Letter to the Editor

Use of robotics in liver donor right hepatectomy

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Thank you for inviting us to comment the review article entitled "*Use of robotics in liver donor right hepatectomy*" by Chen PD *et al.* (1), published on *HBSN* journal. In their interesting paper, the authors stated that despite the fact that minimally invasive surgery (MIS) has been documented with safety and feasibility in complex liver surgery the progress has been slow in regard to the application of MIS in donor graft hepatectomy. Pioneer surgeons have devoted themselves to develop pure MIS approach for donor hepatectomy, but the steep learning curve remains barrier for its wide adoption. The authors suggest that the introduction or robotic assisted surgery may contribute to a wider acceptance of MIS as the technique of choice for live donor hepatectomy. Despite a great attention to donor selection and continuous improvement in donor care the risks of donor hepatectomy remain real and the complication rate not insignificant (2). Traditional open liver resection results in post-operative pain and in at least 30% of the cases these pains were attributed to abdominal wall trauma (1,2). For these reasons and with the aim of facilitating donor recovery, transplant surgeons have been exploring the possibility of routinely applying MIS to live donor hepatectomy. To bridge the gap between open and pure MIS donor procurement, hand-assisted laparoscopic surgery was initially introduced in the 90'. It was not until 2002 that Soubrane O presented the first two cases of pure laparoscopic left lateral living donor hepatectomy, followed in the years to come by several successful attempts to extend the procedure to the procurements of full left and right hepatic lobes (1-6). As reported by the authors of this paper, following the first laparoscopy assisted donor right hepatectomy in 2006, only 22 pure MIS approach for right sided donor hepatectomy were reported during the following 5 years (1). The report of these pioneer surgeries confirmed the feasibility of highly selected cases in the hands of experienced MIS surgeons (4). Today the number of centers performing almost routinely right and full left MIS liver donor hepatectomy is steadily growing especially in Asian countries. Despite these advancements we still lack generalized controlled data demonstrating a significantly clear advantage of MIS approach in donor recovery and decrease in donor complications/risk as it can be seen in left lateral hepatectomy (1). Robotic assisted hepatic surgery aims at lowering the barrier to entry and make MIS easier to adopt. However, also for robotic assisted surgery the clear impact on patient recovery is still debated. In fact, as reported by the authors in *Table 1*, the mean operative duration time was 487 min (ranging, 353–753 min), blood loss from 50 to 500 mL and the mean hospital stay 7 days (ranging, 4–10 days) (1). These data are not so far from the results of the open or the MIS standard techniques. Still important questions remain to be answered. For example, whether all donors with any kind of liver anatomy can be candidate to a robotic approach, or by the same token to MIS approach. Robotic surgery at the present time required a significantly longer operative time, is or will this significant prolongation of operative have an impact on the incidence of deep venous thrombosis and eventually pulmonary embolism? This is a valid question and was pointed out also by Miller *et al.* who

have estimated donor mortality risk in MIS hepatectomy at 0.1–0.5%, an incidence not different than the one reported for open laparotomy (2). Expansion of robotic assisted surgery applied to live donor hepatectomy is expected to grow and potentially replace the open approach. For this to happen, emerging new technologies such as the fusion imaging systems and a smaller articulated vessels sealer will have to be fully operational and substitute or integrate the current rigid harmonic scalpel and the large articulated vessels sealer (7). Moreover, an ultrasonic dissector directly operated by the robotic system will have to be introduced. In this contest, two questions may be considered. The first, who is the first operator? In fact, two experienced surgeons are necessary during a standard robotic complex hepatic procedure, the first surgeon close to the patients to dissect the liver parenchyma (ultrasonic dissector) and the second at the robotic console (suture, clips and endo-GIA). The second question is how to navigate this transition period awaiting the future devices? How to train, both surgeons and operating room personnel for the procedure without risk for the patient. Still too few cases of major liver resections are performed in comparison to open and a significant change in philosophical approach to major liver surgery is needed to allow for the technical evolution promised by MIS and eventually by Robotic assisted surgery.

In conclusion, MIS and Robotic assisted represent the near future and a natural evolution for major liver surgery. The technical innovations to make it safe and routine are being rapidly introduced. It is the task of the hepatobiliary and transplant surgeons to assure that this transition will occur safely for all patients and donors and based on solid scientific ground.

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Footnote

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