484 patients who underwent major hepatobiliary resection for perihilar cholangiocarcinoma between 2010 and 2019. We reviewed individual electronic health records for the purpose of the present study, including the medical records, medications and intravenous order, and imaging findings. All postoperative complications were evaluated according to the CDC, and the CCI was calculated on a daily basis until the postoperative day 14 to construct an accumulating graph as a trajectory (Figure 1).

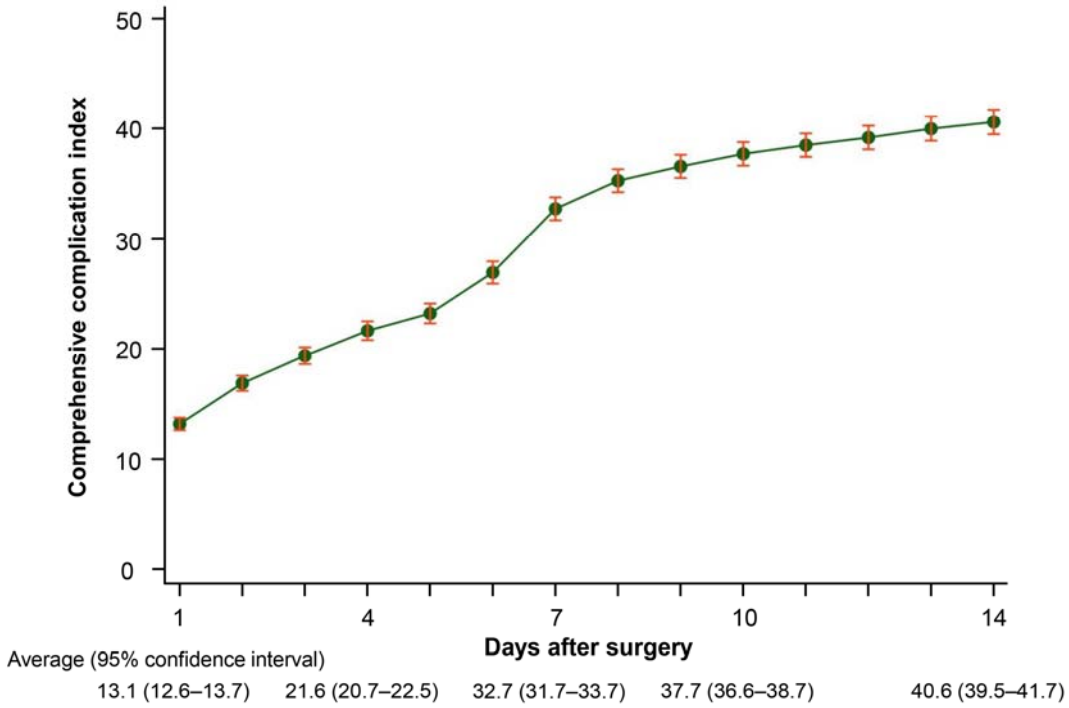

Figure 1. The developmental course of the whole morbidity.

Daily CCI showed an ascension around day 7 and increased slightly thereafter.

Next, group-based trajectory modeling was conducted to categorize the trajectory, and 3 clinically distinct patterns were identified (Figure 2).

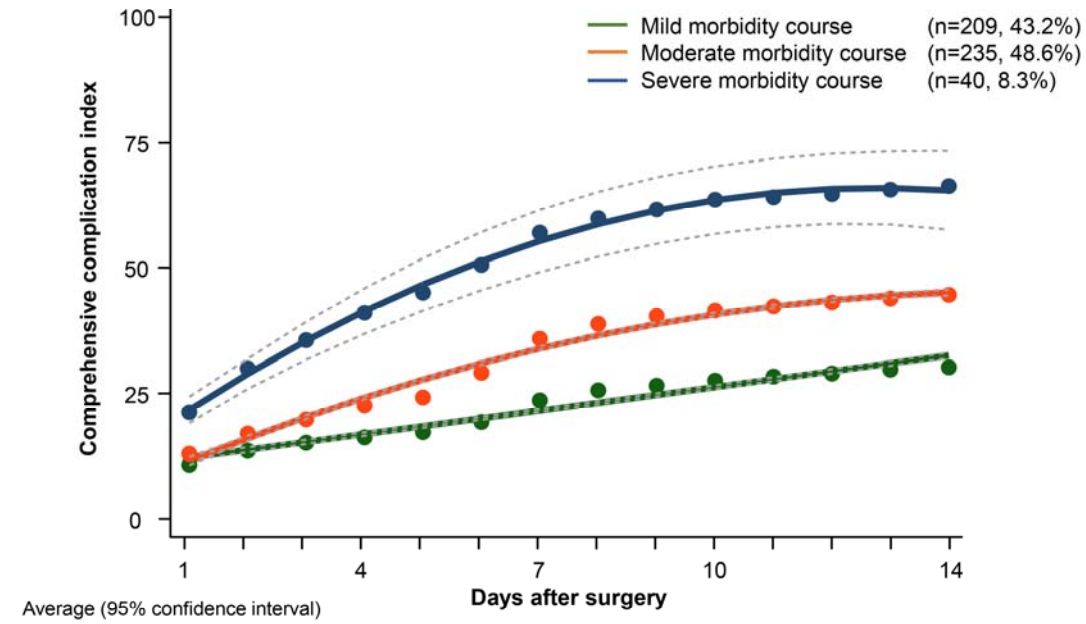

Figure 2. Categorization of the developmental course into clinically distinct patterns under the concept of a group-based trajectory modeling.

Next, the predictive power of early CCI for a subsequent serious course was assessed.

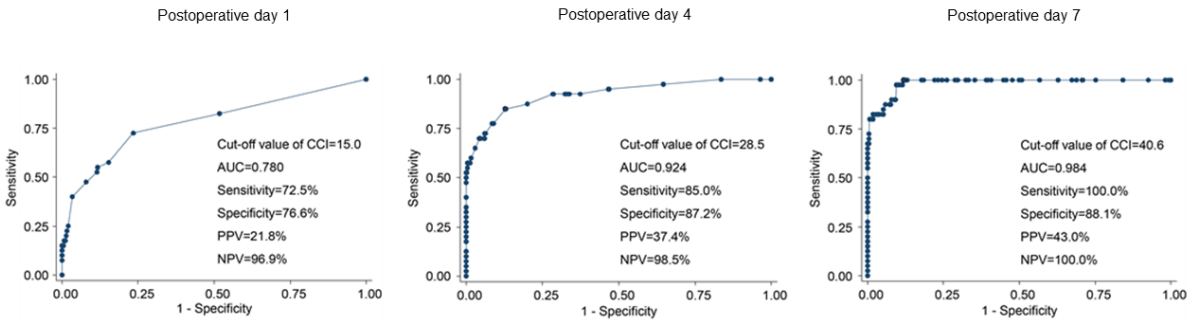

Figure 3 : Evaluation of the ability of early CCI for predicting severe morbidity course by ROC curve analysis

Research Summary and Future Perspective

Although surgical resection is the only curative option for perihilar cholangiocarcinoma, the extended nature of complicated hepatectomy carries a risk of postoperative complications. Because the evaluation of postoperative complications is essential for improving surgical

quality, we focused on the developmental course of overall morbidity. We are trying to improve the postoperative management to prevent lethal postoperative course, including surgical mortality.

Publication

Early prediction of serious postoperative course in perihilar cholangiocarcinoma: trajectory analysis of the comprehensive complication index

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