"A COMPARATIVE STUDY OF RIPASA SCORE AND ALVARADO SCORE IN THE DIAGNOSIS OF ACUTE APPENDICITIS"

A DISSERTATION SUBMITTED TO SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION AND RESEARCH CENTRE, KOLAR, KARNATAKA

In partial fulfilment of the requirements for the degree

MASTER OF SURGERY

IN

GENERAL SURGERY

By
Dr.Paul Dinakaran .M.D.S

Under the Guidance of
Dr. BHASKARAN
Professor
Department of general surgery

DEPARTMENT OF GENERAL SURGERY

SRI DEVARAJ URS MEDICAL COLLEGE

CONSTITUENT INSTITUTE OF

SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION

TAMAKA, KOLAR-563101

NOVEMBER-2019

SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION, TAMAKA, KOLAR, KARNATAKA

CERTIFICATE BY THE GUIDE

This is to certify that the dissertation entitled "A COMPARATIVE STUDY OF RIPASA SCORE AND ALVARADO SCORE IN THE DIAGNOSIS OF ACUTE APPENDICITIS" is a bonafide research work done by Dr. PAUL DHINAKARAN.M.D.S, under my guidance and supervision in partial fulfillment of the requirement for the Degree of M.S. in GENERAL SURGERY

Date: Signature of the Guide

Place : Kolar   Dr. BHASKARAN A,

                                                   Professor,

                                                   Department of General surgery,

                                                   Sri Devaraj Urs Medical College,

                                                   Tamaka, Kolar

SRI DEVARAJ URS MEDICAL COLLEGE,
TAMAKA, KOLAR-563101

DECLARATION BY THE CANDIDATE

I hereby declare that this dissertation/thesis entitled **"A COMPARATIVE STUDY OF RIPASA SCORE AND ALVARADO SCORE IN THE DIAGNOSIS OF ACUTE APPENDICITIS"** *is a bonafide and genuine research work carried out by me under the guidance of*

Dr. BHASKARAN A

Professor

Department of General Surgery,

Sri Devaraj Urs Medical College &

Research centre,

Tamaka, Kolar.

Date

Place: Kolar

Signature of the candidate

Dr. PAUL DHINAKARAN.M.D.S

SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION AND RESEARCH CENTRE, TAMAKA, KOLAR, KARNATAKA

ENDORSEMENT BY THE HOD, PRINCIPAL / HEAD OF THE INSTITUTION

This is to certify that the dissertation entitled

"A COMPARATIVE STUDY OF RIPASA SCORE AND ALVARADO SCORE IN THE DIAGNOSIS OF ACUTE APPENDICITIS"

is a bonafide and genuine research work carried out by

Dr. PAUL DHINAKARAN.M.D.S

under the guidance of

Dr. BHASKARAN A

Professor, Department of Surgery

Dr. P. N. SREERAMULU
Professor & HOD
Department of General Surgery,
Sri Devaraj Urs Medical College,
Tamaka, Kolar.

DR.M.L. HARENDRA KUMAR
Principal
Sri Devaraj Urs Medical College,
Tamaka, Kolar

Date

Place: Kolar

Date

Place: Kolar

SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION AND RESEARCH CENTRE, TAMAKA, KOLAR, KARNATAKA

ETHICAL COMMITTEE CERTIFICATE

This is to certify that the Ethical committee of Sri Devaraj Urs Medical College

Tamaka, Kolar has unanimously approved

Dr. PAUL DHINAKARAN.M.D.S

Post-Graduate student in the subject of

GENERAL SURGERY

at Sri Devaraj Urs Medical College, Kolar

to take up the Dissertation work entitled

"A COMPARATIVE STUDY OF RIPASA SCORE AND ALVARADO SCORE IN THE DIAGNOSIS OF ACUTE APPENDICITIS"

to be submitted to

SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION AND RESEARCH CENTRE, TAMAKA, KOLAR, KARNATAKA.

Signature of MemberSecretary,

Date:

Ethical committee,

Place: Kolar

Sri Devaraj Urs Medical College,

Tamaka, kolar- 563101

SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION AND

RESEARCH CENTRE, TAMAKA, KOLAR, KARNATAKA

COPYRIGHT

DECLARATION BY THE CANDIDATE

I hereby declare that the Sri Devaraj Urs Academy of Higher Education and Research Centre, Kolar, Karnataka shall have the rights to preserve, use and disseminate this dissertation/thesis in print or electronic format for academic /research purpose.

Date:

Place: Kolar

Signature of the candidate

Dr. PAUL DHINAKARAN.M.D.S

Post graduate student,

Department of General Surgery

Sri Devaraj Urs Medical College,

Kolar.

