Pure or Hybrid Mini Laparoscopic Surgery

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The use of smaller incisions, the reduction in the number or the size of trocars seems to be the natural evolution of the incredible revolution in the field of urology thanks to laparoscopic procedures. LESS surgery and NOTES aim to reduce the impact of surgery through the use of a single incision or through natural orifices to complete the surgery. Both approaches are technically demanding for surgeons. This has resulted in a slow and difficult expansion. In contrast, mini laparoscopy (ML) means a continuation of the principles of conventional laparoscopy, in which ergonomics and triangulation are preserved [1]. The recent advent on the market of a new generation of mini laparoscopy instruments has led to an increase in the use of ML in a great variety of extirpative and reconstructive procedures [2].

While ML has been limited to trocars of up to 3mm, hybrid approaches characteristically use larger trocars. In only a reduced number of series the pure ML approach was used. More precisely, it has been used in procedures in which a clear aesthetic benefit for patients was advisable, such as in the reconstructive surgery. In a comparative series of 12 small-incision access retroperitoneoscopic technique (SMART) pyeloplasties versus 12 conventional retroperitoneoscopic, the aesthetic impact was assessed by means of the PSAQ questionnaire. In this study better outcomes for ML compared to the traditional approach were obtained [3]. Another study retrospectively compared 12 patients operated due to obstruction of the pyloureteral junction through ML versus 24 operated using standard laparoscopy. The aesthetic result was favourable for ML, measured also by the PSAQ questionnaire [4]. In another pyeloplasty comparative series, Fiori C. et al., obtained better aesthetic results with respect to the conventional approach. In addition, Pompiglia F. et al., published 10 mini laparoscopic pyeloplasties without control group. By the use of the PSAQ the mean value was similar (29.8 +/-1.5) to the mean obtained by Fiori C. et al., (29.8 +/-1.8) [4,5]. In an extensive multicenter European study, which enrolled a total of 192 patients, 107 pure mini laparoscopic transeperitoneal pyeloplasties were performed, but the aesthetic results were not evaluated [6]. Pure ML has also been used in the extirpation of small surgical masses. Only one series of 37 adrenalectomies showed that this pure approach is a safe procedure, and no complications were described [2].

ML achieves a reduction in the surgical impact on the abdominal wall that should be expressed in a greater patient comfort and less postoperative pain. Only two publications evaluated the pain observed in patients operated on using ML compared with a conventional approach by using the visual analogue scale (VAS). They showed better outcomes in the cases performed with 3 mm instruments, although these results did not show statistical significance [3,4]. VAS punctuation obtained after the use of ML trocars have been shown to be low in non comparative studies [2,5]. However, the outcomes available in the literature are insufficient to state that pure ML has a benefit on patient pain relief.

Recent improvements have been achieved in ML to overcome important limitations of this approach. For example, image quality has markedly improved with a new generation of ML instruments available on the market. These new optics have shown a good visibility even in bleeding surgeries [6]. In addition, the length and rigidity of instruments have been improved. The bipolar coagulation permits a very careful hemostasis and new designed scissors have overcome the excessive flexibility and lack of precision of the previous ones [6,7]. Another important issue is that 3mm trocars are insufficient to maintain the pneumoperitoneum or smoke extraction. The small size of the trocars does not allow the use of accessory material and vascular clips or hemostatic sealants still have to be developed. While technical improvements are emerging, the safety and application of ML can be increased through the combination of 3mm instruments with larger ones within hybrid approaches. Breda A. et al., published an extensive series of 110 patients using a 10mm or 12mm trocar to maintain the pneumoperitoneum and for the subsequent extraction of surgical specimens. Other authors used larger trocars for the introduction of accessory instrumental or vascular clips [6,7]. In one of the first series of ML, Sohle J. et al., recommended specially in extirpative procedures, the use of the larger optic available to ensure an adequate vision [8]. In addition, the uses of modern visual technology as such as SPIEs have been recommended to improve the vision of the surgical field [6].

ML has been used to alleviate some limitations of new minimally invasive approaches. LESS and NOTES approaches have also been combined with ML instruments. Kalliadonis P et al., performed 30 oncological and reconstructive LESS procedures assisted by ML, showing comparable results to conventional laparoscopy [9]. Although the NOTES approach is still considered experimental, vaginal access has proved to be useful in urological surgery. The combination of NOTES with ML instruments for nephrectomy has shown encouraging pre- and postoperative

outcomes [10]. However, due to limited clinical experience with this hybrid technique, solid conclusions cannot be drawn. Any specific approach requires the assessment in terms of safety of the technique and the specific instruments required.

In the future robotic surgery will most likely play a decisive role in the development of minimally invasive techniques in urology. Due to technological advances, our future is heading towards the miniaturization of the instruments. Our perspective as minimally invasive surgeons points at a less invasive surgery to achieve better aesthetic outcomes, less pain, shorter hospital stays and an early recovery. ML alone or combined with other approaches, such as LESS or NOTES, is an acceptable option, which has provided reproducible and feasible results.

REFERENCES


