GUIDELINE FOR LAPAROSCOPIC APPENDECTOMY

Definitions

Utilization of Laparoscopy for Appendicitis

Guideline: The indications for appendectomy are identical whether performed laparoscopically or open. (level III, Grade A)

Guideline and its purpose, it is recognized that the clinician has determined operative intervention for presumed appendicitis is indicated. When the clinician is evaluating a patient with possible appendicitis, during the workup the risk and benefit of each diagnostic test and evaluation should be taken into account.

General considerations when deciding to proceed laparoscopically include availability of trained staff and equipment, ability and training of surgeon, and the patient's ability to tolerate general anesthesia and pneumoperitoneum.

Patient Selection

A. Uncomplicated Appendicitis

GUIDELINE: Laparoscopic appendectomy is a safe and effective method for treating uncomplicated appendicitis and may be used as an alternative to standard open appendectomy.(level I, grade A)

1 Length of operation, post-operative pain, return to work.

Compared with open appendectomy, multiple randomized controlled studies have demonstrated the safety and efficiency of laparoscopic appendectomy for the treatment of acute appendicitis. Generally, these studies involve 200 patients or less but some larger experiences have also been reported. Although the differences between the two approaches have been small, laparoscopic operation is longer showed by most studies, but associated with a shorter hospital stay and possibly with a more quick to work. A meta-analysis of 28 trials available by 1998 found that the laparoscopic approach took about 16 minutes longer but resulted in less post-operative pain on day one, shorter hospital stays (15 hours) and quicker return to full activities (5-9 days sooner). Complication rates were comparable, except that wound infections were slightly lower after laparoscopic appendectomy. More recent updates by these authors analyzing 45 and 54 studies confirm that the open procedure is shorter (12 minutes) but results in more pain and longer stays. Wound infections occurred about half as often with the laparoscopic approach but deep pelvic abscesses were twice as frequent.

Because from clinical trials and the lack of clarity of results, population based studies of up to 150,000 cases looking at the results by 1CD-9 codes for laparoscopic and open appendectomy have been analyzed to sample a broader range of patients. These studies have again shown shorter stays, higher rates of routine discharge and lower morbidity and mortality rates for the laparoscopic group. In particular, mortality rates far better for laparoscopic appendectomy were only 1/5 the rates of open appendectomy for patients older than 65.

2. Complications and conversions.

In earlier population studies, complication rates were comparable between the two approaches, except for a higher wound infection rate for the open approach and a higher intra abdominal abscess rate for the laparoscopic procedure.

Recent studies show little difference in complications suggesting that with added experience surgeons can reduce the rate of abscess formation. The symptoms of Recurrent appendicitis has been seen in patients whose appendix was not completely removed at the original operation. This is a problem seen with open appendectomies as well, but stresses the need for careful laparoscopic dissection and identification of landmarks prior to appendiceal division. Fortunately, the tip of the appendix usually lies free in the peritoneal cavity rather than being behind the cecum, minimizing this risk. The rate of Conversion varies from 0-27%. According to surgeon judgement conversion to open appendectomy should be done, experience, and ability to treat the operative findings safely.

3. Cost.

In the beginning studies of laparoscopic appendectomy suggested higher costs because of the expense for equipment and the longer operative times. As surgeons and centers have gained experience, it is no longer clear that there is a higher cost with laparoscopy. The small differences in operative costs are offset by gains attributable to shorter hospital stays and quicker returns to work. These factors are not entirely addressed by current studies.

B. Perforated Appendicitis

GUIDELINE: Laparoscopic appendectomy may be performed safely in patients with perforated appendicitis (Level II, grade B) and is possibly the preferred approach (level III, grade C). There have been multiple studies have established the feasibility and safety of LA but no randomized controlled trials comparing open and laparoscopic treatment of perforated appendicitis. In complication rates there is significant variability, specifically infection rates, reported in the literature. Level I evidence points that LA has a lower wound infection rate and a large population based study also identified LA to be associated with a lower infection rate. The population studies showed shorter stays, and lower morbidity and mortality rates for the laparoscopic group. whether perforations had occurred or abscesses developed These findings were the same for all age groups. Earlier studies showed a possible increased risk of intra-abdominal abscess (IAA) formation after LA for perforated appendicitis however more recent studies show no difference. Others have shown that with specialized laparoscopic teams, the IAA rate can be diminished.