ACKNOWLEDGEMENT

ABBREVATIONS

RIPASA	**Th Raja Isteri Pengiran Anak Saleha Appendicitis**
GALT	**Gut associated lymphoid tissue**
5-HT	**5-hydroxytryptamine**
CRP	**C-Reactive protein**
WBC	**White blood cell**
RLQ	**Right Lower Quadrant**
USG	**Ultrasonogram**
CT	**Computer Tomography**
MRI	**Magnetic Resonance Imaging**
RIF	**Right Iliac Fossa**
PPV	**Positive Predictive Value**
NPV	**Negative predicitve Value**
SD	**Standard Deviation**

Sri Devaraj Urs Academy of Higher Education and Research

Certificate of Plagiarism Check

Author Name	Dr Paul Dhinakaran
Course of Study	General Surgery
Name of Supervisor	Dr. Bhaskaran - A
Department	Department of General Surgery
Acceptable Maximum Limit	10%
Submitted By	librarian@sduu.ac.in
Paper Title	A COMPARATIVE STUDY OF RIPASA SCORE AND ALVARADO SCORE IN THE DIAGNOSIS OF ACUTE APPENDICITIS
Similarity	07 %
Paper ID	190112061713
Submission Date	2019-01-12 06:17:13

* This report has been generated by DrillBit Anti-Plagiarism Software

Signature of Student	Signature of Supervisor
Head of the Department	
University Librarian 12/1/2019	Director Of Post Graduate Studies

TABLE OF CONTENTS

INTRODUCTION

INTRODUCTION

Acute appendicitis is one of the most common surgical emergencies, with a lifetime prevalence rate of approximately one in seven[1]. Acute inflammation of the vermiform appendix is described in olden texts and an Egyptian mummy of the Byzantine era exhibits adhesions in right lower quadrant suggestive of old appendicitis [2]. A negative appendectomy is taken as a surgery performed for a preoperative diagnosis of appendicitis those results in a normal histopathology specimen. Different techniques have been devised to assist in equivocal cases in attempts to decrease negative appendectomy rates. A number of scoring systems have been used for aiding in early diagnosis of acute appendicitis and its management. These scores make use of clinical history, physical examination and laboratory findings. The Raja Isteri Pengiran Anak Saleha Appendicitis (RIPASA) and ALVARADO score are new diagnostic scoring systems developed for the diagnosis of Acute Appendicitis and has been shown to have significantly higher sensitivity, specificity and diagnostic accuracy. The RIPASA Score is a newly developed diagnostic score for Acute Appendicitis and has been shown to have significantly higher sensitivity, specificity and diagnostic accuracy compared to Alvarado Score, particularly when applied to Asian population [3]. Not many studies have been conducted to compare RIPASA and ALVARADO scoring system in the diagnosis of acute appendicitis.

AIMS & OBJECTIVES

AIMS AND OBJECTVES OF THE STUDY

1. To compare ALVARADO and RIPASA score by applying them to the patients attending Our rural hospital with right iliac fossa pain that could probably be acute appendicitis

2. To correlate Histopathological findings of the operated case with either score

REVIEW OF LITERATURE

REVIEW OF LITERATURE

EMBRYOLOGY OF APPENDIX

Embryology of the appendix is helpful in diagnosing variants from normal appendix. In utero, development is related to that of the midgut. At 4 weeks of gestation, the midgut herniates into the umbilical cord being supplied by superior mesenteric artery. The foregut and hindgut do not herniate due to retention bands. At 5 weeks, as the gut rotates counterclockwise the pre-arterial segment of the midgut returns into the abdomen. By 8 weeks of gestation appendix is histologically visible. By 12 weeks, the post arterial segment has reduced and the cecum is in the upper abdomen with a 270° gut rotation.[4,5]
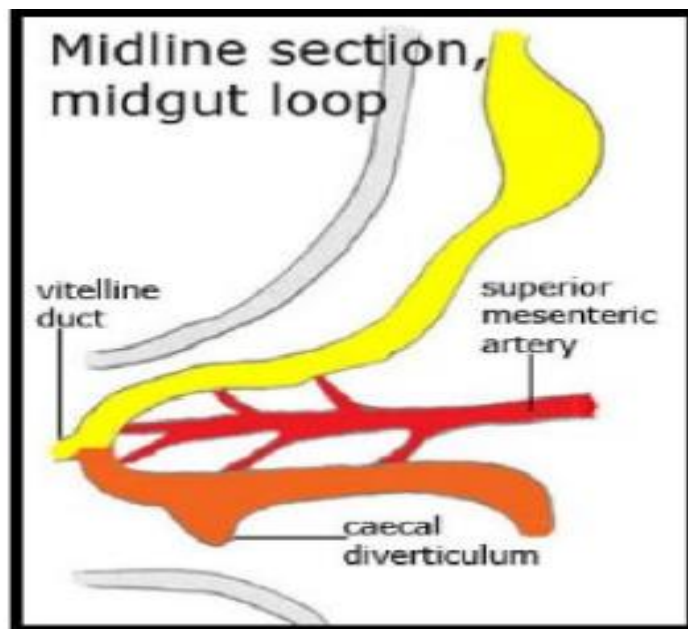

Fig.1 .Embryology of appendix

The gut continues to stretch as parts of primitive mesentery fuse to fix the duodenum, ascending and descending colon to the posterior abdominal (figure.1). After the

formation of cecum, the appendix emerges as a bud from the cecum. Elongation and stretching of the colon separates the appendix and caecum. The appendix adopts various positions, seemingly at random when it is pushed away from caecum. No current literature has explained this process[6].

