1. CHRONIC APPENDICITIS
2. OPEN vs LAPAROSCOPIC APPENDICECTOMY

Speaker: Dr Tut Giel
Moderator: Dr S Malinga
CHRONIC APPENDICITIS

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DEFINITION

• Chronic or recurrent sub-acute appendicitis is a disorder caused by inflammation of the appendix over a period of time.
• There is a controversy as to whether this actually represents a true disease, since acute appendicitis is the typical manifestation of an inflamed appendix.
• Recurrent appendicitis is occasionally termed chronic appendicitis, but this probably a misnomer because the appendix is almost certainly uninflamed in the interval between episodes.
PATHOGENESIS: OBSTRUCTIVE CAUSES

- Obstructive causes account for two third of cases
  1. Obstruction of the lumen; by faecolith or swelling of the lymphoid tissue in response to viral infection
  2. Kinking of the appendix by adhesions
  3. Intestinal parasites, e.g. pin worms
  4. Tumours of the appendix or caecum
PATHOGENESIS:
OBSTRUCTIVE CAUSES

• Distention of the obstructed appendix promotes overgrowth of the resident bacterial flora and subsequent invasion of the mucosa, starting the process of the appendicitis which is rather rapid, and tends to be suppurative or gangrenous
PATHOGENESIS:
NON-OBSTRUCTIVE CAUSES

• Non-obstructive causes account for one third of the cases
• Inflammation usually starts in the mucosa and tends to remain there (catarrhal inflammation)
• However, it spreads but at a slower rate and is less likely to perforate
PATHOGENESIS

• The course of untreated cases are variable
• The acutely inflamed appendix may resolve, but if so a further attack (attacks) is likely
• Persistent obstruction, particularly with a faecolith, tends to produce gangrene and perforation
• The incidence of perforation is high in the very young below 5 years, and in the elderly
• Perforation is followed by generalized, or localized peritonitis
PATHOGENESIS

• When the inflammatory process is slower, the body defense has the time to wall off the inflamed appendix by adhesions to the nearby intestine and the omentum, and within 3 to 5 days of the start of pain an appendicular mass (phlegmon) forms in the right iliac fossa, or in the pelvis.

• Perforation of the appendix within an appendicular mass produces an appendicular abscess.
CLINICAL FEATURES

- Patients usually present with recurrent episodes of presumed acute appendicitis.
- At each presentation, spontaneous resolution may occur with or without use of antibiotics.
- In general discrete episodes of RLQ pain, especially associated with fever and/or leukocytosis are the best indicators of pathology within the appendix.
CLINICAL FEATURES

• Anorexia and nausea
• Vomiting, not usually repeated, but is always preceded by the pain
• Atypical clinical features:
  1. Inflammation of an appendix that point in the pelvis induces tenesmus from rectal irritation, and dysuria from bladder irritation

-Abdominal signs are minimal and tenderness is elicited on pelvic examination
2. Pain and tenderness are higher than the McBurney’s point when the caecum is high -With a sub-hepatic appendix, and pregnancy the condition is commonly misdiagnosed as cholecystitis (right upper quadrant pain)

3. With a long retro-caecal appendix pain is felt in the right loin

4. Diarrhea may occur when the ileum is irritated by an inflamed retro-ileal appendix
DIFFERENTIAL DIAGNOSIS

• It is advisable to exclude other causes of chronic pain mimicking the appendix
  i. Amoebic colitis
  ii. Irritable bowel syndrome
  iii. Chronic calculous cholecystitis
  iv. Crohn disease
DIAGNOSIS

• Mainly is by clinical assessment
  1. White cell count: a moderate leucocytosis
  • However, a normal white cell count does not rule out appendicitis
  2. Urine Analysis: to exclude UTI and renal causes
  3. Pregnancy test: to exclude ectopic pregnancy
  4. Ultrasound examination:
     - May diagnosed appendix in a few cases
     - Used to exclude other diseases that simulate chronic appendicitis
DIAGNOSIS

5. Ct scan: to diagnose appendix pathology and exclude other intra-abdominal pathologies

6. Laparoscopy: diagnostic and therapeutic
COMPLICATIONS

1. Acute on chronic episode of appendicitis
2. Perforated appendix (localized or generalized peritonitis)
3. Appendicular mass (phlegmon) or abscess
TREATMENT

