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LETTER TO THE EDITOR

The role of hand-assisted laparoscopic splenectomy for mega spleens in the da Vinci era

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Dear Editor,

We read with great interest the article by Cavaliere et al., entitled "Robotic vs laparoscopic splenectomy for splenomegaly: A retrospective comparative cohort study" published on *International Journal of Surgery* [1].

Laparoscopic splenectomy is nowadays considered the gold standard for normal to moderately enlarged spleens. However, in case of more challenging conditions such as mega spleens or cirrhotic patients, the laparoscopic approach is still associated with high risk of intra-and post-operative bleeding, high conversion rate, and high morbidity.

In this setting, the authors compared the robot-assisted laparoscopic surgery (RAS) with the direct manual laparoscopy (DML), reporting possible advantages with the use of the da Vinci system for splenectomy in case of splenomegaly. In particular, they reported improved outcomes with RAS in terms of reduced intraoperative bleeding and less conversions to open surgery, although if they also admitted the limitations of the study, such as its retrospective nature and the small sample size, which prevent to draw definitive conclusions. Furthermore, they reported the longer operative time and the higher costs as two limitations of RAS, respect to DML.

We think that, while it is true that the increased dexterity offered by RAS should reasonably help younger or less skilled laparoscopic surgeons to obtain better results in splenectomies for moderate splenomegaly, in case of mega spleens, due to the reduced operative field and to the lack of a tactile feedback, these advantages could not be translated in the same good results, also in expert hands.

Indeed, facing with mega spleens, the robot-assisted intracorporeal manipulation and the exposure of the hilum, as well of the ligaments dissection can still be very difficult, and this difficulty can be accented by the absence of tactile feedback together with the fragility of the parenchyma, which can easily break and bleed. For these reasons, although if we strongly support RAS for several indications in general surgery [2–9], we think that so far, the better option to face a splenectomy in case of mega spleens should be still the hand-assisted laparoscopic surgery (HALS) technique.

Indeed, HALS has the advantage of maintaining a minimally invasive surgical approach like DML, without losing the tactile feedback, thanks to the non-dominant hand inserted in the abdomen, with a powerful ability to gently manipulate the spleen and to bluntly dissect. As a consequence, with HALS, the use of the non-dominant hand strongly increases local control, exposure and manipulation. In particular, HALS allows to improve the accuracy of manipulation by direct tactile sense, and by maintaining tactile feedback and hand–eye coordination, the surgeon can bluntly dissect adhesion around the spleen and encircle the splenic pedicle and the space beneath the tail of the pancreas with the hand in the abdominal cavity [10]. Moreover, in case of marked splenomegaly, it is difficult and sometimes impossible to dissociate the spleen using both DML or RAS, due to the limited visualization of this area owing to the large spleen size, while for HALS, these attachments can usually be severed by blunt finger dissection even in areas that are hidden from the endoscopic view because of the retained tactile feedback [11].

For all these reasons we think that, in challenging cases, the HALS approach can increase safety and reduce conversion rates without significantly increasing costs, at the same time maintaining the good post-operative outcomes of DML or RAS in terms of hospitalization and complications, thus

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maintaining all the advantages of minimally invasive management [10–12].

Finally, the access for the left hand for the HALS technique can be used in malignant diseases, for the extraction of the entire spleen through the subcostal incision used for the hand port.

In conclusion, thanks to the possibility to choose between DML, RAS and HALS, the minimally invasive surgery should be always considered as the best approach for splenectomy in case of splenomegaly of any size. The limits of the traditional laparoscopic technique can be increasingly overcome by the technical advantages of the robotic system or by the use of an HALS technique, depending on surgeon's experience and on spleen size or disease.

Compliance with ethical standards

Conflict of interest Gregorio Di Franco, Desirée Gianardi, Matteo Bianchini, Matteo Palmeri and Luca Morelli declare that they have no conflict of interest.

Ethical approval This article does not contain any studies with human participants or animals performed by any of the authors.

Informed consent For this type of article, informed consent is not required.

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