# Assessing the diagnostic sensitivity of CT and Ultrasound in suspected appendicitis

**Descriptor:**

This audit assesses whether the diagnostic yield of CT and Ultrasound imaging for suspected acute appendicitis meets that of published research studies.

**Background:**

Acute appendicitis is the most common surgical emergency and accounts for one-third of adult patients presenting to A&E with an acute abdomen. CT imaging has high positive predictive value for acute appendicitis and its inclusion in the diagnostic workup in difficult cases has reduced the negative appendicectomy rate significantly, either by confirming/refuting the diagnosis and/or suggesting alternative diagnoses. Ultrasound (US) imaging is preferred as a first-line imaging in children/young adults and women of child-bearing age due to concerns regarding high ionising radiation dose associated with CT. However, it is dependent on operator experience, variation in appendiceal anatomy and patient body habitus.

## The Cycle

**The standard:**

1. The degree of clinicopathological correlation between the pre-appendicectomy CT and Ultrasound reports and the post-appendicectomy histopathology results should be high.

2. The number of removed appendices that are histologically normal should be acceptably low for both imaging modalities.

**Target:**

1. For CT: The sensitivity value should be >90% [ref 1]

2. For US: The overall sensitivity value (includes adults and paediatric subgroup) should be >70% on interval scan following an initial US screening test. The sensitivity value in the paediatric subgroup should be >85%. [ref 1]

3. The positive predictive value should be >92% [ref.2]

4. The negative appendicectomy rate should be <10% for CT [ref.3]

## Assess local practice

**Indicators:**

1. Number of appendicectomies with a pre-operative CT and/or Ultrasound scan

2. Numbers of which were confirmed histologically as either normal appendices, or acute appendicitis

**Data items to be collected:**

1. Obtain list from pathology department of last 100 patients undergoing appendicectomy

2. Review pre-appendicectomy radiology reports and post-appendicectomy histopathology reports

3. For appendicectomies where pathology report indicates chronic inflammation, review previous 6 months radiology records to identify any possible false negative CTs or ultrasounds.

**Suggested number:**

100 retrospective consecutive cases (depending on local practice may have to increase numbers on pathology list if large proportion proceed to surgery without pre-operative imaging)

**Suggestions for change if target not met:**

•Presentation of audit results to radiology department with a discussion of specific cases of radiological-pathological discrepancy, case-based learning points and recommended further reading

• Further education of both trainee and consultant radiologists in the form of self-directed learning, consultant teaching or peer-to-peer lectures

• Modification of appendicitis imaging protocol to only allow consultants to assess cases of suspected appendicitis if reporting by trainees identified as a source of error

• In cases of equivocal initial US, consider an interval US scan in young patients and women of reproductive age

• Implementation of a peer-review scoring system (eg RADPEER) to identify particular areas for improvement

**Resources:**

• Compilation of the paired pre-operative imaging reports (CT/US) and post-operative histopathology reports for all patients undergoing appendicectomy for suspected acute appendicitis (1h)

• Inspection of the paired imaging and histopathology reports of cases (6h)

**References:**

1. Eng, K., Abadeh, A., Ligocki, C., Lee, Y., Moineddin, R., Adams-Webber, T., Schuh, S. and Doria, A. (2018). Acute Appendicitis: A Meta-Analysis of the Diagnostic Accuracy of US, CT, and MRI as Second-Line Imaging Tests after an Initial US. Radiology, 288(3), pp.717-727.
2. Dude, J.B., Lynch, M.L., Bhatt, S., Dogra, V.S., 2012. Computed Tomography Mimics of Acute Appendicitis: Predictors of Appendiceal Disease Confirmed at Pathology. J Clin Imaging Sci, 2(73), pp.1-8.–6.
3. Colson M., Skinner K.A., Punnington G., 1997. High negative appendicectomy rates are no longer acceptable. Am J Surg, 174(6), pp.723

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