Letter to the Editor

Laparoscopic parenchymal sparing hepatectomy—a response letter

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We thank Dr. Giovinazzo and Dr. Sutcliffe for their thoughtful comments regarding our systematic review on laparoscopic parenchymal-sparing hepatectomies (LPSH) (1). The meta-analysis of the current literature demonstrated that LPSH was feasible with perioperative outcomes comparable to previously published data on open parenchymal sparing hepatectomy (PSH), however mostly in the setting of solitary liver tumors (2). We made clear in our paper that the main limitations of the study are (I) the selection bias as the analysis is based only on retrospective studies, and also (II) the relative lack of data regarding LPSH for more than one lesion and bi-lobar disease. It is acknowledged that laparoscopic liver resections for tumors in the posterosuperior segments and with multicentric disease are technically more challenging (3). These limitations are currently being investigated by a variety of prospective trials, i.e., the Orange posterior-superior segment trial.

The systematic review was performed to draw attention to this novel species of liver resection LPSH and describe its technical infancy. We agree with Giovinazzo and Sutcliffe that the definition of LPSH used is quite preliminary. Not every non-anatomical resection is per se a PSH. Any resection becomes a PSH by the fact that an anatomical resection of "more" liver tissue could be considered a "reasonable" but less optimal alternative in 2020 by most experts. PSH will need to be defined as we go, and the definition will change as time passes and skills in LPSH improve. No doubt, only an operational definition will allow prospective studies to be performed and we fully support the call for such a definition. The indeterminacy of the current definition is rather reflective of the ongoing evolution and innovation in liver surgery due to surgical technique and indications for resection based on tumor biology, resulting in an ongoing expansion of resectability criteria for a wide variety of liver tumors. Our review and most published literature broadly define PSH as an oncological resection which preserves as much functional, uninvolved liver parenchyma as possible by decreasing the non-tumorous component of the specimen (2,4-6). Along these lines, even major hepatectomies may well be considered PSH, as for example, in the scenario of a central hepatectomy for a large, centrally located tumor compared to a trisectorectomy. In surgery for metastases the dichotomy between parenchymal-sparing and non-parenchymal sparing matters much more than the dichotomy 'Major-minor resection' which has dominated liver surgery for so long. Desjardin *et al.*, proposed to use tumor to liver ratio of the planned resection to define PSH (6). Likely any such definition will have to be based on volumetry. Which cut-off to choose, remains an empiric question that has to be answered in future. It has to be acknowledged that there are situations where the metastatic lesions are quite small, too difficult targets for intraoperative ultrasound guidance, deep and too numerous to be resectable with a parenchymal sparing approach. Also, since most colorectal liver metastases receive neoadjuvant chemotherapy, there are situations of disappearing metastases after chemotherapy that at least do not go missing

once a larger anatomical resection of the infested part of the liver is performed (7). These situations are a clear indication for non-parenchymal sparing resections. At times, there simply are oncological contraindications to parenchymal sparing resections of colorectal liver metastases.

LPSH is, in our view, the most minimally invasive minimal invasive surgery of the liver. If technically not feasible, an alternative open PSH should always be considered less invasive compared to a laparoscopic right or left hepatectomy due to the priority of the effect of liver volume remnant volume on morbidity and mortality over the effect of the approach. We also agree with Giovinazzo and Sutcliffe in that regard. However, laparoscopic innovation consists in asking the question: "could we do this safely laparoscopically?" each and every time a resection is planned—parenchymal sparing or not, anatomical or non-anatomical. ALPPS and Two-stage hepatectomies have been performed laparoscopically (8,9), so it does not help to draw up artificial borders by saying "open hepatectomy should still be considered the gold standard" as is the style of consensus conferences that seem to be driven by fear to open the floodgates to surgical adventurism. The innovation of today is the gold standard of tomorrow and laparoscopic parenchymal sparing resections of bi-lobar multiple lesions will be performed routinely much sooner than we expect. However, the point Giovinazzo and Sutcliffe are making, is well taken. The majority of surgeons will perform resections on bi-lobar lesions with open surgery and pick very selective cases for laparoscopy.

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Footnote

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