Histology of appendix

Histology of appendix mimics as that of colon from epithelium to the serosa. Simple columnar cells with mixed enterocytes, goblet cells, and membranous cells are seen in epithelium. Crypts contain enteroendocrine cells which are formed by discrete invaginations of epithelium. Individual crypts are separated by the lamina propria, which contains more lymphoid nodules than the colon [5.]

Anatomy of appendix

The length of appendix varies, ranging from 5 to 35 cm, average of 9 cm. Usually it arises near the ileocecal valve, from the posteromedial cecal border or from the cecal fundus. After the origin appendix can have a variable course, retrocecal being most common. Alternative routes include retroileal, preileal, pelvic, cross midline, and as far as into the hepatorenal recess. The surface marking most often used for the base of the appendix is the junction of the medial two thirds and lateral one third of the line joining umbilicus and right anterior superior iliac spine, popularly known as

McBurney's point.The three taeniae on the surfaces of the ascending colon and caecum converge towards the base of appendix, where they are attached to the longitudinal muscule coat of the appendix. Anterior taeniae (Taeniae libra) of the caecum, which is generally prominent and will be easily followed to the root of the appendix, is used as a guide. Congenital malformations of appendix are rare. Agenesis, Duplication and even more rarely triplication have been reported in literature. Diverticulitis occurring as potential complication of diverticula also reported. A mucosal fold may partially cover the appendiceal orifice, known as Gerlach's valve. The cecum and the appendix are moved out of the pelvis during pregnancy, such that the right upper quadrant should also be reviewed for evaluation of appendicitis[7].

Vascular supply

Mesoappendix contains the main appendicular artery, which arises from the lower division of the ileo-colic artery. Appendicular artey is seen entering the mesoappendix at a short-distance from the root of the appendix along with a branch of posterior caecal artery. This blood supply to the appendix varies considerably as shown in figure 2. Accessory arteries are commonly seen. In about 80% of the subjects, there are two or more accessory arteries. This is known as Dr.Sheshachalam's artery. This has got applied importance during appendicectomy.

Lymphatic Drainage

Lymphatic vessels pass to lymph nodes in the mesentry of the appendix and those along the ileo-colic artery.

Nerve supply

Nerves are derived from the vagus (parasympathetic nerves) and from superior mesenteric ganglia and celiac ganglia (sympathetic nerves). The nerves are distributed in plexus around ramification of superior mesenteric artery.
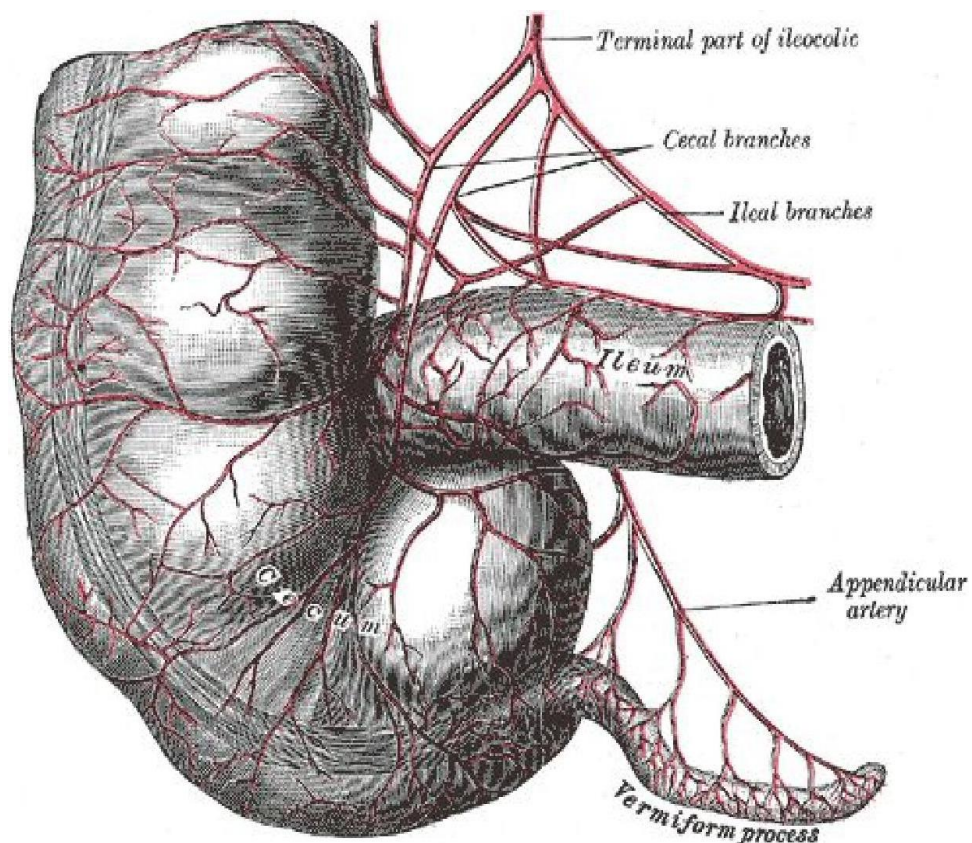
Figure.2 Blood supply of appendix

