Association of Procalcitonin and C-Reactive Protein Biomarkers with Complicated and Uncomplicated Appendicitis in Pediatric Patients

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Background

- Pediatric acute appendicitis (AA) patients often show non-specific signs and symptoms, complicating diagnosis and surgical decision-making; delays in treatment may result in longer hospital stays, higher perforation rates, and poorer outcomes. [1,2]
- Biochemical markers such as procalcitonin (PCT) and C-reactive protein (CRP) have been widely investigated as potential diagnostic adjuncts.[3-6]
- Previous studies have shown variable accuracy of these markers. [3-6]

Methods

This cross-sectional study evaluated PCT and CRP levels in relation to appendiceal histopathology among pediatric patients undergoing appendectomy (laparoscopic or open) at Dr. Sardjito General Hospital, Yogyakarta, Indonesia, between April 2015 and March 2016.

Results

A total of 66 patients fulfilled the inclusion criteria, consisting of 52 (78.8%) complicated AA cases and 14 (21.2%) non-complicated AA

Table 1. Patients' characteristics

		Complicated AA N (%)	Non-Complicated AA N (%)	Total N (%)
Sex	Male	25 (48.1)	8 (57.1)	33 (50)
	Female	27 (51.9)	6 (42.9)	33 (50)
Age	≤ 10 years-old	30 (57.7)	11 (78.6)	41 (62.1)
	>10 years-old	22 (42.3)	3 (21.4)	25 (37.9)

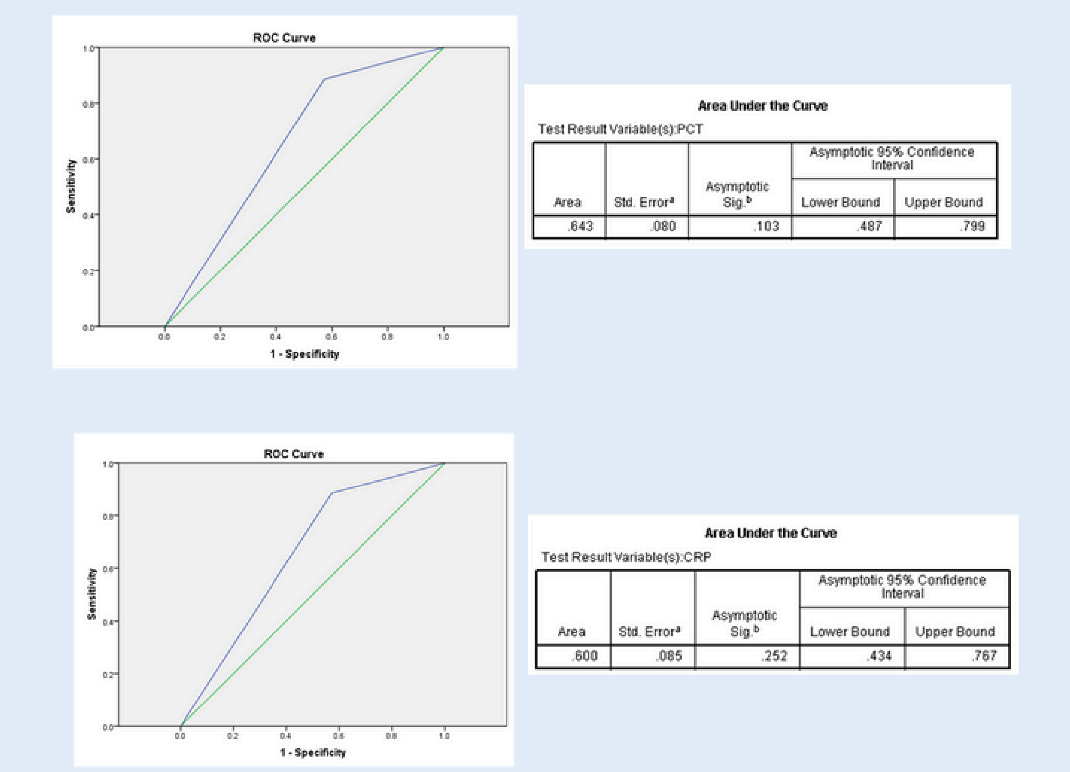

Figure 1. ROC curves for PCT and CRP levels for complicated AA

Table 2. Relationship between PCT and CRP levels with the severity of AA

Biochemical marker		Complicated AA N (%)	Non-Complicated AA N(%)	Total N (%)	*p*
PCT	Increased (≥5)	41 (74.5)	6 (42.9)	47 (71.2)	0.008*
	Normal	11 (25.5)	8 (57.1)	19 (28.8)	
CRP	Increased (≥0.05)	39 (75)	5 (35.7)	44 (66.7)	0.006*
	Normal	13 (25)	9 (64.3)	22 (33.3)	
*statistically significant					

Table 3. Sensitivity, specificity, predictive values, accuracy, and likelihood ratios of PCT and CRP levels in distinguishing complicated from non-complicated AA

Marker	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	Accuracy (%)	LR+ / LR−
PCT	78.8	57.1	87.2	42.1	74.2	1.84 / 0.37
CRP	75	64.3	88.6	40.9	72.7	2.10 / 0.39

Conclusion

- Elevated levels of PCT and CRP are associated with the occurrence of complicated appendicitis, with PCT being more sensitive and specific.
- Incorporating PCT and CRP measurements into clinical practice may improve diagnostic accuracy for appendicitis in the pediatric population.

References