

Morphing into Mini

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Mini-laparoscopy (MINI) is a natural progression and advancement of standard laparoscopy. It proposes to diminish surgical trauma by reducing the diameter of standard laparoscopic (5-10 mm) instruments without compromising range of motion or triangulation. MINI was first described more than 15 years ago, and though not really a new modality of access, it needs to be carefully revisited now because several aspects have changed:

1. New instruments have been developed with improved design, more resilient materials with better durability, effector tips with greater functionality, and better electrosurgery and energy options. This is giving a totally new perspective on MINI.
2. In laparoscopic procedures where enhanced visualization in a restricted space is necessary, MINI instruments offer some advantages over conventional instruments. Examples of restricted-space procedures include TEP inguinal hernia repair, lumbar and thoracic sympathectomy, common bile duct exploration, and Transanal Endoscopic Operations (TEO).
3. When laparoscopic suturing and/or knot tying is necessary, the enhanced precision of the new frictionless MINI instruments provides handling advantages over conventional instruments and trocars that utilize rubber seals and valves, as these can preclude some amplitude of movement and cause some drag on the instruments.

During the early MINI years (1990s), surgeons clipped most structures. With MINI at that time, clipping required changing the scope several times during a procedure, making MINI not only more complicated but also boring and time consuming. Early MINI instruments also had a number of mechanical limitations. These factors resulted in MINI being stigmatized as a complicated platform that could only be used on lower BMI patients. It seemed to have no major advantages over conventional laparoscopy, and MINI did not progress the way that industry had imagined. Many thought that it had been relegated to a footnote in the surgical texts. However, the early technical limitations of MINI are now being solved by the efforts of industry in crafting more resilient and higher performing instruments. Also, longer trocars without seals or valves are available now and these help to stabilize the instruments and increase their strength and durability without limiting surgical movements. The bottom line is that, with proper education about the new instrumentation and port placement, MINI is no longer an experimental technique. The “New MINI” appears to be here to stay for the foreseeable future.

For example, with Mini Lap Chole, using the new MINI instruments has allowed the safe and successful completion of more than 97% of cases with purely mini instruments.¹ With some adjustments in the technique, and with proper education about port position and pre-operative planning, we learned to manage the cystic duct by tying knots and the cystic duct by better use of electrosurgery. No clips are required and no changing of the telescope is necessary. Currently, MINI Clipless Cholecystectomy is a highly reproducible procedure with all the safety, effectiveness, and advantages of standard laparoscopic cholecystectomy, and it is also cost effective and offers great aesthetic appeal.

Another great advantage of the MINI approach is the enhanced view, particularly in close or restricted spaces. A surgeon that uses MINI can work closer to the tissue of interest, without being disturbed by clashing of 5-10 mm instruments. Mathematically speaking, we can find gains up to 2.7x in magnification when using MINI instruments, as the thinner instruments occupy less of the visual field. In TEO, an enhanced view and more freedom of movement can be experienced. Also, more delicate surgeries may be performed preferentially with MINI because of the improved vision and precision of movement that MINI offers.

In short, the recent gains of MINI are many, and there is much more than aesthetics to be emphasized when evaluating the benefits of mini-laparoscopic surgery. Gains beyond cosmesis include less abdominal wall trauma, more precise surgical movements, enhanced view and better dexterity, and in some cases improved postoperative pain, without any negative impact on surgical safety, operative time, surgical effort, or cost.

Going smaller is not unique to laparoscopy as the reader can see from the table of contents. All specialties must continue to evolve to use more minimally invasive techniques, as this is what the patient and the economies want. As we move forward towards directed energy “surgical” techniques and even less invasive surgery, the decreased tissue trauma with equivalent and better surgical outcomes will make us all better doctors and provide better care.

¹ Carvalho GL, Silva FW, Silva JS, et al. Needlescopic clipless cholecystectomy as an efficient, safe, and cost-effective alternative with diminutive scars: the first 1000 cases. *Surg Laparosc Endosc Percutan Tech.* 2009;19(5):368-372.