

division of

**Pediatric Anesthesia
& Pain Management**

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ANESTHESIA FOR ROBOTIC LAPAROSCOPY

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Potential Advantages of Robotics:

- ❑ 3-D visualization similar to open surgery
- ❑ 1 cm ports for minimally invasive surgery
- ❑ Patient side cart with 3 or 4 arms
- ❑ Instruments have 7 degrees of motion to mimic human dexterity

Unique Anesthetic Considerations:

- ❑ Limited access to the patient (airway, IV lines, monitoring)—robot will be positioned over head of bed
- ❑ Surgical time potentially much longer—need to pad pressure points and position patient carefully
- ❑ Prolonged pneumoperitoneum—CO₂ absorption, lower extremity venous stasis and peripheral edema, acidosis, risk of air embolism
- ❑ Impaired ventilation—increased intra-abdominal pressure, need for hyperventilation to lower pCO₂

Other Anesthetic Considerations:

- ❑ Fluid balance
- ❑ Need for muscle relaxation
- ❑ Glucose homeostasis in infants and small children
- ❑ Temperature regulation
- ❑ Consider postoperative ICU care for infants and long cases

Monitoring:

- ❑ Standard ASA
- ❑ +/- Arterial line (frequent ABGs and continuous BP)
- ❑ +/- CVP
- ❑ PIVs above diaphragm
- ❑ IV injection ports to the right of patient's head
- ❑ Precordial stethoscope over left chest in pediatric patients (to listen for endobronchial intubation)
- ❑ Temperature probe
- ❑ Foley

Access to the pediatric patient is severely limited, making preparation and open communication between the anesthesiologist and surgeon essential. In the case of an airway emergency or cardiac arrest, moving the robotic cart to resuscitate the patient requires disengaging the instruments prior to backing the machine away from the OR table. If any members of the OR team are unfamiliar with the setup for robotic-assisted surgery, a “practice run” is worthwhile prior to proceeding with surgery to ensure a rapid response in the event of a crisis.

Typical room setup requires the OR table turned 45 degrees to the left to facilitate positioning of the robotic cart over the head of the table. The patient is elevated on blankets and egg-crate to the level of the robotic arms. Pressure points must be carefully padded. The anesthesiologist, surgeon, and nurses should discuss optimal room setup in advance such as alternative placement of the robotic cart over the patient's left side to

improve access to smaller patients. For infants and small children, endotracheal tube position must be confirmed prior to positioning the surgical cart. An airway emergency may be prevented by obtaining an intraoperative fluoroscopy following positioning and then securing the ETT at the proper depth if clinical confirmation of ETT position is in doubt.

Minimal patient access may require specialized monitoring. We recommend placement of a precordial stethoscope over the left chest to monitor for inadvertent endobronchial intubation. Prior to positioning the robotic cart, the anesthesiologist must also ensure patency of IV catheters and tubing since inspection of IV sites will be very difficult when the cart is in place. Ideally, IV catheters should be placed above the diaphragm since the pneumoperitoneum will impede venous return. IV injection ports should be positioned to the right of the patient's head for ready access to administer medications. Placement of an intra-arterial catheter allows continuous monitoring of blood pressure and periodic checks of acid-base status. A central venous catheter is a reasonable consideration for longer cases as a monitor of central venous pressure. A foley should be placed for accurate urine output measurement. A forced air warming blanket, preferably lower body, can be used to maintain temperature as long as the hose is not compressed by the robotic arms.