• The treatment of chronic appendicitis is:
  i. Open appendicectomy or
  ii. Laparoscopic appendicectomy
CONTROVERSIES

1. Chronic appendicitis is generally not accepted as an independent clinical entity despite a number of reports based on clinical assessment, morphologic workup, laparoscopic exploration, and pathology analysis

   • Chichcom et al. (2011) conducted a prospective cohort study during a period of 4 years.
CONTROVERSIES

• All patients presenting with a chronic pain of the RLQA were selected for study underwent clinical assessment and systematic ultrasonography of the abdomen; these served as a basis of selecting candidates for appendectomy. They had pains for 2-8 years.

• The intraoperative findings, histology results, and outcome after appendectomy were analyzed.
CONTROVERSIES

• 213 out of 392 patients finally analyzed, their mean age was 15.3 years; 192 patients were females.
• Echography showed a heterogeneous lesion in the RLQA in 87% of the cases.
• The operative findings displayed adhesions and other signs of chronic inflammation in 182 cases.
• Pathological analysis frequently revealed fibrosis and lymphoplasmocytic infiltration indicative of chronic inflammation.
• 87% of the patients were cured by appendectomy.
CONTROVERSIES

• They concluded that There is a chronic process involving the appendix that occurs in the RLQA of patients with chronic pains, typically the adolescent female.

• Decou et al. discovered a gross and/or a histologic appendiceal "abnormality" in 87% of their series of children aged 5 to 16 years
2. Diagnosis and management of chronic is a subject of controversy
   - There are few studies that describe the ultrasound findings of lesions in chronic appendicitis
   - Ultrasound, unfortunately, is operator-dependent imaging procedure
CONTROVERSIES

- CT scan have helped identify the appendix and other chronic lesions in the RLQA, but they are more invasive and less available in most places.
  
  Therefore they can not be considered a key to diagnosis (Chichcom et al. 2011)
CONTROVERSIES

- The advent of laparoscopy seems to have helped understand the problem
- However, this technique, is not available everywhere
  - Esposito et al. state that it is a simple option to be used whenever and wherever it is available for diagnosis of the appendix and other pathologies in RLQA pain
  - According to some authors, it is not superior to the open technique in the management of appendicular pathologies
CONTROVERSIES

3. It is questionable whether elective appendectomy can effectively reduce persistent or recurrent pain in the RLQA due to chronic or recurrent appendicitis

- Chichcom et al. (2011): state that removal of the appendix cures the pain in a majority of cases (87%)

- They believe that even in the absence of laparoscopic facilities, chronic pain of the RLQA can still be properly addressed by using McBurney’s point for open appendicectomy.
CONCLUSION

• The diagnosis of the appendicitis is by clinical assessment.
• All the radiological images can diagnosed only the appendicitis (the don not show the chronicity of the appendix).
• Pathological analysis frequently revealed fibrosis and lymphoplasmocytic infiltration indicative of chronic inflammation.
• Removal of the appendix cures the pain in a majority of cases.
CONCLUSION

Is the chronic appendicitis a clinical entity or just a clinical term?

Further studies are necessary
LAPAROSCOPIC VERSUS OPEN APPENDECTOMY

Speaker: Dr Tut Giel
Moderator: Dr S Malinga
INTRODUCTION

• Acute appendicitis is a common indication for abdominal surgery with a life-time incidence between 7 and 9%, and appendectomy is one of the most common surgical procedures
• Appendectomy is a common, inexpensive, simple procedure on which generations of young surgeons have gained and improved their surgical skills
• Open appendectomy (OA) performed through the right lower quadrant incision was first described in 1894
• Since its introduction by McBurney in 1894, appendectomy has been the treatment of choice for acute appendicitis
• For more than a century, OA remained the gold standard for the treatment of acute appendicitis, due to its favorable efficacy and safety
INTRODUCTION

