Clinical Guideline

SUSPECTED APPENDICITIS

SETTING	Primary and Secondary Healthcare Institutions in the Western Cape which refer to Red Cross War Memorial Children's Hospital (RCWMCH)
FOR STAFF	Primary and Secondary Doctors and Nurses who refer patients to RCWMCH
PATIENTS	Patients under the age of 12 years old with Suspected appendicitis

Introduction

Appendicitis is the most common surgical cause of abdominal pain. However, appendicitis only accounts for 1 % of patients presenting to the general practitioner with abdominal pain. There is a separate guideline available for the assessment and management of paediatric patients with abdominal pain. Please refer to the clinical guideline on abdominal pain in children for guidance on the assessment and management of abdominal pain.

The intension of this guideline is to improve insight into the management of patients assessed to have suspected appendicitis. The reason for this is the increased rate of inappropriate initiation of antibiotics and non-operative management of suspected appendicitis by non-surgical health professionals in the Western Cape.

Background

Acute appendicitis is the most feared cause of abdominal pain. This is appropriate as there is still up to 1% mortality from delayed diagnosis in developing countries.

Most cases have the classical history of **abdominal pain** localizing to right iliac fossa, associated **gastrointestinal (GIT) symptoms** (e.g. nausea, loss of appetite, vomiting, diarrhoea) and **signs of inflammation.** Pain typically precedes the other symptoms and progressive worsens over hours. Localised or generalised peritonism suggests ruptured appendicitis.

The diagnosis is more challenging in certain groups which warrant careful consideration:

- **Children < 5 years old:**
  - The signs of appendicitis are often picked up late in these patients due to communication difficulties
  - More than 95% of children under 5 years old with appendicitis present with complicated appendicitis as a result.
  - It is important to have a low threshold for further investigation or admission for observation in this age group.

- **Neurologically impaired children** (including patients with spina bifida, spastic quadriplegia)
  - The signs of appendicitis are often picked up late in these patients due to communication difficulties
  - possible abnormal innervation, resulting in atypical patterns of pain.

- Patient who **present early** in the disease processes:
  - The signs may not be "classical" and blood investigations may lag behind the clinical picture.

- Careful reassessment and safety-netting with warning signs of when to return are important for patients with a short history at the time of presentation.

Important details on history and examination

Please see the guideline on assessing abdominal pain in children for clear guidance on the assessment of abdominal pain.

Investigations

Urine dipstick is non-negotiable in every patient with abdominal pain.

- The presence of WBC without nitrites in the case of suspected appendicitis is often seen, especially if the inflamed appendix is adjacent to the bladder wall.
- Raised ketones are common and are due to decreased dietary intake

Pregnancy test in all females ≥10 years old.

- Although the likelihood of pregnancy in a 10 yr old child is low, this threshold has the benefit of avoiding almost any missed pregnancies.
- Parents are happy to proceed with the test when clinicians acknowledge the low threshold and explain that this is a routine practise to avoid bias.

Blood tests

- **Full blood count** preferably with a differential count and **CRP** act as markers of inflammation. Baseline values are used to monitor response, specifically in the case of non-operative management
- **Serum urea, creatinine and electrolytes** indicate the degree of dehydration and possible acute kidney injury
- Cultures should be standard practise in all patients presenting with features of systemic sepsis

Ultrasound

- The use of abdominal ultrasound is not indicated in every case of appendicitis.
- Patients with inconclusive initial assessment for appendicitis may undergo an USS as part of the assessment done by the surgical team.
- USS does not have 100% sensitivity for appendicitis, so a normal finding does not independently exclude appendicitis but contributes to the clinical picture is some cases.
- USS is important in the case of patients considered for non-operative management (see below) and for patients with an appendix mass being considered for percutaneous management of complicated appendicitis.

Management and referral guidance

- Patients should be initiated on ivi fluid with or without a fluid bolus based on their clinical condition
- Regular analgesia should be initiated as soon as the patient is stabilised
- NGT should be inserted and left on free drainage in all patients with vomiting
- **Antibiotics should only be initiated in patients assess to have septic shock**
- Patients suspected to have appendicitis require referral to a centre with the capacity to assess and surgically manage appendicitis in a patient of that age group. This may be a secondary level hospital in the case of patients older than 6 years old, but this is not consistent across the Western Cape at this time.
- Patients who present to a unit with surgical capacity but no paediatric anaesthesia support will still benefit from surgical review in that unit prior to referral to a paediatric unit. This can prevent inappropriate referral in a significant proportion of patients.

- **Doctors and nurses who do not intend to take full responsibility for the surgical management of appendicitis should NEVER initiate non-operative management of appendicitis.**

Non-operative management of appendicitis

Non-operative management has been proven to be safe and effective in patients with uncomplicated appendicitis. For this practise to be safe and effective, very strict criteria need to be met and ongoing monitoring is required.

Do not ever manage patients with appendicitis nonoperatively outside the setting of a surgical unit with the capacity to do a safe appendicectomy. The decision to undertake non-operative management of appendicitis should always be made by the surgical team taking full responsibility for the comprehensive management of the appendicitis, including proceeding to appendicectomy when non-operative management fails.

Patient selection:

The first step of non-operative management is careful surgical assessment of the patient with suspected appendicitis to confirm that the patient has acute appendicitis and that there is no evidence of any complications such as perforations, necrosis, a collection or appendix mass.

Management:

Once the diagnosis is confirmed and the complications are excluded then patients are started on intravenous antibiotics in the inpatient setting. Ongoing monitoring is essential to confirm that the patient responds appropriately to antibiotic therapy. Patients will only be discharged once they have objectively improved and can tolerate completion of antibiotics in the oral form.

If during this monitoring phase, patients are found not to respond adequately with resolution of symptoms, the team will proceed to appendicectomy.

After 24 - 48 hours of intravenous antibiotics, patients who have shown resolution of their symptoms will be discharged home to complete a total of 5 days of antibiotics (oral co-amoxiclav).

Discharge and follow-up:

Patients and their parents are advised that 1/3 of patients managed with non-operative management of appendicitis will re-present with acute appendicitis in the future. Should this occur, the practise is to proceed to appendicectomy at the recurrent episode.

Patients are given the option of an interval appendicectomy. This is the removal of the appendix on an elective basis at a time when it is not inflamed. Patients who choose not to undergo an interval appendicectomy will be followed up at the surgical outpatients department to confirm they are well and asymptomatic 1 month after completion of non-operative management.

What about the patient with recurrent appendicitis?

Patients who represent with signs and symptoms of appendicitis will undergo an appendicectomy in the unit that initially managed them non-operatively. Management in this scenario is the same as for any acute appendicitis and will involve antibiotic therapy as well as an appendicectomy. The decision about the duration of antibiotics will be made intraoperatively after visualising the appendix.

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