Radially Expandable 3-12mm Trocar: A Novel, Universal Alternative for Routine Mini-laparoscopic Surgeries and Emergency Situations

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OBJECTIVES

When performing minimally invasive surgery, it is customary to consider small size trocars. However, most if not all hemostatic laparoscopic instruments require large trocars (12mm). Hence, in cases of emergency, large trocars are frequently required to introduce large instruments such as staplers, clip appliers, etc.

The Xpan Universal Trocar System is a 3mm trocar that can be upsized to 5mm or 12mm intracorporeally when required, thereby facilitating use of the full spectrum of mini/conventional (3mm-12mm) instruments.

Herein, we present the descriptive details in addition to *in vitro* and *in vivo* observations of the Xpan Universal Trocar System.

OVERVIEW OF TECHNOLOGY

Xpan Universal Trocar System



The Xpan Universal Trocar System has not received regulatory approval or clearance in any jurisdiction and is not for sale. Details about the Xpan Universal Trocar System are being provided as general company information only and should not be construed as product or service advertisement.

DESCRIPTION OF TECHNOLOGY

The Xpan Universal Trocar System is comprised of a multi-strut, radially expandable, rigid cannula mechanism with an elastic outer layer that begins at a 3mm diameter. The elastic layer is expandable up to 12mm in diameter and provides sealing between the struts.

The 3mm expandable trocar is inserted in tissue with a 3mm obturator equipped with a proprietary seamless tip technology. Once positioned intracorporeally, the trocar can be easily expanded sequentially (5mm then 12mm) or directly (to 12mm) using cannulas/obturators of respective size.

The Xpan Universal Trocar System is adaptable and can also be expanded to a 5mm or 12mm diameter prior to entry, then used in a manner analogous to conventional optical or bladeless trocars when desired.

PRELIMINARY RESULTS

The Xpan Universal Trocar System was evaluated in *in vitro* and *in vivo* porcine models. The evaluative summary observations included the following:

1. Low insertion forces due to low profile 3mm tissue entry
2. Seamless, fast, and highly controlled expansion to 5mm/12mm without pneumoperitoneum loss
3. The expandable rigid cannula design created superior abdominal wall retention with no CO2 loss around the trocar upon expansion to 5mm/12mm
4. Universal utility of the system as a 3-5-12mm radially dilating trocar, a 5mm/12mm conventional optical/bladeless trocar or as a less invasive and more reliable alternative to a conventional Hasson trocar.

CONCLUSIONS & FUTURE DIRECTIONS

For mini laparoscopic surgeries (3mm), the Xpan Universal Trocar System is a promising, versatile trocar device that improves the surgeon's intraoperative flexibility and enables use of large instruments when necessary. Further studies are being conducted to incorporate advanced features to provide a superior substitute to a wide range of currently used conventional fixed diameter and radially dilating trocars.

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