- The advent of endoscopic surgery led to the idea of performing Laparoscopic Appendicectomy (LA)
- Laparoscopy was rediscovered by surgeons only in 1980, initially for cholecystectomy
- In 1981, Semm, a German gynecologist, performed the first LA
- More than 2 decades later, the benefits of LA over Open Appendicectomy (OA) are still controversial
- Despite numerous case series and small, single-institutional randomized clinical trials comparing LA versus OA, a consensus concerning the relative advantages of each procedure has not yet been reached
DIAGNOSIS OF ACUTE APPENDICITIS

• Briefly, the pathophysiology and progressive timeline of AA is attributed to:
  i. Luminal obstruction causing distension
  ii. Ineffective venous and lymphatic drainage
  iii. Bacterial invasion, and, finally,
  iv. Perforation with associated leakage of contents into the peritoneal cavity

• The presentation, evaluation, and diagnosis of AA are notoriously inconsistent, with a multitude of factors attributing to these discrepancies
DIAGNOSIS OF ACUTE APPENDICITIS

• The classic history consists of anorexia and peri-umbilical pain, followed by nausea, right lower quadrant (RLQ) pain, and vomiting, as well as leukocytosis

• History and physical examination should provide enough clinical information to diagnosis AA, with the use of imaging (ultrasound, CT Scan) as adjuncts in the assessment

• Treatment consists of providing aggressive intravenous fluid resuscitation and antibiotics, placing the patient nil per os, providing pain control, and preparing the patient for definitive operative management
DIAGNOSIS OF ACUTE APPENDICITIS

• Many other conditions can mimic appendicitis such as gastroenteritis, kidney stones, urinary infections, ulcerative colitis and Crohn's disease

• In women, problems such as ovarian cysts and pelvic infections can mimic appendicitis

• In fact appendicitis is a disease which can mimic most of the causes of abdominal pain as well as some chest pathology
OPEN vs LAPAROSCOPIC APPENDICECTOMY

- To date there have been some prospective randomized controlled studies comparing LA and OA
- While some studies concluded that LA was superior to OA in terms of a faster recovery, improved wound healing, and earlier resumption of diet, other studies found no such benefits, or even favored conventional appendectomy
- However, most of these studies had small sample sizes, and therefore the risk of a type II error (failing to observe a difference when in truth there is one) may be high
- The statistical power of analysis can be increased through a meta-analysis, which combines and compares the data from different studies
OPEN vs LAPAROSCOPIC APPENDICECTOMY

- Laparoscopy, as a minimally invasive technique, has unique advantages in several areas, and many scholars have tried to prove these advantages
- Yet, because OA involves a small incision and perfect skill, the advantages of LA over OA continues to be debated
OPEN vs LAPAROSCOPIC APPENDICECTOMY: Outcomes of Interest

• The outcomes of interest have included:
  i. Operating time
  ii. Postoperative length of hospital stay
  iii. Resumption time of normal activities
  iv. Resumption of normal diet
  v. Postoperative pain (assessed by visual analogue scale (VAS) graded from 0 to 10, with 0 being no pain and 10 being the most intense pain)
OPEN vs LAPAROSCOPIC APPENDICECTOMY: Outcomes of Interest

• Several complications following LA vs. OA techniques have also been included:
  i. Wound infection
  ii. Postoperative ileus
  iii. Intraoperative bleeding (>500 mL)
  iv. Urinary tract infection (UTI)
  v. Intra-abdominal abscess (IAA) formation
# OPEN vs LAPAROSCOPIC APPENDICECTOMY: Patient Selection

<table>
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<tr>
<th>Laparoscopic Appendectomy</th>
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<td>Immune-compromised patients</td>
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OPEN vs LAPAROSCOPIC APPENDICECTOMY: Patient Selection

• Absolute contraindications to LA are:
  i. Hemodynamic instability
  ii. Lack of surgical expertise

• Relative contraindications to LA include:
  i. Severe abdominal distention that causes operative view obstruction or complicates abdominal entry and bowel manipulation
  ii. Generalized peritonitis
  iii. Multiple previous surgical procedures
  iv. Severe pulmonary disease
  v. Pregnancy
OPEN vs LAPAROSCOPIC APPENDICECTOMY: Patient Selection

• As laparoscopic technology advances and surgeons' expertise increases, many surgeons have successfully performed a multitude of laparoscopic procedures in the presence of these relative contraindications.