C. Women of Childbearing Age

GUIDELINE: Laparoscopic approach for fertile women with presumed appendicitis should be the preferred method of treatment. (Level 1, grade A). With improved visualization of the entire abdomen, laparoscopy for the treatment of appendicitis improves the diagnostic accuracy and can identify the definitive pathology more often than the open approach.

D. Elderly Patients

Population based studies have shown a lower rate of complications and death, especially in the elderly (2.4 v/s 0.5%) for open vs. laparoscopic appendectomy in patients over age 65 years. This supports the primary use of laparoscopic appendectomy for uncomplicated appendicitis in those centers possessing the requisite skills and equipment.

E. Pediatric Patients

GUIDELINE: Laparoscopic appendectomy may be safely performed in pediatric patients.

F. Pregnancy

GUIDEINE: Laparoscopic appendectomy may be performed safely in pregnant patients with suspicion of appendicitis (Level II, Grade B).

Laparoscopic appendectomy can be performed safely in any trimester and is considered by many to be the standard of care for gravid patients with suspected appendicitis.

G. Obesity

GUIDELINE: Laparoscopic appendectomy is safe and effective in obese patients.(level II, Grade B) and may be the preferred approach (level III, grade C)

Some advantages of the laparoscopic approach may convey over the open approach in access to the appendix, visualization, and decrease in wound complications. In the morbidly obese, longer trocars and instruments may be needed.

Special Considerations

A. Treatment of normal appendix on laparoscopy for appendicitis

GUIDELINE: If no other pathology is identified, the decision to remove the appendix should be considered but based on the individual clinical scenario.(level III, Grade A)

Macroscopically normal appendixes may have abnormal histopathology. From several studies it has been cleared that a 19% to 40% rate of pathologically abnormal appendix in the setting of no visual abnormalities. Therefore the risk of leaving a potentially abnormal appendix must be weighed against the risk of appendectomy in each individual scenario. Cases of postoperative symptoms requiring re operation for appendectomy have been described in patients whose normal appendix was left in place at the time of the original procedure.

Technical Aspects

GUIDELINE: Developing a consistent operative method decreases costs, Or time, and complications. (level II, Grade B)

A. Historical context

The development of electrocoagulating bipolar instruments, ultrasonic dissectors, and endoscopic staplers as well as improved camera optics has simpified Laparoscopic appendectomy. The number of ports creation and its size has reduced with the experience. Mastery of the learning curve and proficiency in advanced laparoscopic techniques has decreased times span of surgery.

There is very little Level I evidence comparing particular techniques however some Level II and III evidence suggests that developing a consistent method decreases costs and OR time and decreases complications. This applies to laparoscopic appendectomy performed in a training program. One study involved the creation of a minimally invasive service.

The use of standardized techniques, including peritoneal lavage following removal of the appendix has been shown to reduce the intra-abdominal abscess rate after a learning curve of 20 cases.

B. Technical approaches

Positioning: Supine position with Trendelenburg, left arm tucked with both surgeon and camera operator on patient’s left side. Foley placement, or voiding preoperatively in uncomplicated appendicitis, provides decompression of bladder which may help with exposure and avoid injury.

Trocar placement: Basic principles of triangulation in trocar placement apply. All studies describe placement of the initial (usually a 10mm camera) port at the umbilicus. One study found that using all 5 mm ports was feasible although

35% needed conversion to a 10mm trocar due to a fatty mesoappendix. While port placement is at the discretion of the operating surgeon, the secondary port placements reported in the literature were:

i. LLQ and RUQ or R mid-abdomen.
ii. LLQ and RLQ directly above appendix for retraction. This location provides a means for "fingeroscopy" to break up adhesions. One study found that fingerscopy may allow more efficient and full analysis of inflammatory adhesions and loculations and prevent incomplete appendectomy.
iii. RLQ and suprapubic.
iv. LLQ and suprapubic.
v. Considerations: Having two working ports in adjacent quadrants (i.e. LLQ and suprapubic positions) allows the surgeon to work two-handed, rather than relying on an assistant to provide retraction while the surgeon dissects. Surgeons should consider the experience level of their assistant as well as the goals of a training program if they work in one.

Appendiceal retraction: Methods reported include simple retraction with a grasper via a 5mm port, a 5mm port placed directly above the appendix, an endotie around the end of the appendix to retract up, or a straight needle placed through the abdominal wall.