Sina Abedi MSA Capstone Abstract

Title: University of Colorado Liver Transplant Anesthesia Database: Patients, Management and Outcomes Trends

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Introduction: Liver transplantation surgery is one of the most complex surgical procedures, with substantial challenges to anesthesiologists based on the critical illness of liver recipients and the frequent intraoperative hemodynamic, coagulopathic and metabolic events. We aimed to develop and validate the ***University of Colorado Liver Transplant Anesthesia (LTA) Database*** to efficiently collect and clinical data for quality improvement and research purposes. We hypothesized that the development of this electronic database is feasible and it allows the analysis of population characteristics, clinical management, and outcomes of patients receiving a liver transplantation at the University of Colorado Hospital.

Methods: We designed a retrospective LTA database including automatically-extracted variables related to patient characteristics (e.g., age, sex, MELD score, preoperative comorbidities and therapies), graft and procedure characteristics (e.g., ischemia time, surgical duration, blood product usage, use of transesophageal echocardiography, hemodialysis), clinical outcomes (e.g., extubation at end of surgery, postoperative acute kidney injury and other complications, mortality), and hospital resources utilization (e.g., postoperative destination, ICU admission, hospital length of stay). Each variable required the development of a definition dictionary, practical implementation for data extraction with the assistance of an Epic analyst, and validation.

Results: We queried all patients who underwent a liver transplantation surgery between the January 2018 and May 2024. A variable dictionary was developed, data queries were performed, manually-validated and coding revised. A total of 771 patients receiving a liver transplantation were identified: 59.7% males, mean±SD age 51±12 years, mean±SD MELD score 26±8, 38.7% alcoholic disease. With an exception in 2020 due to the COVID-19 pandemic, there has been a steady increase in the annual number of LT cases, from 97 in 2018 to 136 in 2023. The proportion of donation-after-circulatory-death (DCD) liver grafts has significantly increased from 4% in 2018 to 40% in 2023, and live-donor graft have been maintained around 12%. Approximately 5% of patients every year received a simultaneous liver-kidney transplantation. No clinically relevant changes were observed in patient characteristics, although alcoholic cirrhosis has increased (from 29% in 2018, to 48% in 2022 and 45% in 2023). Intraoperatively, the use of thromboelastography and hemodialysis have remained stable (approx. 99.7% and 16% of cases, respectively), but transesophageal echocardiography utilization has significantly increased from 26% in 2018 to 52% in 2023. Blood transfusion has remained stable: median[IQR] PRBC 8[4,15] units, FFP 13[7,25] units, platelets 2[0,3] units, cryo 0[0,1] units, cell saver 1.4[0.5,3.5] L. Approximately 66% of patients were transferred to the ICU after liver transplantation every year, although the proportion of patients extubated at the end of surgery has significantly increased (from 78% in 2018 to 86% in 2023).

Conclusion: The University of Colorado LTA database is feasible and allows the analysis of population characteristics, clinical management, and outcomes of patients receiving a liver transplantation at the University of Colorado Hospital. This initiative will constitute the platform to monitor LTA patient management and outcomes at the University of Colorado and enable multicenter collaborations with the goal of improving the care and outcomes of patients receiving anesthesiology care for liver transplantation.