• If intraoperative complications that cannot be handled using laparoscopy arise during laparoscopic appendectomy, understanding when to convert to an open appendectomy is crucial.
OPEN vs LAPAROSCOPIC APPENDICECTOMY:
Patient Selection

• Relative indications for conversion from LA to OA include:
  i. Dense adhesions due to inflammation or prior surgeries
  ii. Perforated or gangrenous appendicitis
  iii. Gangrenous or necrotic base
  iv. Retrocecal appendix
  v. Inability to visualize the appendix
  vi. Uncontrolled bleeding
  vii. Tumor of the appendix extending into base
  viii. Other pathology, including malrotation, carcinoma, diverticula of cecum, endometriosis, pelvic inflammatory diseases, torsion of tubo-ovarian cyst
  ix. Unexpected diagnosis
OPEN vs LAPAROSCOPIC APPENDICECTOMY: Operating Time

- 36 studies reported data that allowed quantitative pooled analysis for operating time.
- According to the analysis of all 36, the laparoscopic approach takes 12.35 min longer than open surgery.
- However, subgroup analysis revealed that pre-2000 era, LA took 15.14 min longer than OA, and this decreased to only 8.67 minutes after this period (year 2000 till present).
OPEN vs LAPAROSCOPIC APPENDICECTOMY: Operating Time

• A reputation for extended operating time is a major disadvantage, and has considerably influenced the widespread use of LA: according to an initial study, LA involved a significant increase in operating time.

• This may have been due to the inexperience of the surgeons with the new technique.

• However, with increased experience the mean operating time for LA and OA has become similar.
OPEN vs LAPAROSCOPIC APPENDICECTOMY: Intraoperative Bleeding

• Only 4 studies provided details of intraoperative bleeding (>500 mL)

• The meta-analysis with a fixed effects model suggested that the conventional approach led to a reduced incidence of intraoperative bleeding, however, the difference was not statistically significant

• The reason why the rate is higher after LA is not clear, and the further investigation is necessary
OPEN vs LAPAROSCOPIC APPENDICECTOMY: Postoperative Hospital Stay

• According to an analysis for the period 1990-2009, the length of hospital stay after surgery was shortened in LA by 0.60 days, a difference that is not of clinical significance.

• However, since the year 2000 the reduction in postoperative hospital stay became more significant.

• A 48-hour discharge policy for LA proposed by Grewal et al. contributed to the increased difference.

• However, other results of LA are not consistent with a shortened hospital stay, and many believe that this was one area where LA has no advantage over OA.
OPEN vs LAPAROSCOPIC APPENDICECTOMY: Return to Normal Activity

- For the subgroup of studies reported during the year 2000 and after, there was no statistical difference between the two procedures, although the results demonstrated a trend in favor of LA.
- Early return to full activity is accepted as an obvious advantage of LA, which was supported by a large scale meta-analysis conducted by the Cochrane Colorectal Cancer Group.
- The trocar incisions of LA contribute to minimal trauma to the abdominal wall and less pain, allowing faster recovery.
- A trend towards less difference in return to normal activity was noted in recent meta-analytical studies.
OPEN vs LAPAROSCOPIC APPENDICECTOMY:
Return to Normal Diet

• Fast resumption of a normal diet following LA was another appealing advantage, resulting from minimal manipulation of the cecum and ileum

• Although a significant difference was found (p < 0.00001), the practicality of a difference of 0.34 days remains doubtful

• Subgroup analysis demonstrated a trend in favor of LA which had increased over time
OPEN vs LAPAROSCOPIC APPENDICECTOMY: Postoperative Pain

• Only eight studies recorded postoperative pain data, measured by VAS, on the first postoperative day.
• Meta analysis of VAS for postoperative pain with a random effects model demonstrated a score of 0.70 points less for LA compared with OA.
• The meta-analysis indicated that LA offered significant advantages in relieving postoperative pain (p = 0.008), mainly due to its minimal invasiveness.
• However, the difference in VAS between the two procedures was not statistically significant for the post-2000 subgroup of studies (p = 0.82).
• The trend toward a smaller incision in OA may explain this decreased difference.
OPEN vs LAPAROSCOPIC APPENDICECTOMY: Wound Infection

