



ARTICLE OF THE MONTH

Groose MK, Aldred BN, Mezrich JD, Hammel LL. Risk Factors For Intracardiac Thrombus During Liver Transplantation. *Liver Transplantation*. 2019 May 22. Epub ahead of print.

Abstract:

“Background

Intracardiac thrombus (ICT) is an intraoperative complication during orthotopic liver transplantation (OLT) with high mortality. Patients with end stage liver disease have compromised coagulation pathways and when combined with stressors of surgery, thrombi can form. However, it is unknown which patients are most likely to develop ICT.

Methods

We performed a retrospective cohort study of all OLT patients at our hospital from 2010 to 2017 to identify risk factors for ICT. Analysis was performed with conventional bivariate tests and logistic regression.

Results

The incidence of ICT during OLT was 4.2% (22/528) with a 45.5% (10/22) mortality. Patients who developed ICT had higher physiologic MELD scores at the time of transplant (25.1 vs 32.4, $p=.004$), received grafts from donors with higher BMIs (28.1 vs 32.2, $p=.01$), and had longer intraoperative warm ischemia times (53.1 vs 67.5 minutes, $p=.001$). The odds of developing ICT were significantly lower after administration of intravenous heparin prior to inferior vena cava (IVC) clamping compared to no administration of heparin (odds ratio, 0.25; 95% confidence interval, 0.08-0.75; $p=.01$).

Conclusion

The incidence of ICT at our institution is higher than previously reported which may be explained by our routine use of transesophageal echocardiography. While many factors associated with ICT in this study are non-modifiable, administration of IV heparin prior to IVC cross-clamping is modifiable and was found to be protective. Further studies will be needed to confirm findings and ultimately aid in preventing these lethal events.”

COMMENTS MADE BY CROUCH, CARA MD

Summary:

This article, which was electronically published ahead of print in May, was chosen from *Liver Transplantation* for its thorough single institution review of the incidence of intracardiac thrombus (ICT) during liver transplant and attempts to identify risk factors for this catastrophic

complication. This article reviewed the records of adult patients who underwent orthotopic liver transplant at a single institution between January 2010 and July 2017 excluding patients who were undergoing re-transplant, simultaneous liver-kidney transplant and simultaneous heart-liver transplant, multivisceral transplant or those who received a living donor liver transplant. The incidence of ICT was identified by the presence of notes indicating a thrombus within the anesthesia record or by a period of hemodynamic instability that was consistent with believed ICT followed by the administration of anticoagulants.

The team identified 22 cases of ICT out of 528 transplants. The authors point out that 20 of the 22 cases were identified via transesophageal echocardiography (TEE), however, they note that only 8 of these patients had a TEE probe in place from the start of the case, while the other 12 had probes emergently placed during hemodynamic collapse.

The variables that were found to be statistically significant for association with the development of intracardiac thrombus were higher physiologic MELD scores, an organ from a donor with a higher BMI, and longer warm ischemic time of the organ. The authors also found that administration of IV heparin prior to cross-clamp of the IVC was protective against the development of ICT, which is not an unexpected finding. The authors noted that there was a trend toward lower pre-operative fibrinogen and higher INR levels that was associated with developing an ICT, however, this was not statistically significant. The authors evaluated whether the administration of antifibrinolytics (either aminocaproic acid or tranexamic acid) was associated with a higher risk of ICT and did not find any significance. Similarly, there was no correlation between the total number of intraoperative blood products administered and the risk of developing ICT.

Given the rarity of this complication, it is difficult to determine the true risk factors for the development of ICT. However, now that intraoperative use of transesophageal echocardiography is increasing in liver transplantation, we may see this reported more frequently. It would be very interesting to see similar retrospective analysis from other high-volume centers to determine if similar risk factors are identified.

References:

1. Goose MK, Aldred BN, Mezrich JD, Hammel LL. Risk Factors For Intracardiac Thrombus During Liver Transplantation. *Liver Transplantation*. 2019 May 22. Epub ahead of print.

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