Pre and Post Operative Considerations in the care of the Pediatric Laparoscopy Patient

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Preoperative Considerations

● “Preoperative patient care and patient selection are as important as the actual laparoscopic procedure”

Contraindications to Laparoscopy

- Massive Hemoperitoneum
- Coagulopathy that is not controllable
- Diffuse bowel distention either due to obstruction or ileus
Special considerations should be taken for the Following:

- Patients with ventriculoperitoneal shunts
- Prior history of NEC or peritonitis
- Prior laparotomies for bowel obstruction
- Diaphragmatic hernias
Special considerations should be taken for the Following:

- Massive Ascites
- Prune Belly Syndrome
- Cardiac or respiratory problems that impair CO2 exchange
- Organomegaly
- Morbid obesity
Preoperative Studies

- Routine labs and PT PTT
- Confirm the presence or absence or the appendix in patients who had prior abdominal surgery
Preoperative Studies

- Evaluate the palpable testis size prior to laparoscopy in NPT
- In patients with shunts consider checking if there are pockets or adhesions with US or CT
Post Operative Care

- Pain
- Hydration
- Feeding
- Drains and tubes
- Fevers
- Lumps and Bumps
- Bleeding
Pain Management

- Narcotics
- Toradol
- Acetaminophen
- PCA
Shoulder Pain

- Keep patients flat for several hours
  Minimizes post op complaints of shoulder pain
- This is generally not a problem in patients with suction drains
Post Operative Vomiting

- Studies indicate that a well hydrated patient has less vomiting post operatively.
- Patients should be hydrated preoperatively if possible.
To Hydrate or Not to Hydrate?

- Reimplants
- Pyeloplasties
- UDT
- Varicoceles
- Major reconstructive surgeries
Post operative Feeding

- Clears initially
- Regular diet
- Mitrofanoffs and cecostomies
  Clears for 24 hours
Drainge is minimal

- Remove drains as soon as the drainage is minimal
- Stress the system before pulling drains
Stents

- Most DJ stents remain in place 4-6 weeks
- Obtain US pre removal as a baseline
- US post removal 4-6 wks later
Increased Urinary drainage

- Check location of DJ stent
- Suction drainage against anastomosis
- Clogged foley catheter
- Too much fluids
- Post obstructive diuresis
Abdominal distention or mass

- Bowel obstruction
- Urinary ascites
- Urinoma
- Bleeding
- Subcutaneous emphysema
Lumps and bumps

- Hernia at trocar site
- Evisceration of omentum
- Hematomas
- Pneumoscrotum and pneumolabia
Postoperative Fevers

- Pneumothorax
- Pneumonia
- Atelectasis
  - Positioning
  - Pain
  - Urinary ascites
- Infection
- Bowel injury
- Infected urinoma or hematoma
Post operative bleeding

- Trocar site
- Epigastric artery injuries
- Raw dissection beds
- Unsecured vessels
- Renal tissue
Diminished Urinary Output

- Normal physiologic response
- Dehydration
- Obstruction
- Malpositioning of stents
- Bladder perforation
- Disruption of anastomosis
- Acute Renal failure
Respiratory Problems

- Pneumothorax
- Chylothorax
- Hemothorax
- Pulmonary embolus
- Pneumonia
Neurologic Problems

- Nerve injuries
  - Obturator nerve
  - Genitofemoral nerve
  - Femoral nerve
  - Phrenic nerve
  - Hypogastric plexus

- Strokes

- Brachial Nerve Palsy
Conclusions

- Good preoperative planning and in some cases assessment may make your procedure much easier and it should eliminate surprises.
- The problems encountered post operatively after laparoscopic surgery are really not much different than those encountered after open surgery.
Additional readings

- Hemodynamic and Respiratory Effects of Pediatric Urological Retroperitoneal Laparoscopic Surgery: A Prospective Study
  Lorenzo AJ, Karsli C, Halachmi S, Dolci M, Luginbuehl I, Bissonnette B, Farhat WA
  The Journal of Urology
  April 2006 (Vol. 175, Issue 4, Pages 1461-1465)

- Optical Access Trocar Injuries in Urological Laparoscopic Surgery
  THOMAS MA, RHA KH, ONG AM, PINTO PA, MONTGOMERY RA, KAVOUSSI LR, JARRETT TW
  The Journal of Urology
  July 2003 (Vol. 170, Issue 1, Pages 61-63)

