A COMPARATIVE STUDY OF RIPASA SCORING SYSTEM AND ULTRASONOGRAPHY IN THE CLINICAL DIAGNOSIS OF THE ACUTE APPENDICTITIS

Surgery

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ABSTRACT

Background: Acute appendicitis is the commonest cause of acute abdominal pain in the surgical practice. Correct clinical diagnosis prevents unnecessary surgeries and complications. Various scoring systems are there to aid clinical diagnosis of the acute appendicitis.

Methods: A prospective observational study was carries out at the Department of Surgery, B J Medical College, Ahmedabad, from February 2018 to December 2018. Demographic, clinical and laboratory investigations' data was collected from consenting patients. The gold standard for the diagnosis was histopathological examination. The data was analyzed by IBM SPSS Statistics (2015). Sensitivity, specificity, accuracy and negative predictive value and positive predictive value (= precision) were compared.

Results: Majority of the patients with right iliac fossa pain were operated. RIPASA scores better than USG on all the 4 attributes viz. sensitivity (0.90 against 0.84), specificity (0.30 against 0.20), accuracy (0.80 against 0.73) and positive predictive value (= precision) (0.87 against 0.84).

Conclusion: RIPASA is not only less reliant on the technology and skill but also better in guiding the prognosis.

KEYWORDS

INTRODUCTION:

Acute appendicitis (AA) has life time risk of 6-7%. It is the most common cause of the acute abdominal (right iliac fossa) pain and this pain is taken as the hallmark unless proven otherwise.

If remaining undiagnosed, AA may progress to perforation, which may be associated further with increased morbidity and mortality. That's why surgeons have a propensity to operate with a probable diagnosis of AA rather than to wait till it's certain.

Notwithstanding the advances in modern radiographic imaging and diagnostic laboratory investigations, the diagnosis of appendicitis remains essentially clinical – requiring a mixture of observation, clinical acumen and surgical science[1] which was originally proscribed by Harvard pathologist Reginald Fitz in 1886.[2]

Thus surgeons through ages have preferred negative appendicectomy (NA) over the 'ongoing but missed' complications of perforation. It has been usual in surgical practice all over the world to accept a NA rate even up to 30% in order to avoid the morbidity and mortality associated with AA.[1,2]

Though routine history and physical examination both remain the most effective and practical diagnostic modalities, in order to reduce the NA rates, various scoring systems have been developed for supporting the diagnosis of AA.[1]

To increase the diagnostic accuracy, 6 scoring systems of AA are in vogue[2] – of which, RIPASA (The Raja Isteri Pengiran Anak Saleha Appendicitis score) and Alvarado [originally proposed in 1986, Mantrel modification by Kalan et al in 1994][1] are more prevalent – corroborating CT scan, radioactive isotope study, ultrasonography, laparoscopy, MRI, computer aid barium enema etc.[2]

Though originally designed for pregnant females, Alvarado scale has been found of less predictive efficacy even in females - with NA rates of 26.9% against 15% in males.[1] Its superiority over PAS (Pediatric Appendicitis scale) has also been debated[2] in case of children. Sensitivity of the scale has been found to be as low as 65.9% (1/3 rd amiss).[3]

On the other hand, In a retrospective study, the RIPASA score has been shown to achieve better sensitivity (88%) and specificity (67%) than the Alvarado score (sensitivity 59%, specificity 23%) in an Asian population.[4] Thus aim of this study was to compare the accuracy of the RIPASA scoring systems against USG (ultrasonography) for the clinical diagnosis of the AA.

Methodology:

A prospective observational study was carried out at the Department of Surgery, B J Medical College, Ahmedabad, from February 2018 to December 2018. Demographic, clinical and laboratory investigation data was collected from consenting patients.

The gold standard of the diagnosis was histopathological examination (HPE). The data was analyzed by IBM SPSS Statistics (2015). The sensitivity, specificity, positive predictive value and negative predictive value were compared.

Inclusion criteria: Patients with right iliac fossa pain with provisional diagnosis of the AA, who were willing for surgery and consenting for the study.

Exclusion criteria: Patients with appendicular mass or abscess, or with generalized peritonitis.

A purposive (non-probabilistic) sampling (because population pool was undefined while inclusion and exclusion criteria were defined) with additional convenience sampling attribute (because only those who visited the given hospital in a given time period were sampled) was done and 60 persons (30 females and 30 males) were finally included in the study.

