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ULTRASONOGRAPHIC ASSESSMENT FOR ACUTE APPENDICITIS: DEFINING THE FEATURES THAT ENHANCE DIAGNOSTIC ACCURACY

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Aim of the study: The use of ultrasonography (US) as the first line imaging modality of choice in children with suspected appendicitis has gained traction in recent years. However, cited limitations include poor specificity and ambiguity in clinical relevance of features seen on imaging. We aim to identify the components of abdominal US that are significant in confirming the presence of appendicitis.

Methods: This was an ethically approved study reviewing all US reports for children admitted to the paediatric surgical unit in our institution between January-December 2013 in whom acute appendicitis was a differential diagnosis. Reports were scrutinized for the following:Appendix diameter, compressibility of appendix, presence of probe tenderness, increased vascularity, surrounding echogenic fat stranding, presence of lymph node enlargement, presence of extraluminal fluid collection. Demographic data, final diagnosis and histological reports were recorded. Univariate logistic regression analysis was performed to determine covariates that were significant for appendicitis. Statistical significance was set at $p<0.05$.

Main results: Of 810 US done, we excluded 131 with suspected intussusception and 38 which did not mention evaluating the appendix, leaving 641 reports for analysis in children with median age 10.8 years(range 1.3-21.3) and 297(46.3%) boys. When the appendix could be visualized on the US, compressibility was a negative predictor for appendicitis, and all other factors except lymph node enlargement were positive predictors for appendicitis(Table). When the appendix could not be visualized, only echogenic fat stranding and presence of extraluminal fluid significantly predicted for appendicitis. Neither gender nor age were significant. When all significant factors were included in the model, only 7 patients had complete profiles, which was too small a sample for multivariate analysis

Conclusion: Periappendiceal features assessing for intra-abdominal inflammation are useful in confirming or excluding appendicitis. However, prospective studies using standardized protocols for ultrasonographic assessment that include checklists to ensure complete data entry are required.

Table: Univariate analysis of ultrasonographic features significant for confirming or excluding appendicitis using logistic regression models in 641 ultrasound reports

Variable	Visualised appendix		Appendix not visualised	
	OR (95% CI)	P-value	OR (95% CI)	P-value
Appendix diameter (n=404)	5.49 (3.93, 7.66)	<0.001	NA	NA
Compressibility (n=90)	0.01* (<0.01,0.04)	<0.001	NA	NA
Probe tenderness (n=256)	30.9 (12.3,77.8)	<0.001	5.93 (0.98, 35.8)	0.05
Increased vascularity (n=119)	44.6 (13.4, 147.9)	<0.001	0.46 (0.01,116.2)	0.92
Echogenic fat stranding (n=447)	399.6 (139.8, 999)	<0.001	47.7 (7.13, 318.8)	<0.001
Lymph node enlargement (n=240)	0.76 (0.20, 2.83)	0.68	0.40 (0.04, 3.70)	0.42
Presence of extraluminal fluid (n=406)	4.45 (2.40, 8.26)	<0.001	8.31 (2.11, 32.8)	0.003

* OR < 1 indicates compressibility is a significant negative predictor for appendicitis.
NA=not applicable; OR=Odds ratio; CI=Confidence interval