

Response to Minou: "Does the temporary porto-caval shunt have any beneficial impact in orthotopic liver transplantation?"*

*This letter is reply to Dr. Andrei Minou. [Minou A. Does the temporary porto-caval shunt have any beneficial impact in orthotopic liver transplantation? *Transpl Int* 2011; **24**: e71.]

doi:10.1111/j.1432-2277.2011.01279.x

Dear Sirs,

Thank you for the opportunity to reply to Dr. Minou's letter about the article we authored [1].

Some variables reported in table 2 showed a non-normal distribution and could be better represented by median and range. Normal distribution of all variables was tested using Kolmogorov–Smirnov test before we applied both Student's *t*-test (with variance equality testing) and Mann–Whitney *U*-test, when a non-normal distribution was present. Student's *t*-test is a very powerful test for non-normally distributed variables, although Mann–Whitney test is commonly recommended. As shown in Table 1, there were no changes in significance when Mann–Whitney *U*-test was performed. For these reasons we believe that, although data presentation can be improved, data analysis is still statistically correct and does not invalidate the manuscript results.

Focusing on graft and patient survival, we were already aware that the small amount of patients included in the study is a limitation (as we clearly highlighted in the discussion), but we believe the reported differences are interesting enough to be taken into account. In the context of using very marginal grafts in very sick patients [as in competitive areas with a Mayo End stage Liver Disease (MELD) based allocation system], strategies to reduce the risks of primary graft dysfunction (PGD) should be

encouraged. Recently, some authors postulated that an increased rate of PGD is found using extended criteria donors (ECD) with multiple factors of marginality [2]. In the reported paper, PGD mediated by ischemia/reperfusion injury (identified by other authors as the underpinning of increased rate of PGD using ECD [3]) depended on the number of ECD variables and recipient status stratified by MELD score.

The impact of hyperperfusion shortly after reperfusion has been recently proven in an animal model for small size syndrome in liver transplantation (OLT) [4]. Such impact synergizes with the extended criteria that high-risk donors already carry, as such criteria mainly reflects a limited amount of functional parenchyma. We opine that decompressing the splanchnic territory with temporary porto-caval shunt (TPCS) during hepatectomy and anhepatic phase facilitates dissection, reduces blood loss, and ameliorates the impact of the first pass hyperperfusion damage to an already handicapped organ.

Recently, Cochrane Reviews focused on pivotal differences in OLT procedures, and failed to demonstrate evidence to support or refute the use of veno-venous bypass or piggyback technique versus standard technique [5,6]. So, should we refuse the vast amount of clinical research that lacks the highest level of evidence? Not every

Table 1. Non-normally distributed variables.

	TPCS group (n = 58)	Non-TPCS group (n = 90)	
Recipients characteristics			
Pre-OLT platelets (x100 000/cc)	58 (22–465)	80 (11–557)	NS
Intraoperative variables			
Mean surgical time (min)	391 (251–1047)	404 (249–840)	NS
PRBC transfusion (units)	6 (0–30)	8.5 (0–91)	0.017
FFP transfusion (units)	6.5 (0–38)	9 (0–75)	NS (0.082)
Platelet transfusion (units)	0 (0–30)	0 (0–70)	NS

Data are expressed as the median and the range and compared using the Mann–Whitney *U*-test. NS, nonsignificant.

advance in the field of liver transplantation has been supported at the highest level of evidence, and it has to be taken into account that different surgical techniques can be chosen based on personal preferences of an experienced surgeon and reproducibility varies according to level of expertise, donor–recipient ratios, and resources availability.

We strongly believe that, despite the limitations of our study, the results should encourage the transplant community to fully investigate the potential benefit of the temporary porto-caval shunt in liver transplantation, by studying not only the clinical results, but also the effects on ischemia/reperfusion injury and intraoperative liver hemodynamics. Our recommendation for a multicenter randomized controlled trial has been previously suggested [7].

Davide Ghinolfi,¹ Josep Marti² and Juan Del Rio Martin³

¹ Cisanello Hospital – General Surgery and Liver Transplantation, University of Pisa, Pisa, Italy

² Hospital Clinic i Provincial – General Surgery, Barcelona, Spain

³ Auxilio Mutuo Hospital – Hepatobiliary Surgery and Liver Transplantation, San Juan, Puerto Rico, USA

References

1. Ghinolfi D, Marti J, Rodriguez-Laiz G, *et al.* The beneficial impact of temporary porto-caval shunt in orthotopic liver transplantation: a single center analysis. *Transpl Int* 2011; **24**: 243.
2. Briceno J, Ciria R, de la Mata M, Rufian S, Lopez-Cillero P. Prediction of graft dysfunction based on extended criteria donors in the model for end-stage liver disease score era. *Transplantation* 2010; **90**: 530.
3. Busuttil RW, Tanaka K. The utility of marginal donors in liver transplantation. *Liver Transpl* 2003; **9**: 651.
4. Fondevila C, Hessheimer AJ, Taura P, *et al.* Portal hyperperfusion: mechanism of injury and stimulus for regeneration in porcine small-for-size transplantation. *Liver Transpl* 2010; **16**: 364.
5. Gurusamy KS, Koti R, Pamecha V, Davidson BR. Venovenous bypass versus none for liver transplantation. *Cochrane Database Syst Rev* 2011; **3**: CD007712.
6. Gurusamy KS, Pamecha V, Davidson BR. Piggy-back graft for liver transplantation. *Cochrane Database Syst Rev* 2011; **1**: CD008258.
7. Davila D, Bartlett A, Heaton N. Temporary portocaval shunt in orthotopic liver transplantation: need for a standardized approach? *Liver Transpl* 2008; **14**: 1414.