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LETTER TO THE EDITOR

Development of a machine perfusion device for cold-to-warm machine perfusion

To the editor,

With interest we read the article by Goumard et al. on the development of a novel circuit for combined hypo- and normothermic machine perfusion.¹ The authors are to be commended for their work, and the attempt to make an inexpensive perfusion machine available to a broader public.

Cold-to-warm perfusion, even with two different perfusion solutions, has been successfully performed in various studies with a widely used and CE-marked perfusion device (Liver Assist [Organ Assist, Groningen, Netherlands]).^{2,3}

There are several potential issues that are not clarified in this article. First, it appears the same perfusion pressures are used during hypothermia and normothermia. We would like to stress the importance of using lower pressures during hypothermic machine perfusion (HMP) to prevent undesired shear stress due to increased vascular resistance.⁴ Most centers that have used HMP clinically over the last years, have been using pressure-guided systems at portal pressures ≤ 5 mmHg and arterial pressures ≤ 25 mmHg.^{5,6}

Secondly, it remains unclear what perfusion solution is used during HMP. To the best of our knowledge, the safety of using the only CE-certified perfusion solution (Pump Protect®, Carnamedica, Poland) for HMP has not been studied nor been approved for temperatures up to 20 °C.

Lastly, in a recent study combining hypo- and normothermic machine perfusion (NMP) to assess viability of initially declined human donor livers, all grafts cleared lactate and maintained a physiological perfusate pH.⁷ We hope that the authors of the present study can validate their results by showing that livers

perfused with this new system can meet the viability criteria for transplantation previously described by our own group⁷ and others⁸ (Table 1).

Conflict of interest

None declared.

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Table 1 Viability criteria for liver transplantation during normothermic machine perfusion. Modified from van Leeuwen et al.⁷ and Watson et al.⁸

Viability criteria after 150 min of NMP	
Perfusate lactate	<1.7 mmol/L
Perfusate pH	7.35–7.45
Bile production (cumulative)	>10 mL
Bile pH ^a	>7.45 ^a
Difference between perfusate glucose and bile glucose	>10 mmol/L

^a Especially the difference between perfusate pH and bile pH should be positive, as described earlier.⁷

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