Functions of the appendix

The human vermiform appendix is usually referred to as a vestigial organ with no known functions. The appendix, as per current concept participates in the secretory immune system in the gut. Secretory immunoglobulins produced by Gut associated lymphoid tissue (GALT) function as a very effective barrier that protects milieu interior against the hostile milieu exterior. Removal of the appendix produces no detectable change in the immune function[8]

Applied anatomy of appendix [9]

Appendix is a susceptible site for inflammation and infection because

➢ It is long, tube like, with a narrow lumen

➢ It is cul-de-sac (blind ended)

➢ Rich in lymphoid tissue (known as abdominal tonsil)14

➢ Positional variations

➢ Has got false valve of Gerlach

➢ Supplied by an end artery, ie, appendicular artery

➢ Near to caecum, that is rich with microorganisms

APPENDICITIS

Epidemiology

Acute appendicitis is the most common surgical emergency worldwide [10]. There is an increase in incidence worldwide and the estimated life time incidence is 10% [11]. Westernization and rapid changes in food habits are attributed to this increase in incidence of appendicitis[12,13]. Incidence is higher at 2 to 3 decade, with slight male predominance. There is a difference in the life time risk according to geographical distribution with incidence being higher in South Korea (16%) and least in Africa. Seasonal variations have also been documented and appendicitis is more common during summer and spring [14]. However the clinical profile and presentation are different in the developing countries, leading to significant morbidity and even mortality due to delayed presentation and diagnosis.

Table .1 Causes of acute appendicitis

Acute Appendicitis	
Luminal obstruction Faecaliths, ,lymphoid hyperplasia, foreign bodies, **Primary Tumors** carcinoid, adenocarcinoma, Kaposi sarcoma, and lymphoma **Metastatic tumors -** colon and breast carcinoma	**Infective** **Bacterial-** Bacteroides fragilis,E. Coli , Peptostreptococus ,Pseudomonas , Bacteroides **Viral-** Adenovirus, Mumps, Meseales, influenza virus etc **Parasites-**Ascaris, schistosomiasis

Pathophysiology of acute appendicitis

The presence of lymphatic tissue in appendix suggests that it has a role in the immune system; however well-defined function had not been established yet. Acute inflammation of appendix is classified as:

Simple appendicitis - inflamed appendix, in the absence of gangrene, perforation, or abscess around the appendix

Complicated appendicitis – perforated / gangrenous appendicitis or the presence of peri-appendicular abscess.

The primary pathological event in acute appendicitis is due to its luminal obstruction because of varied causes as described in table 1. Faecal stasis and faecaliths are the most common cause of obstruction, followed by lymphoid hyperplasia, vegetable matter and intestinal worms. Abundant lymphoid follicles are seen in appendix of young adult population, which is also a cause of high prevalence of appendicitis in this age group [15]. Although the cause for appendicitis is multifactorial and full ranges of specific causes are unknown, recent researches are focused on genetic factors, environmental influences and infections. As obstruction of lumen occurs it leads to inflammation, causing rise in intraluminal pressures and ultimately leading to ischemia. Subsequently, the appendix enlarges and an inflammatory change occurs in

the surrounding pericaecal fat and peritoneum. If untreated, the inflamed appendix eventually perforates. Because of its small luminal capacity rapid distension of the appendix occurs and intraluminal pressures can reach 50 to 65 mm Hg. As luminal pressure increases, venous pressure is exceeded and mucosal ischemia develops. Once luminal pressure exceeds 85 mm Hg, vascular congestion and thrombosis of venules ensues leading to engorgement of appendix. Lymphatic and venous drainage is impaired and ischemia develops. Mucosa begins to ulcerate when hypoxia sets in, resulting in compromise of the mucosal barrier and leading to invasion of the appendiceal wall by intraluminal bacteria. This inflammation extends to include serosa, parietal peritoneum, and adjacent organs. As a result, visceral afferent nerve fibres that enter the spinal cord at T8 - T10 are stimulated, causing referred epigastric and periumbilical pain represented by these dermatomes. At this stage, somatic pain supersedes the early referred pain, and patients usually undergo a shifting of maximal pain to the right lower quadrant. If allowed to progress, arterial blood flow is eventually compromised, and infarction occurs, resulting in gangrene and perforation, which usually occurs after 24 and 36 hours. Anorexia, nausea, and vomiting usually follow as the pathophysiology worsens [16–18]. The rate of non-perforated appendicitis has overall decreased in male patients between 1970 and 2004, with even greater declines in female patients as shown in population based studies by Livingston et al

[19]. However, a similar decrease in rate of perforated appendicitis was not reported in perforated appendicitis due to improved imaging techniques over the decade.

