

A REVIEW OF RADIOLOGIC DIAGNOSIS OF ACUTE APPENDICITIS AND THE IMPACT OF NEGATIVE APPENDICECTOMY RATES AT AUCKLAND CITY HOSPITAL

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INTRODUCTION

Acute appendicitis is the most frequent cause of acute abdominal pain.¹

Negative appendicectomy (normal appendix on histology) has the same risk profile as an operation for appendicitis without therapeutic benefit.

Our center has good access to radiologic investigations and uses this heavily in the diagnosis of acute appendicitis.

We reviewed the impact of imaging on diagnosis and our unit's negative appendectomy rates.

METHODS

RETROSPECTIVE AUDIT

Reviewing all cases of appendicectomies.

STUDY PERIOD

1st May 2014 - 31st May 2019 at Auckland City Hospital.

EXCLUDED

- Children under 16 years of age
- Appendectomies completed as a part of another operation e.g. right hemicolectomy for colorectal cancer.

IMAGING



REVIEWED

Clinical notes including operation notes, radiological and histopathology reports for each patient.

RECORDED

Data on demographics, type of scan, scan diagnosis, and histological results.

RADIOLOGIST REPORTS

Results of ultrasound scans (USS) and computed topography (CT) scans were based on radiologist reports.

IMAGING RESULTS

Acute appendicitis (AA):

Specifically stating AA or reported as 'highly' or 'strongly' suggestive of appendicitis were considered positive.

Indeterminate:

If uncertainty or ambiguity was expressed in the report, if further imaging was recommended and/or if the appendix could not be visualised.

Normal:

Imaging was considered normal if reports specifically used the word 'normal' or if 'no signs of appendicitis' were seen.

HISTOLOGICAL RESULTS

Histological results were used as the reference standard to compare imaging accuracy. An appendectomy was considered negative if appendiceal samples were negative on histology. Negative appendiceal rates were defined as the rate of pathologically normal appendices removed surgically when patient was suspected of having appendicitis.

NEGATIVE APPENDICECTOMY

The pathologically defined negative appendicectomy rate for our study were histological reports with the following result; normal appendix, serositis, fibrous obliteration, inflammation outside the appendix/periappendicitis such as diverticular disease/endometriosis. Neoplasms and mucosal inflammation were considered positive results.

RESULTS

2458 APPENDECTOMIES

Six were part of a larger operation.
Two CT reports were unavailable.

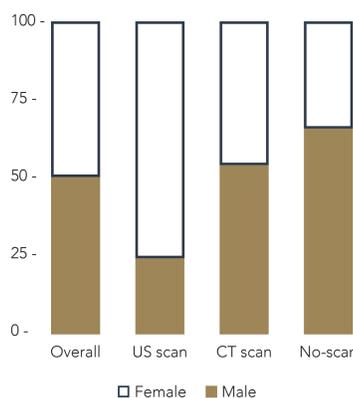
2450 SCANS WERE ANALYSED

35 Mean age **51%** Female **49%** Male

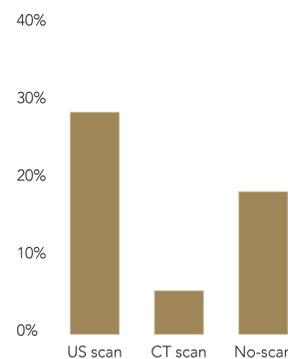
1810 SCANS WERE COMPLETED

1048 CT Scans **758** US Scans **4** MRI Scans

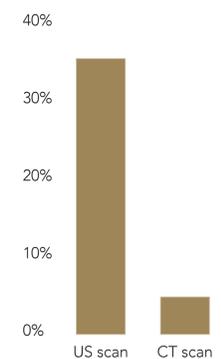
GENDER DISTRIBUTION RELATIVE TO IMAGING MODALITY



NEGATIVE APPENDICETOMY RATES RELATIVE TO IMAGING MODALITY



RATE OF NON-DIAGNOSTIC SCANS



- 80 patients (3.3%) received two or more imaging modalities.
- 722 had a clinical diagnosis of appendicitis and proceeded to theatre with no imaging.
- Of the scans completed 45% of US scans were indeterminate (non-diagnostic) compared to 4% CT scans.
- Only 10% of patients who had a non-diagnostic US scans proceeded to CT scan.
- The overall negative appendicectomy rate for imaging confirmed appendicitis was 15%.
- The negative appendicectomy rate for CT scans was 6% compared to 29% seen with US scans.
- The rate of negative appendicectomy in patients with no imaging was 18%.

CONCLUSIONS

- CT scans appear to have greater utility in accurate diagnosis of appendicitis.
- 42.6% of our patients had a CT scan prior to an appendicectomy.
- Accurate radiological diagnosis may reduce the need for surgery, reducing risk to patient and costs to the health sector.
- The NAR is considerably higher in those receiving USS.
- Missed diagnosis of appendicitis poses a risk of complications and carries a mortality rate of up to 1.5%.²
- Concerns of irradiation is a major barrier to obtaining a CT, particularly in females of reproductive age.
- A shift in clinical practice towards routine use of CT scans in all patients with suspected appendicitis should be considered.

REFERENCES

1. Crocker C, Ali M, Abdolell M, Kamali M, Cpsta A. Ultrasound and CT in the diagnosis of Appendicitis: accuracy with consideration of indeterminate examinations according to STARD guidelines. Am J Roentgenol. 2020;215(3):639-44.
2. Giljaca V, Nadarevic T, Poropat G, Nadarevic VS, Stimac D. Diagnostic Accuracy of Abdominal Ultrasound for Diagnosis of Acute Appendicitis : Systematic Review and Meta-analysis. World J Surg. 2017;41:693-700.