PURPOSE: Laparoscopic varicocelectomy is a minimally invasive option for varicoceles in children. Occasional reports of nerve injury after inguinal laparoscopic procedures have been published. There is anatomical variation in the sensory innervation of the anterior thigh and variable branching patterns of the nerves involved. We report a retrospective analysis of our patients, focusing on the incidence of sensory changes on the ipsilateral anterior thigh after laparoscopic varicocelectomy. MATERIALS AND METHODS: The medical records of all patients who underwent laparoscopic varicocelectomy at 1 institution performed by 2 of us (YR and DV) from 1997 to 2002 were retrospectively reviewed. Demographics, outcomes and any postoperative sensory complications were obtained by chart review and telephone interview. RESULTS: A total of 58 patients underwent laparoscopic varicocelectomy during this 5-year analysis and 51 with a total of 62 varicoceles were available for review. Three patients (4.8%) experienced transient numbness of the ipsilateral anterior thigh, which resolved or improved in an average of 8.0 months (range 6 to 9). Symptoms were not always noticed immediately postoperatively (range 0 to 10 days). In affected patients the sensory distribution was usually consistent with injury to the genitofemoral nerve. CONCLUSIONS: Laparoscopic varicocelectomy is a minimally invasive procedure that still has the potential for complications. Cautery or harmonic dissection of the peritoneum overlying the spermatic cord and excessive traction on the tissues surrounding the cord should be avoided intraoperatively. Patients and surgeons should be aware of the possibility of nerve injury and the resultant sensory deficit.

PURPOSE: Pneumothorax is a rare but known complication of adult urological laparoscopic surgery and has been described occasionally in children as well. The etiologies for pneumothorax during such procedures are discussed as is the management of pneumothorax in this setting. We investigate the occurrence of pneumothorax during laparoscopic pediatric urological procedures in children.

MATERIALS AND METHODS: Pneumothorax developed during urological laparoscopic procedures in 4 pediatric patients (3 females, 1 male). Patient age ranged from 8 months to 11 years (mean 5.4 years). Laparoscopic surgical procedures performed included right upper pole partial nephrectomy, left upper pole partial nephroureterectomy, removal of left multicystic dysplastic kidney and bilateral Cohen reimplantation of ureters. Procedures were performed with a maximum insufflation pressure of 15 mm Hg. During the same time period as these four cases, a total of 285 laparoscopic urologic procedures were performed at our institution.

RESULTS: Pneumothorax was suspected due to decreased oxygen saturations, subcutaneous emphysema, increased respiratory effort and decreased chest lung sounds unilaterally. Pneumothorax was confirmed with chest x-rays. Operative time ranged from 171 to 249 minutes (mean 199.5). Duration of surgery before pneumothorax developed ranged from 75 to 239 minutes (mean 176, median 168). Conservative management of pneumothorax was used in 3 patients and a pigtail chest tube was used in 1. In all cases the estimated blood loss was minimal.

CONCLUSIONS: Urologists performing laparoscopy in children should be aware of the possibility of a pneumothorax developing during the procedure. Evaluation for decrease in O2 saturation should include a search for pneumothorax in these patients. Close observation generally suffices for management.

PURPOSE: We documented thoracic related complications during urological laparoscopic surgery.

MATERIALS AND METHODS: A total of 1129 patients underwent major urological laparoscopic procedures in a 5-year period. Operative reports and postoperative radiographic reports were retrospectively reviewed to identify patients with thoracic related medical and surgical sequelae. Of the patients 619 (55%) underwent at least 1 chest x-ray in the immediate or early postoperative period. In the remaining 510 patients (45%) there was no clinical indication to perform chest x-ray. RESULTS: Of 619 patients undergoing chest x-ray 438 (71%) were completely normal. Medical pulmonary complications, surgical thoracic complications and subclinical, incidentally detected gas collections in the chest were identified in 12.6%, 0.5% and 5.5% of patients, respectively. Medical complications in 12.6% of cases included pulmonary infiltrate/atelectasis in 9.7%, pleural effusion in 4.8% and pulmonary embolus in 0.3%. Surgical complications included symptomatic pneumothorax in 4 patients (0.35%), hemothorax in 1 (0.08%) and chylothorax in 1 (0.08%). Subclinical abnormal thoracic gas collections were radiographically noted in 34 of the 619 patients (5.5%) on chest x-ray, including pneumomediastinum in 19 (3.1%), pneumothorax in 10 (1.6%) and pneumopericardium in 5 (0.8%). Overall 36 of 40 (90%) thoracic surgical complications (3) and subclinical, incidentally detected gas collections (33) occurred during retroperitoneal laparoscopy. Re-intervention was necessary in 6 patients (0.5%), namely pulmonary embolus requiring vena caval filter placement in 3 (0.3%), pneumothorax requiring a chest tube in 2 (0.17%) and hemothorax requiring emergency open thoracotomy in 1 (0.08%). No patient underwent open conversion to complete the initial proposed operation. CONCLUSIONS: Due to its high solubility the expectant management of incidental CO2 pneumothorax, pneumopericardium and pneumomediastinum is recommended initially in the clinically stable patient. Inadvertent diaphragmatic entry can be satisfactorily repaired laparoscopically without open conversion. Although it is rare, surgical thoracic complications are potentially life threatening, requiring prompt identification and management.