Clinical features

Primary presenting complaint of patients with acute appendicitis is the abdominal pain. A study by Ortega-Deballon et al [20], Lane et al [21] and Hasan Erdam et al [22] that reported that the acute appendicitis diagnosis rate found in patients presenting with pain in the lower right quadrant was 65%, 55% and 68% respectively. Only in 50% of patients the diagnostic sequence of colicky central abdominal pain followed by vomiting with migration of the pain to the right iliac fossa is present. Typically, the patient describes a peri-umbilical colicky pain, which intensifies during the first 24 hours, becoming constant and sharp, and migrates to the right iliac fossa. The initial referred pain is due to visceral innervation of the midgut, and the localized pain is caused by involvement of the parietal peritoneum after progression of the inflammatory process. Loss of appetite is often a predominant feature. Constipation and nausea are often present with profuse vomiting that may indicate development of generalized peritonitis after perforation but is rarely a major feature in simple appendicitis [15–18,23]. Disease stratified approach after complete clinical and diagnostic evaluation is shown in table 2.

Table.2 Disease approach to acute appendicitis [24]

APPENDIX	Macroscopic appearance	Microscopic appearance	Clinical relevance
Normal appendix			
Normal underlying pathology	No visible changes	Absence of any abnormality	Consider other cause
Acute intraluminal Inflammation	No visible changes	Luminal neutrophils only with no mucosal abnormality	Might be the cause of symptoms, but consider other causes
Acute mucosal/submucosal Inflammation	No visible changes	Mucosal or submucosal neutrophils and/or ulceration	Might be the cause of symptoms, but consider other causes
Non-perforated appendicitis			
Suppurative/phlegmonous	Congestion, colour changes, increased diameter, exudate, pus	Transmural inflammation, ulceration, or thrombosis, with or without extramural	Likely cause of symptoms

		pus	
Complex appendicitis			
Gangrenous	Friable appendix with purple, green, or black colour changes	Transmural inflammation with necrosis	Impending perforation
Perforated	Visible perforation	Perforation	Increased risk of postoperative complications
Abscess	Mass found during examination or abscess seen on preoperative imaging or during surgery	Transmural inflammation with pus with or without perforation	Increased risk of postoperative complications

Diagnosis of acute appendicitis

Biomarkers

There is not a single laboratory marker for discriminating acute appendicitis from other causes of acute abdominal emergencies. Classical presentation usually reveals a mildly elevated leukocytosis with a left shift. The white blood cell (WBC) count is

elevated in 70% to 90% of patients with acute appendicitis. Likewise, neutrophilia greater than 75% will occur in the majority of cases. Measurement of C-reactive protein (CRP), an acute phase reactant, has been studied but an elevated CRP appears to have a sensitivity of 47% to 75% and specificity of 56% to 82% in acute appendicitis [19]. Serotonin or 5-hydroxytryptamine (5HT) is a useful marker in the diagnosis of appendicitis, where it levels are elevated in inflammation and its metabolites are excreted in urine helpful in diagnosing acute appendicitis with sensitivity of 58% to 98% and 48% to 100 % specificity in adults within the first 48 hours of presentation [25,26].These inflammatory markers such as serum interleukin 6, serum phospholipid A2, procalcitonin ,CRP and serotonin were used to diagnose acute appendicitis , since they have low specificity with high false-positive and negative rates they are not useful in current clinical practice as diagnostic biomarkers in diagnosing acute appendicitis [27,28].

Risk scores used in acute Appendicitis

Individually each clinical signs and laboratory test have poor accuracy in diagnosing appendicitis. Combination of presenting signs and symptoms along with laboratory data were used to stratify risk as low, intermediate and high in patients with appendicitis . Scoring system widely used are ALVARADO [25] scoring system has good sensitivity but low specificity, which limit its clinical impact and only few

surgeons rely on this to take clinical decision. A new scoring system named RIPASA [3] score is being used currently to outperform Alvarado scoring system have been developed and its accuracy is being established in cases with acute appendicitis in Asian population. Alvarado score and modified Alvarado scoring system were the two commonly used scoring system used in western population and its sensitivity and specificity range from 53%-88% and 75%-80%, respectively [30]. These scoring systems have low sensitivity and specificity when applied to Middle Eastern and Asian population [31,32]. Thus need to evaluate RIPASA scoring system is necessary which have high sensitivity and specicity in our population.

