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An Increased Lactate-to-pyruvate Ratio Is Not a Stand-alone Marker of Ischemia

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We read the article *Evaluation of Intrahepatic Lactate/Pyruvate Ratio As a Marker for Ischemic Complications Early After Liver Transplantation—A Clinical Study* authored by von Platen et al. [1] The authors conclude that the lactate-to-pyruvate ratio (L/Pr) is not a reliable marker of ischemia in liver transplants and question the clinical utility of the cutoff values for detection of ischemia (lactate > 3 mmol/L) and L/Pr that we reported from a cohort of 73 liver transplants in 2012,[2] and which was followed up in a report on 20 pediatric liver transplants in 2013.[3]

Unlike the report from von Platen et al,[1] we had numerically more episodes of hepatic artery thrombosis (HAT) in our material allowing statistical analyses of the data. We assume that a relatively large proportion of pediatric liver transplants can at least partly explain our high proportion of HAT. Being aware of the biological pitfalls with pyruvate, and although the L/Pr alone discriminated ischemia from the reference cohort with an area under curve in the receiver operating characteristics analyses with an area under curve (AUC of 0.99), we performed the contingency table analyses for sensitivity and specificity with the criteria of *simultaneously increased lactate and L/Pr*. Thus, an increased L/Pr not accompanied by an increased lactate is not a marker of ischemia.

Unlike von Platen et al,[1] we monitored our whole liver transplants with 1 microdialysis catheter in each liver lobe. This improved the specificity for 1 measurement from approximately 70% to >90%, and a repeated positive measurement improved the specificity further. We also showed that glycerol is indicative of ischemia in liver transplants with an AUC of 0.85.

We agree that it is regrettable that the patient who was diagnosed with HAT at postoperative day (POD) 10 was not diagnosed earlier by increased lactate and L/Pr in microdialysis samples. However, although the thrombus was considered old by the transplant surgeon at POD 10, we question the statement that the thrombus occurred 22 hours after the transplantation. We fully agree with the authors that the small increase in lactate and L/Pr at this time point was not enough to trigger further examinations. It seems as if the patient was monitored with microdialysis catheters for a little <4 days. Could it be that the thrombus occurred, for example, between POD 4 and 9 and could still be considered "old" by the surgeon?

Our experience with microdialysis in liver transplants is good, and we have implemented it as part of our clinical routine in high risk, mainly pediatric liver transplants. It is a relatively costly and work demanding method and cost benefit considerations speak against using it for the large cohort of low-risk adult liver transplant recipients.

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Letter to the editor regarding the article Evaluation of Intrahepatic Lactate/Pyruvate Ratio As a Marker for Ischemic Complications Early After Liver Transplantation—A Clinical Study authored by von Platen, D'Souza, Rooyackers, and Nowak in Transplantation Direct December 2019, Volume 5, Issue 12, p e505. We title of the letter is An increased lactate-to-pyruvate-ratio is not a stand-alone marker of ischemia. We hope you will find our letter to the editor worth publishing in Transplantation Direct.

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