PURPOSE: We evaluated the effect of previous abdominal surgery on perioperative outcomes in patients undergoing a renal/adrenal laparoscopic procedure via a transperitoneal approach. MATERIALS AND METHODS: Renal/adrenal laparoscopic procedures via a transperitoneal approach were assessed. Medical records were reviewed to obtain operative and perioperative data. RESULTS: Of the 190 patients 76 (40%) had previously undergone abdominal surgery. Patients with versus without an earlier abdominal operation had a longer mean hospital stay (3.8 versus 2.6 days, p = 0.002) but not longer median operative room time (median 220 versus 210 minutes, p >0.05). Operative and major complication rates were greater in patients with previous operations (16% versus 4%, p = 0.009 and 16% versus 5%, p = 0.022, respectively). Access and total complication rates were not altered (4% versus 2% and 33% versus 24%, respectively, p >0.1). An upper midline scar/ipsilateral upper quadrant scar was associated with a greater access complication rate (12% versus 0%, p = 0.029) but not a higher operative complication rate (21% versus 13%, p = 0.502). Multiple logistic regression confirmed that previous abdominal surgery was the only factor associated with operative complications. CONCLUSIONS: Previous open abdominal operation increased the risk of operative and major complications, which most likely resulted in increased length of stay. The location of the scar impacted the access complication rate. Patients who have undergone previous open surgical procedures should be counseled on the greater risk of complications if the transperitoneal route is elected. Alternatively a retroperitoneal approach may be used.

PURPOSE: To increase the safety and efficiency of laparoscopic surgery clinical training programs have been developed to increase the skill and efficiency of urological trainees. We evaluated the impact of dedicated laparoscopy training on the rate and type of complications after trainees entered clinical practice. MATERIALS AND METHODS: Data were obtained from 13 centers where laparoscopy was performed by a single surgeon with at least 12 months of training in urological laparoscopy before clinical practice. Data included training experience, laparoscopic procedures performed after commencing clinical practice and associated complications. Procedures were classified as easy, moderate and difficult. RESULTS: During training each surgeon participated in a mean of 71 cases. In clinical practice a total of 738 laparoscopic cases were performed with the group reporting an overall complication rate of 11.9%. The rate was unchanged when the initial 20, 30 and 40 cases per surgeon were compared with all subsequent cases (12%, 11.9% and 12% versus 11.8 to 12%, respectively). The re-intervention rate was 1.1%. The complication rate increased with case difficulty. Overall and early complication rates attributable to laparoscopic technique in the initial 20, 30 and 40 cases were identical. The most common complications were neuropathy in 13 patients, urine leakage/urinoma in 9, transfusion in 7 and ileus in 5. CONCLUSIONS: The complication rate of surgeons who completed at least 12 months of laparoscopy training did not differ according to initial versus subsequent surgical experience. Intensive training seems to decrease the impact of the learning curve for laparoscopy.
Complications of pediatric urological laparoscopy: mistakes and risks.

PURPOSE: We evaluate the results and complications of laparoscopic urological procedures in children. MATERIALS AND METHODS: In a 3-year period 4,350 laparoscopic procedures were performed at 8 Italian centers of pediatric surgery. We analyzed only the data of urological procedures for a total of 701 laparoscopic operations on patients 1 month to 14 years old. The indications for surgery were cryptorchidism in 414 cases, varicoceles in 159, ambiguous genitalia in 37, total nephrectomy in 34, partial nephrectomy in 4, adrenalectomy in 3 and other diagnostic procedures in 50. We adopted a retroperitoneoscopic approach in 72 cases (10.3%) and a laparoscopic approach in 629 (89.7%). Patient records were analyzed to search for any complication that may have occurred during the laparoscopic procedure and assess how they were managed.