ALVARADO SCORING (AS) SYSTEM

In 1988 based on retrospective data analysis of 305 patients presenting with abdominal pain suggestive of acute appendicitis Alvarado published a scoring system. He found out that study eight predictive factors have diagnostic value in diagnosing acute appendicitis and assigned each factor a value of 1 or 2 based on their diagnostic weight. A score of 1 was given for 6 variables: migration of pain to right lower quadrant (RLQ), fever, rebound tenderness, anorexia, nausea or vomiting, and shift of leucocytes to left. A score of 2 was given for RLQ tenderness and raised leucocyte count more than 10,000cells/mm^3. The likelihood of appendicitis and specific management recommendations are given based on the total score. A score of 5 or 6 is

"compatible" with the diagnosis of acute appendicitis and recommends the clinician observe or serially examine the patient. A score of 7 or 8 is "probable" appendicitis and a score of 9 or 10 is "very probable" appendicitis and recommends surgical intervention [29] shown in table .3

Table.3 Alvarado scoring system

COMPONENTS	SCORE
Pain migration to RIF	1
Anorexia	1
Nausea/ vomiting	1
RIF tenderness	1
Rebound tenderness	2
Fever	1
Raised WBC	2
Shift of WBC to left	1
TOTAL SCORE	**10**

Guidelines for management according to total ALVARADO score:

9 to 10 = definite acute appendicitis

7 to 8 = high likelihood of appendicitis

5 to 6 = compatible with, but not diagnostic of appendicitis.

0 to 4 =extremely unlikely (but not impossible) to have appendicitis.

In 2011 a systematic review of 42 studies done by Ohle et al [33] using Alvarado score cut off 5 (to rule out appendicitis)and 7(rule in appendicitis) found that the sensitivity of 99% (95% CI: 97–99%) and specificity of 43% (36–51%). At a cutoff of 7 (criteria to proceed directly to surgery) sensitivity was 82% (76–86%) and specificity was 81% (76–85%). Based on these results, they concluded score of 5 or lower provide a good rule out score and score of 7 is not helpful in ruling in appendicitis. The score is inconsistent in children with intermediate and high risk group with over prediction of appendicitis in women across all risk strata.

A retrospective analysis by Mckay et al [34] by applying Alvarado score to 150 of patients aged 7 and older who presented with abdominal pain to emergency department found that sensitivity of Alvarado scores 3 or lower was 96.2% (53/55), and the specificity 67% (2/3). Patients with Alvarado scores 7 or higher had an incidence of acute appendicitis with sensitivity of 77% and the specificity 100%. The sensitivity of equivocal Alvarado scores, defined as scores of 4 to 6, for acute appendicitis was 35.6%, and the specificity of 94%. They concluded that lower Alvarado scores help in ruling out appendicitis and higher scores lack sensitivity.

In a retrospective study of 215 adults and children who presented with acute abdominal pain, Gwynn et al [35]found that 8.4% (12 of 143) of subjects with appendicitis had an Alvarado score below 5, thus Alvarado score lacks in predicting

appendicitis when lower scores are seen where their predicting sensitivity improved with computerized Tomography(CT) imaging of appendix.

In a prospective validation of appendicitis score in 849 children presenting with acute abdominal pain, 37% of children had appendicitis with intermediate Alvarado score of 3 to 6, thus Alvarado score had been overlooked [36].

A cross sectional study done to assess the Alvarado score in reducing negative appendectomy rates in Karachi showed that the overall negative appendectomy rate was 28.7% (males: 28.2%, females: 30%). Sensitivity and specificity of the Alvarado scoring system were found to be 93.5% and 80.6% respectively. Positive and negative predictive values were 92.3% and 83.3%, respectively, and accuracy was 89.8%.Thus showed that Alvarado score helps in ruling out negative appendectomy rates [37].

Some studies shows that application of CT imaging along with Alvarado scoring system helps in improving diagnostic and accuracy and negative appendectomy rates [38].

Application of Alvarado score in132 patients with suspected appendicitis by Jang et al [39] found that 87 patients had surgery with the intention to treat appendicitis and 10 patients did not have appendicitis. The diagnosis of acute appendicitis was highly

accurate for an Alvarado score above 6 (90.9%). None of the patient with score less than 4 had appendicitis.

Jalil et al [40] done a study in 2011 in Pakistan to evaluate the diagnostic predictivity of Alvarado scoring system and found that overall sensitivity, specificity, positive predictive value and negative predictive value of Alvarado score for acute appendicitis were 66%, 81%, 96%, 29% respectively and further adds that in men scores more than 7 had higher diagnostic accuracy than compared to women.

Studies show that Alvarado scores less than 4 during initial presentation and later sent home after monitoring for a short period to rule out appendicitis in ER had been found to have appendicitis later during review visits [41,42].

In study by Khan et al [32] 17 of 100 patients had AS< 4 , they were discharged ,3 patient but returned with 48 hrs and had appendicitis(17%) underwent surgery with positive histology. Simiarly Winn et al [42] study also shows that 12 patients (9.8%) of the study population where discharged home when they had AS score <4, later found to have appendicitis in 4 people , with 2 of them underwent surgery with negative histology .High rate of appendicitis was found when AS < 4 in a study of which 13

of 14 (92.8%) patient with score less than 4 underwent surgery found to have acute appendicitis [41].

Yücel Yüksel et al [43] showed highest percentage of appendicitis in patients with AS score < 4 having with 13 out of 25 (56.5%) patients had appendicitis requiring surgery. Further he concluded that patient's age in conjunction with AS has no efficacy in detecting appendicitis; however Body Mass Index < 25 is associated with high appendicitis. Thus studies show that patient with less AS score can be missed without applying clinical and diagnostic imaging. Thus alternative scoring system with high accuracy and positive predictive value needed in decreasing the negative appendectomy rate in this group of population .Based on the systematic reviews it was concluded that Alvarado score of 5 have high sensitivity in ruling out appendicitis, however it lacks specificity where intermediate scores does not reliably determine the need for surgery without further clinical assessment and testing [33,44,45].

