Single-port Robotic Surgery in Children

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Evolution of Pediatric Urologic Surgery

Single-incision surgery → Standard lap/robotic ports

I don’t like visible incisions…
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Single-incision surgery  ➔  Standard lap/robotic ports  ➔  HIdES* ports

*Gargollo, J Urol, 2011
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Single-incision surgery → Single-incision surgery???
Single-port (SP) robotic platform

- FDA clearance for Urology in 2018
- 2.5cm, 4-channel port
- 12x10mm articulating camera
- 6mm multi-wristed instruments
Objectives

• Demonstrate feasibility of SP robotic platform in pediatric population

• Report intraoperative details, perioperative outcomes
First SP robotic pediatric series

• Pyeloplasty
  • 2 female: age 10y, 6y
  • 1 male: age 23 months

• Mitrofanoff
  • Female: age 10y
• 2.5cm incision in Pfannenstiel line

• Retract port = increase working distance
  • 10cm needed for deploying elbows, wristing of instruments
SP robotic platform: instruments

• Maryland dissecting forceps
• Cadiere forceps
• Wristed needle driver
• Curved scissors
Results: Pyeloplasty

• All completed via single-port
  • No complications
  • Median operative time: 120 minutes
  • EBL: <5mL
  • liposomal extended-release bupivacaine (EXPAREL®) to incision for 10y, 0.25% bupivacaine for others
• No opioids
• Dismissed <24hrs on acetaminophen, ibuprofen PRN
Results: Mitrofanoff

- SP plus 5mm assist port
  - No complications
  - Operative time: 240 minutes
  - EBL: <5mL
  - Exparel
  - No opioids
SP robotic platform: Technical considerations

- Visualization:
  - Excellent; no different than with HIdES

- Instrument use/movement:
  - No difficulty
  - Deploy, triangulate without clashing in the older children
SP robotic platform: Limitations

• Difficult in smaller patient

• <10cm working distance → cannot deploy instrument elbows
  • No wristing
  • Working in straight-line
SP robotic platform: Limitations

- Loss of insufflation with use of lap instruments
  - Passing needles
  - 5mm laparoscopic suction
- Seal on port doesn’t maintain closed system
- Rapid loss of working space
SP robotic platform: Recommendations

- Limit use to older children, teenagers
  - Need 10cm working distance
  - Can use Gel-Port to extend

- Place needles into abdomen after incision, before port placement

- SP-specific suction device (but consider cost)
Conclusions

• Single-port robotic surgery is feasible in pediatric patients

• Patient selection is key

• Improvements to platform are needed to expand use