• The reduction of wound infection is a significant advantage of LA

• The chance of wound infection is greater in OA partly because the inflamed appendix is removed from the abdominal cavity directly through the wound, whereas in LA it is extracted via a bag or trocar

• In addition, the port-site wounds in LA are smaller compared to the longer wounds of OA, especially in obese patients
OPEN vs LAPAROSCOPIC APPENDICECTOMY: Intra-Abdominal Abscess

• 17 recorded data for the incidence of IAA
• Overall, meta-analysis failed to show any statistically significant difference in the incidence of IAA, but there was a trend in favor of OA (OA has less incidence of IAA)
• Gupta et al. considered that aggressive manipulation of the infected appendix and increased use of irrigation fluid, possibly producing greater contamination of the peritoneal cavity, might have an impact on IAA formation after LA
• Memon et al. believed that carbon dioxide pneumoperitoneum contributed to the mechanical diffusion of bacteria inside the peritoneal cavity, but experimental proof of this is lacking
• Conversely, Katkhouda et al. believed that mastery of the learning curve and the use of standardized surgical techniques reduced the incidence of IAA after LA
OPEN vs LAPAROSCOPIC APPENDICECTOMY: Postoperative Ileus

• The combined data from 18 studies showed that the incidence of postoperative ileus was 1.96% for OA, and 1.78% for LA

• Although the results indicated that the laparoscopic approach resulted in a reduced incidence of postoperative ileus, the difference was not statistically significant
OPEN vs LAPAROSCOPIC APPENDICECTOMY: Postoperative Ileus

• There were several explanations for the reduction of ileus following LA
• Firstly, decreased handling of the bowel during the procedure leads to less postoperative adhesion, and such adhesion may be responsible for ileus
• Secondly, patients after LA had less opiate analgesics, which inhibited bowel movements in the postoperative period
• Lastly, earlier mobilization after LA may also contribute to the reduction of adhesion
OPEN vs LAPAROSCOPIUC APPENDICECTOMY: UTI

• The combined data from only five studies revealed that the incidence of postoperative UTI was 0.76% for OA and 1.75% for LA

• Although the results indicated that the laparoscopic approach resulted in an incidence of postoperative UTI that was greater than that of OA, the difference was not statistically significant
OPEN vs LAPAROSCOPIC APPENDICECTOMY: Conversion Rate

• It is hard to understand why the conversion rate from LA to OA increased over time (1990-2009)
• Perhaps as experience with the laparoscopic procedure is gained, surgeons might attempt to perform LA for complicated cases such as gangrenous and perforated appendicitis, most of which might have been treated previously by the open approach
• The increased difficulty in LA might have resulted in the higher conversion rate
OPEN vs LAPAROSCOPIC APPENDICECTOMY: Conclusion

• Despite the limitations of meta-analysis, most authors believe that LA involves a shorter hospital stay, less postoperative pain, a faster recovery, and a lower complication rate compared with OA.

• LA is a safe and effective treatment alternative for patients with acute appendicitis, and is recommended for those hospitals where laparoscopic expertise and equipment are available.

• Although LA was associated with slightly more operating time than OA, subgroup analysis revealed that this difference has been diminishing.
OPEN vs LAPAROSCOPIC APPENDICECTOMY:

Conclusion

• The slightly higher incidence of IAA, intraoperative bleeding and UTI was worrisome, and due to insufficient primary data, most research unfortunately are unable to stratify the postoperative abscess rate according to the severity of the appendicitis

• Therefore, bias between groups might be present and might have affected the results

• Further studies should match for the severity of appendicitis to settle the question
OPEN vs LAPAROSCOPIC APPENDICECTOMY: Conclusion

• In conclusion, current studies show that LA provides considerable benefits over OA, including a shorter hospital stay, less postoperative pain, earlier postoperative recovery, and lower complication rate.
• Therefore, the widespread use of LA is routinely recommended in those hospitals where laparoscopic expertise and equipment are available.
THANKS
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