RIPASA scoring in acute appendicitis

The components of original RIPASA score [3] (table. 4) are patients' demographics (age and gender), symptoms (RIF pain, the migration of pain to the RIF, nausea and vomiting, anorexia, and the duration of symptoms), clinical signs (RIF tenderness, guarding, rebound tenderness, Rovsing's sign, and fever), and laboratory investigations (elevated white cell count and negative urinalysis) RIPAS Hospital.

The probability of each of the 14 parameters was calculated and scores of 0.5, 1.0, or

2.0 points were allocated to each parameter based on its probability in patients with

acute appendicitis.

Table.4 RIPASA SCORING SYSTEM

	score
Patient's demography	
• Male	1.0
• Female	0.5
• Age <40 yrs	1.0
• Age ≥40 yrs	0.5
Symptoms	
• RIF pain	0.5
• Pain migration to RIF	0.5
• Anorexia	1.0
• Nausea & vomiting	1.0
• Duration of symptoms <48 hrs	1.0
• Duration of symptoms >48 hrs	0.5
Signs	
• RIF tenderness	1.0

• Guarding	2.0
• Rebound tenderness	1.0
• Rovsing's sign	2.0
• Fever >37∘c, <39∘c	1.0
Investigations	
• Raised WCC	1.0
• Negative urine analysis	1.0
Total Score	

* Guidelines for management according to total score:

<5 = Probability of acute appendicitis is unlikely.

5-7.0 = Low probability of acute appendicitis.

7.5-11.0 = Probability of acute appendicitis high

>12 = Definite acute appendicitis

RIPASA score was assessed in 267 patients with acute appendicitis by Butt et al [46] showed that Sensitivity of RIPASA score was 96.7%, specificity 93.0%, diagnostic accuracy was 95.1%, positive predictive value (PPV) was 94.8% and negative predictive value (NPV) was 95.54%. Some studies quote high sensitivity for RIPSA and ALVARADO were equally same 88% and 83% respectively with less specificity in diagnosing appendicitis [47].

Study done by Hasan Erdam et al [22] in 2013 to assess the reliability and practical applicability of the widely used Alvarado, Eskelinen, Ohhmann and RIPASA scoring systems in patients with suspected acute appendicitis, the sensitivity and specificity levels of the scoring systems were 82% and 75% for the Alvarado, 100% and 28% for the RIPASA, 96% and 42% for the Ohmann, and 100% and 44% for the Eskelinen scores. The negative appendectomy rates of the Alvarado and RIPASA was found to be 12% and 25% respectively .When a cut-off value for the Alvarado system was set at 6.5, its sensitivity was found to be 81% and cut-off value for the RIPASA system was set at 10.25, its sensitivity was calculated as 83.1%.Thus RIPASA score have high specificity than Alvarado score.

According to literature, the criteria for good diagnostic quality, score should have 15% rate of negative appendectomies, a 10% rate of negative laparotomies, a 35% rate of potential perforations, a 15% rate of overlooked perforations and a 5% rate of overlooked acute appendicitis [48,49]. Although the accepted rate of negative appendectomy is approximately 15%-20% Negative appendectomy rate varies from 20% to 40% as reported by surgeons in suspected cases of appendicitis [50,51].

Study done in India by Nanjundaiah N et al [52] showed that sensitivity of RIPASA and Alvarado score were 96.2% and 58.9% and their specificity were 90.5% and 85.7%

respectively. RIPASA score correctly classified 96 % of all patients confirmed with histological acute appendicitis to the high probability group (RIPASA score greater than 7.5) compared with 58.9% with Alvarado score (Alvarado score greater than 7.0; p-value less than 0.001).

Ina retrospective study done by chong et al [3] to assess the RIPASA score in patients who had undergone surgical appendectomy showed that RIPASA had 88% sensitivity, 67% specificity, with a PPV of 93 percent and NPV of 53 percent in patients with acute appendicitis. The negative appendectomy rate decreased significantly from 16.3 percent to 6.9 percent, which was a 9.4 percent reduction (p is 0.0007) when the ROC optimal cut off was kept at a score of 7.5. Another study done in India by Sarang Rathod et al [53] showed that RIPASA score had sensitivity and specificity of 82.61% (95% CI 72.02, 89.76) & 88.89% (95% CI 67.2, 96.9) respectively. It had a PPV of 96.61% (95% CI 88.46, 99.07), NPV of 57.14% (95% CI 39.07, 73.49), and a diagnostic accuracy rate of 83.91% (95% CI 74.78, 90.17), thus helping in diagnosing of acute appendicitis.