Table.1: RIPASA SCORING SYSTEM[5]

		Score	Patient score
Gender	Male	1	
	Female	0.5	
Age	<40 years	1	
	>40 years	0.5	
Symptoms	RIF pain	0.5	
	Pain migration to RIF	0.5	
	Anorexia	1.0	
	Nausea and vomiting	1.0	
Duration of symptoms	<48 hours	1.0	
	>48 hours	0.5	
Signs	RIF Tenderness	1.0	
	Guarding	2.0	
	Rebound Tenderness	1.0	
	Rovsing's Sign	2.0	
	Fever >37 <39 °C	1.0	
Investigations	Raised WBC	1.0	
	Negative Urinalysis	1.0	
Foreign nationality		1.0	
Total		17.5	

RIF: Right Iliac Fossa, WBC: White Blood Cell

RESULTS:
Table.2: USG finding of appendix

Positive	39
Secondarily inflamed	03
Sub Acute appendicitis	03
Probe tenderness	02
Normal	03

Statistical analysis of the collected data was performed on RIPASA score, USG findings and HPE (gold standard) reports with IBM SPSS Statistics (2015) as per table 2-4.

Table.3: tripartite comparison (RIPASA, USG and HPE)

	RIPASA	USG finding	HPE
Positive	TP 45, FN 05	TP 42, FN 08	50 P
Negative	TN 03, FP 07	TN 02, FP 08	10 N
Total	PR = 52 NR = 08	PU = 50 NU = 10	n = 60

Table.4: bipartite comparison (RIPASA versus USG)

Statistical Attribute	RIPASA	USG
Sensitivity	45/50 = 0.90	42/50 = 0.84
Specificity	3/10 = 0.30	2/10 = 0.20
Accuracy	48/60 = 0.80	44/60 = 0.73
Positive Predictive value = Precision	45/52 = 0.87	42/50 = 0.84
Negative predictive value	3/8 = 0.38	2/8 = 0.25

DISCUSSION:

AA was considered in the differential diagnosis of the every case of the acute abdominal pain. Early diagnosis was made in most of the cases based on the history and clinical examination. The periumbilical pain, which shifted to right iliac fossa with nausea and vomiting, was clinical hallmark. Anorexia was the constant feature followed by fever and leukocytosis.

Ultrasonographic finding of the appendicitis included appendix of 7 mm or more in anteroposterior diameter, as a thick walled, non-compressible luminal structure. Findings supportive of the diagnosis of appendicitis included:
- aperistaltic, non-compressible, dilated appendix (>6 mm outer diameter)
- appendicolith
- distinct appendiceal wall layers
- echogenic prominent pericaecal and periappendiceal fat
- periappendiceal hyperechoic structure: amorphous hyperechoic structure (usually >10 mm) seen surrounding a non-compressible appendix with a diameter >6 mm
- periappendiceal fluid collection
- target appearance (axial section)
- periappendiceal reactive nodal prominence/enlargement.

As shown in table.3, out of 60 patients, 50 (P) were proven cases of AA on our gold standard test i.e. HPE and other 10 (N) were negative. Out of the 50 (P), 45 (TP= true positive) were reconfirmed on RIPASA while 5 were missed (FN = false negative).

Out of 10 (N), 7 tested positive on RIPASA (FP = false positive) while only 3 were confirmed negative (TN = true negative). Thus out of 60 cases, 52 scored positive on RIPASA (P_R) while 8 scored negative (N_R). On the other hand, out of the 50 (P), 42 (TP= true positive) were reconfirmed on USG while 8 were missed (FN = false negative). Out of 10 (N), 8 tested positive on USG (FP = false positive) while only 2 were confirmed negative (TN = true negative). Thus out of 60 cases, 50 scored positive on USG (P_U) while 8 scored negative (N_U).

Going by statistical terminology, thus the RIPASA scores better than USG on all the 5 attributes viz sensitivity (0.90 against 0.84), specificity (0.30 against 0.20), accuracy (0.80 against 0.73), negative predictive value (0.38 against 0.25) and positive predictive value (= precision) (0.87 against 0.84).

As the sample size was small due to limited reach and duration, the output parameters can't be further processed into any comparison of significance. Hence t-test was not applied secondarily.

CONCLUSION:

RIPASA is not only less reliant on the technology and skill, but also better in guiding the prognosis.

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