



Response to “Critical appraisal of the modified ante situm liver resection—is the original method the better choice?”

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Dear Editor,

We would like to thank Fard-Aghaie and the Barmbek group for their letter to the Editor and appreciate the discussion about our results concerning modified ante situm liver resection without use of hypothermia and veno-venous bypass.

Since 1988, we performed about 40 ante situm resections and more than 20 ex situ resections at Hannover Medical School. In 2000, Raab et al. reported a mortality rate close to 30% for these procedures while hypothermia and veno-venous bypass were still used routinely [1]. The mortality in our present cohort was only 14% showing no increase of mortality applying the modified procedure with avoidance of the veno-venous bypass as well as hypothermia in our patients.

As requested, we provide results of pre-/postoperative liver function tests for all patients included in our previous report [2] (see Fig. 1). Apart from one patient, all individuals treated by modified ante situm resection fulfilled the criteria of the commonly applied “50:50 criteria” in the early postoperative course [3]. The patient who died did not show the typical clinical course of postoperative liver failure as already previously discussed [2].

The avoidance of the veno-venous bypass has been the standard procedure for liver transplantation in our center for

many years and is in line with recent publications that total vascular occlusion (TVO) is possible without a worsened outcome after liver transplantation and specific risks of bypass can be avoided [4]. From these results, we changed our procedure concerning complex liver resections with venous reconstruction in specific patient constellations. This is in line with other groups that likewise published alternative approaches to avoid the use of the conventional veno-venous bypass [5]. Regarding patient safety, not only the risk for complications arising from the use of veno-venous bypass such as portal vein thrombosis needs to be considered, one also has to keep in mind that setup of the bypass itself represents a technical procedure that requires advanced surgical skills and should only be performed by an experienced surgeon.

Comparison of this small series of cases to the impressive cohort of 77 cases with complex liver resection using standard TVO, veno-venous bypass, and in situ hypothermic portal perfusion published by Azoulay et al. seems pretty difficult as duration of cold ischemia was significantly longer with 101 min in relation to only 30 min in our cohort [6]. This is of great importance since it was previously shown that even in cirrhotic livers 30 min of warm ischemia can be well tolerated [7]. Most interestingly, the report of Azoulay et al. also provides some data for 87 cases with complex liver resection using standard TVO and veno-venous bypass but no in situ hypothermic portal perfusion. Despite avoidance of the latter, outcome of these patients was even better: The 30- and 90-day mortality rates for the 87 TVO cases that were performed without hypothermic perfusion during the same time period were 6.9% (6 cases) and 9.2% (8 cases), respectively (compared with 14.3% (11 cases) and 19.5% (15 cases), respectively, in aforementioned cohort of 77 patients). Of course, there might be a bias looking at these results due to potential differences in patient characteristics and the complexity/extent of the procedures performed which were not provided in the mentioned report.

H. Bektas and Florian W. R. Vondran contributed equally to this work.

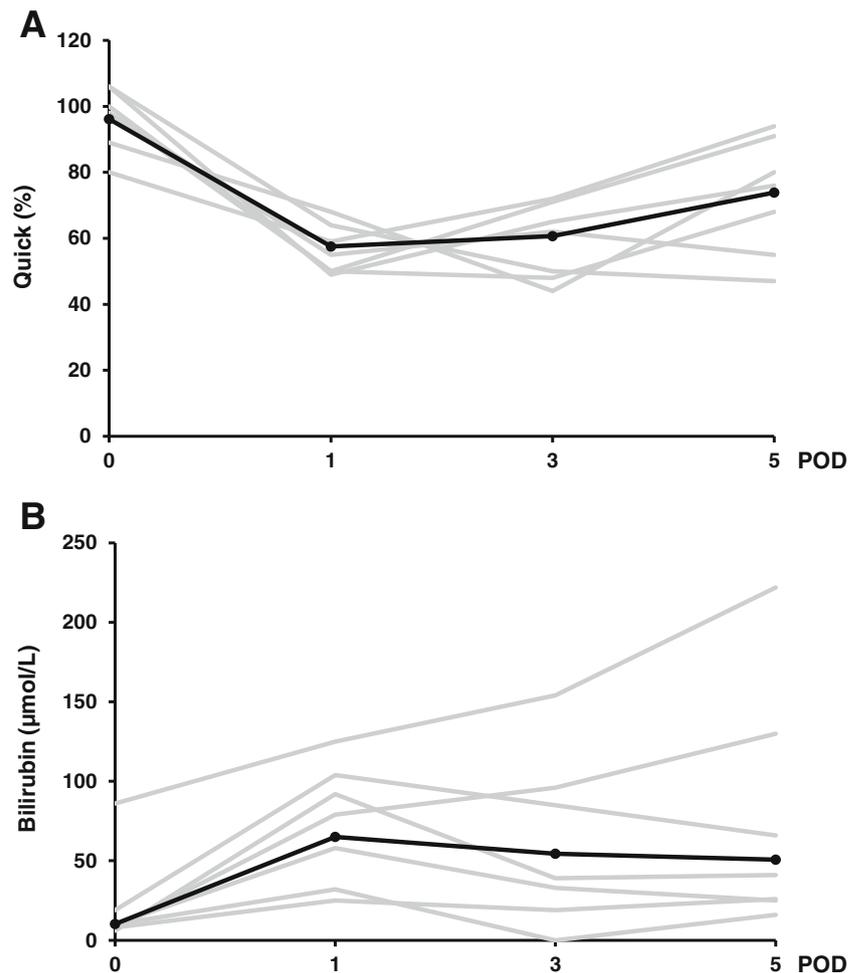
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Fig. 1 a, b Results of pre-/postoperative liver function tests for all patients in our previous report (POD: post-operative day)



We totally agree with Fard-Aghaie et al. that the reconstruction of the inferior vena cava (IVC) and the venous outflow might represent a time-consuming phase of the ante situm procedure. Hence, the near to complete parenchymal dissection and preparation of TVO not only represents an important step of this complex procedure for minimization of the ischemic time the liver will be exposed to, but also enables the experienced HBP surgeon to define the extent of the required vascular reconstruction as well as to estimate the time necessary for its realization. If reconstruction seems complex with expected time to exceed 60 min, then cold perfusion should be considered in line with the conclusions drawn by another work of Azoulay et al. [8].

However, we disagree with Fard-Aghaie et al. that complete replacement of the IVC usually represents the most time-consuming technical part of the reconstruction as demonstrated by the short time of reconstruction in two of our presented cases that required PTFE-grafts [2]. Partial reconstruction of the IVC using large venous allografts with reinsertion of the hepatic veins often seems at least equally challenging and time-consuming in our opinion.

Unfortunately, the own data referred to by Fard-Aghaie et al. (12 cases mentioned) is not published so far, and thus direct comparison with our patients as well as the cohorts of Azoulay et al. is rather difficult but would be of great importance due to the particularly low mortality (0%) reported in their own cohort.

In conclusion, with our presented modified procedure of ante situm liver resection, we want to point out another approach suitable for the treatment of advanced or unfavorably located liver tumors by experienced HBP surgeons in highly selected patients.

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