RESULTS: We recorded 19 complications (2.7%) in our series, of which 6 required conversion to open surgery and 13 did not. There was no mortality. At a maximum follow-up of 4 years all children were alive and had no problems related to the laparoscopic complications. CONCLUSIONS: Our study shows that pediatric laparoscopic urological surgery has an acceptable rate of complications with no mortality. We believe that routine use of open laparoscopy in pediatric patients is a key factor to help avoid complications. Most complications can be avoided with surgeon and team experience, together with proper compliance with the indications for surgery.

BACKGROUND: Bleeding complications during laparoscopic surgery are rare but probably underreported. The aim of the current study was to elucidate the clinical relevance of bleeding complications and major vascular injuries during standard laparoscopic procedures.

PATIENTS AND METHODS: The Swiss Association of Laparoscopic and Thoracoscopic Surgery (SALTS) prospectively collected the data on 14,243 patients undergoing different standard laparoscopic procedures (1995 to 1997). These data were analyzed with special interest in intraoperative and postoperative bleeding complications and major vascular injuries. RESULTS: In all, 331 patients (2.3%) had intraoperative bleeding complications. Whereas 44 patients suffered from an external bleed of the abdominal wall, the bleeding was internal in the remaining 287. Thirty-three patients with internal bleeding required blood transfusion with a mean blood loss of 1,630 mL. Surgical hemostasis was necessary in 68% of external and 91% of internal bleeds. There were 250 patients (1.8%) with postoperative bleeding complications. External bleeding occurred in 143 patients, and 107 patients developed internal bleeding. External bleeding was mainly treated conservatively (92%), whereas 50% of internal bleeds required further surgical intervention. Major vascular injuries occurred in 12 patients (incidence 0.08%) with open treatment being necessary in all cases.

CONCLUSIONS: Bleeding complications are, in fact, common during laparoscopic surgery. Meticulous dissection technique, immediate recognition, and adequate surgical treatment are mandatory for their management.

PURPOSE. Urological laparoscopy has a significant and steep learning curve plus its own unique set of complications. Our retrospective study documents the success at 1 institution of maintaining a low number of complications during urological laparoscopy using a standardized approach plus clinicians with significant laparoscopic experience. MATERIALS AND METHODS. We evaluated 282 consecutive adults who underwent urological laparoscopic procedures at our institution. Of the procedures 241 (85%) were performed for pelvic lymph node dissection, and 41 (15%) for renal and other miscellaneous conditions. The common factor in all of these laparoscopic procedures was a single team approach, thus standardization for the entire series of procedures. RESULTS. Of 12 complications (4.2%) 5 were noted intraoperatively and 7 were discovered in the postoperative period. Five patients (1.8%) required open surgical intervention, including 3 intraoperative repairs of vascular (1), ureteral (1) and bladder (1) injuries. Procedures were aborted because of technical difficulties in 7 patients (2.8%) and because of hemorrhage during adrenalectomy in 1. Delayed complications included ureteral injury in 1 patient, seroma at the trocar site in 2, exacerbation of bowel diverticulitis requiring surgical intervention in 1, prolonged endotracheal intubation for hypercapnia in 1 and transient brachial nerve palsy in 2. CONCLUSIONS. Along with appropriate patient selection and adequate instrumentation, the benefit of significant laparoscopic experience and standardization cannot be overemphasized. The success of this combined approach is reflected in the low rate of major (2%) and minor (2.5%) complications experienced at 1 institution.

PURPOSES: To assess the level of activity in pediatric urological laparoscopy and its relationship to complications a survey of the membership of the American Academy of Pediatrics, Section on Urology was conducted. MATERIALS AND METHODS: An anonymous questionnaire was mailed to 251 pediatric urologists and 153 responses were recorded. RESULTS: Of the respondents 75% reported performing diagnostic and operative laparoscopy (average 54 cases). Patient age ranged from newborn to 20 years. Average case load for laparoscopy was 19 of 401 total cases yearly. More than 5,400 laparoscopic cases are represented by the reported experience. Complications were reported in 5.38% of cases (average complication rate 6.06% per practitioner). Excluding preperitoneal insufflation or subcutaneous emphysema the complication rate was 1.18%. Complications requiring surgical repair occurred in 0.39% of cases, including bowel, bladder and great vessel injury. The clearest predictor of complication rate was laparoscopic experience. The technique used to obtain pneumoperitoneum was also important in that Veress needle technique was associated with a 2.6% significant complication rate in contrast to 1.2% for open technique (p < 0.006). CONCLUSIONS: Laparoscopy is widely practiced in the pediatric urological community with a good safety record. Complications occur and important means of minimizing them are to provide for supervised experience with emphasis on the details of safe technique.