



Minimal access liver surgery: from the escalation, to the boundaries, searching for the rules

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Minimal access liver surgery (MALS), is now routinely performed worldwide, and procedures like limited resections of antero-inferior segments and left lateral sectionectomy could be retained as standard once performed laparoscopically (1). It is a common belief that MALS procedures mean shorter and better postoperative outcome, and essentially more safety compared to the open approach. Furthermore, MALS procedures facing with complex disease presentations are increasingly proposed (2). In this escalation of MALS in the panorama of the surgical offer available for patients with liver tumors open liver surgery (OLS) seems somehow passed away. In this setting, the paper of Tong *et al.* tried to set clinically based criteria for allowing to foresee the risk of conversion and morbidity once a MALS is planned (3). At least the attempt is worth to be awarded while the results should be validated by means of further studies able to test the scoring system the authors proposed. For sure there is the merit to investigate the burden of MALS, which implies the recognition of a limit and subsequently the need for its precise definition. A definition which, as anything in medicine, could not be considered definitive, since it will probably evolve with expertise and technology as it has been the case in the last 10–15 years. Anyhow, pointing out the existence of a limit superimposes caution to any effort to get over the burden unless the attempt is based on a solid background. For sure, in this sense, the authors have provided an instrument for the surgical community which conveys limits to which any surgeon has to face with. This is particularly relevant given that in liver surgery even the basic concept of what is resectable and what is not, is something

vaguely established (4).

Looking to the data it is clear what intuitively seemed: the access is linked to the complexity of the problem to be solved and it should be tailored accordingly. This concept sustains the reasonability of the acronym MALS rather than MILS (minimal invasive liver surgery) pointing out the fact that the laparoscopic approach is something about the access which does not imply by definition that the procedure should be minimal invasive also for the liver itself (5-7). In summary the complexity, the same complexity affecting feasibility and risk in OLS as well, implies graduation of the access accordingly. Then, as supposed, tumor location and amount of tissue to be removed are crucial elements for considering MALS. That happens, as in OLS, complexity demands sometime an access featured by the extension to the chest of the abdominal incision (8). Indeed, the access is established for having the room to readily manage the planned and unplanned occurrences, and obviously this is the case both of MALS and OLS. The only difference between them is the fact that for the first the second is acting as a rescue whether at least up to now the reverse does not work. Thus, the surgical conduct and the outcome depend mostly on the complexity of the procedure on the liver. Then, if could be acceptable considering limited resections of antero-inferior segments and left lateral sectionectomy as standard once approached by MALS (1), the same could not be automatically transferred to more complex procedures: a higher rate of conversion and morbidity once the complexity increases, as perfectly stated by Tong *et al.*, is supporting that (3). By

pointing out this aspect, Tong *et al.* has the merit to reduce the excessively optimistic consideration of MALS as equally safe and performant of OLS despite the complexity. A too superficial conclusion which omitted to consider the biased matching which to make comparable the groups undergoing MALS and OLS minimized the complexity of just the OLS group (9,10). Obviously, that leads to results which are not comparing the two groups but just a marginal portion of one with the body of the other: this is exactly what is usually seen in most of the papers comparing MALS and OLS (9) or MALS for simple vs complex conditions (10). Even a randomized trial well conducted and meaningful, was anyhow focusing the analyses to a subgroup of patients' carrier of CLM: the oligometastatic ones (11). It would have been more reasonable to add the word "selected" in the title to let better adhering the message to the analysed environment, then reducing the risk of addressing generalized messages leading to misconducting conclusions.

Given that, once it is accepted that access which should be designed for the specific complexity of the planned operation, a further scenario should be worth to be dealt with. Indeed, we are assisting to the growing relevance of parenchyma sparing surgery (PSS). The latter, once feasible, conveys intuitive advantages compared to the major hepatectomies (12). Moreover, PSS is now applied also in case of high tumor burden, somehow overlapping and even overwhelming the patients' profiles of those addressed to major hepatectomies or even staged procedure (13,14): that thanking the feasibility, and oncological suitability of tumor-vessel detachment (R1vasc) (15,16). However, this enhanced PSS approach as it is a R1vasc policy, despite featured by levels of safety superior than those warranted by any major staged or not procedure (13,14), is technical demanding, and that limits its wide spread out through the surgical community and at least for the moment could not be faced with MALS. MALS on the contrary is suitable for staged procedures (6,7), demonstrating how it does not mean MILS since it may vehicle opposed policies to PSS. On the other hand, the difficulty to translate in a MALS environment the complex PSS should deserve a serious consideration by the surgical community. Indeed, we may assist to a phenomenon in which for avoiding OLS, major but MALS are preferred to PSS but OLS. Indeed, MALS appealing especially for the young surgeons together supported by a somehow obvious marketing around it could induce emphasizing laparoscopic staged procedure for relatively low tumor burden, rather than getting into complex PSS potentially safer, with adequate oncological

suitability, and capable to warrant more chance for further surgery in case of relapse but open. It is then clear how relevant is the attempt of Tong *et al.* to provide criteria for affording MALS more consciousness, hopefully limiting paradoxical attitudes as that aforementioned.

Given the lack of a common definition of resectability (4), and all the aforementioned consideration, Tong *et al.* tried to fix criteria based on the outcome which may deserve in aiding customize the approach to the different liver involvement and the liver resection to be done either MALS or OLS.

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Footnote

Conflicts of Interest: The author has no conflicts of interest to declare.

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