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A single centre evaluation of risk prediction models and imaging modalities in acute appendicitis

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Objective: Patients with suspected appendicitis remain a diagnostic challenge. This study aims to validate risk prediction models and to investigate diagnostic accuracy of ultrasonography (US) and computed tomography (CT) in adults undergoing an appendicectomy.

Materials and Methods: A retrospective case review of patients aged 16-45 undergoing an appendicectomy between January 2019 to January 2020 at a tertiary referral centre was performed. Primary outcomes were the accuracy of a high-risk appendicitis risk score and US and CT imaging modalities when compared to histological reports following appendicectomy.

Results: A total of 206 patients (107/205, 51.9% women) were included. Removal of histologically normal appendix was equally likely in men and women (13.1 versus 11.2%, relative risk 1.17, 95% c.i. 0.56 to 2.44; $P = 0.67$). A high-risk appendicitis score correctly identified 84.0% (79/94) of cases in men and 85.9% (67/78) of cases in women. US was reported as equivocal in 85.7% (18/21) of low-risk women and 59.0% (23/39) of high-risk women. CT in low-risk women resulted in 25.0% (2/8) equivocal results whilst correctly diagnosing (5/6) or excluding (1/2) appendicitis in 75.0% of the total cohort (6/8). In high-risk women CT resulted in 3.8% (1/26) equivocal results whilst correctly detecting (22/23) or excluding (1/3) appendicitis in 88.5% of total high-risk patients (23/26).

Conclusions: This study suggests that risk prediction models may be useful in both women and men to identify appendicitis. US imaging gave high rates of equivocal results and should not be relied upon for the diagnosis of appendicitis but may be useful to exclude other differential diagnoses. CT imaging is a highly accurate diagnostic tool and could be considered in those at low-risk where clinical suspicion remains to reduce negative appendicectomy rates.