Recent observational study done in Mexico comparing the RIPASA and modified Alvarado scoring system showed that RIPASA score with 8.5 as the optimal cutoff value had sensitivity (93.3%), specificity (8.3%), PPV (91.8%), NPV (10.1%) which is comparable to Modified Alvarado score with 6 as the optimal cutoff value had

sensitivity (75%), specificity (41.6%), PPV (93.7%), NPV (12.5%).Thus concluded RIPASA score had to added advantage over modified Alvarado score when applied to patient with acute appendicitis [54].Both the sensitivity and specificity of Alvarado and RIPASA scoring system vary with age, gender and duration of symptoms .Thus there is a need for evaluation of RIPASA score in our population.

Imaging techniques to diagnose acute appendicitis

Ultrasonogram

Ultrasound (US) is rapid, non-invasive with no radiation exposure making it first tool of imaging in patients with acute appendicitis without age or gender indifference [55,56]. Thorough evaluation of abdomen and pelvis is necessary to rule out appendicitis in patient presenting with acute abdominal pain suggestive of appendicitis. The specific US approach to the right lower quadrant should include graded compression US. Retrocaecal appendix is well visualized when patient lies in left lateral decubitus position. Normal and gas-filled loops and muscular layer of the anterior and posterior abdominal will obstruct the view of appendix in such cases the abnormal bowel loops or the obstructed appendix will be non-compressible and optimally seen on the graded compression image. The appendix appears on ultrasound as a lamellated, elongated, blind-ending structure. Unlike normal bowel, the inflamed appendix is fixed, non-compressible, and appears round on transverse images. Traditionally, the diagnosis of

appendicitis is made when the diameter of the compressed appendix exceeds 6 mm .In contrast, the thick-walled and non-compressible appendix, maintained in a fixed position by the compressing transducer, will show circumferential colour when inflamed. Appendiceal perforation can be diagnosed when the appendix demonstrates irregular contour or when periappendiceal fluid collections are identified .Appendicoliths are seen in 30% of appendicitis cases and may confer a higher risk of perforation [23,56]. Doppler examination does not rule out normal from acute appendicitis.Hussain et al [58] found that the diagnostic accuracy of ultrasonogram in acute appendicitis had has sensitivity of 88%, specificity of 92%, positive predictive value of 94%, negative predictive value of 86%, and overall accuracy of 90% with diameter of 7 mm or larger followed by non- compressibility of inflamed appendix had high accuracy in diagnosing appendicitis.

Computerized Tomography

Computerized Tomography (CT) is the reliable diagnostic imaging of choice in patients with normal, doubtful, suboptimal cases of appendicitis with US. CT is found to be superior to graded compression US in the diagnosis of acute appendicitis in thin patients with equivocal appendicitis, staging the periappendiceal inflammation and more accurate in demonstrating normal appendix thereby helping excluding appendix from other acute abdominal surgical emergencies. Analysis of the data for CT and US

revealed similar specificities (89% *vs* 91%, respectively) and positive predictive values (96% *vs* 95%, respectively); however, CT demonstrated higher sensitivity (96% *vs* 76%), accuracy (94% *vs* 83%), and negative predictive value (95% *vs* 76%). CT was shown to be more accurate in staging inflammation and ruling out other differential diagnosis of acute abdominal pain [15,55,56,59–61].

Magnetic Resonance Imaging (MRI)

On MR imaging, the appendix is identified as a tubular structure with intraluminal T1 and T2 prolongation. Appendicitis is diagnosed using thresholds of the size used for CT. Inflammatory changes are visualized as T2 hyperintensity in the periappendiceal fat. Although the use of MR imaging avoids ionizing radiation, it has several disadvantages, including high cost, long duration of studies, and limited availability on an emergent basis.

Table. 5Differential diagnosis of Acute Appendicitis.

Frequent causes	Rare causes
Acute gastroenteritis	Epiploic appendicitis
Acute mesenteric adenitis	Acute pancreatitis
Acute cholecystitis	Colonic and appendiceal diverticulitis
Intestinal intussusceptions (children)	Intestinal obstruction
Perforated peptic ulcer	Crohn's disease
Meckel's diverticulitis	Yersiniosis
Rectus sheath haematoma	Henoch-Schönlein purpura
Right Spighelian hernia	Diabetic ketoacidosis
Urinary tract infection	Right pyelonephritis
Right uretheral stone	Right pneumonia
Ruptured right Graafian follicle	Ruptured ectopic pregnancy
Right salpingitis	Pain on the right 10th and 11th dorsal nerves
Endometriosis	Porphyria
Ovarian torsion	Other abdominal inflammatory conditions
Acute gastroenteritis	Epiploic appendagitis

Complications

1. Perforation

   The overall incidence of perforation is 16% to 39%. Perforation rates are strongly age related and are highest in the very young (40% to 57%) and in the elderly (55% to 70%), in whom misdiagnosis and delayed diagnosis are common. Risk for perforation occurs when patient presents after 36 hours of clinical symptoms [17,62].

   2. Abscess

   3. Appendiculo-cutaneous fistula

   4. Appendico- vesical fistula

   5. Peritonitis.

TREATMENT STRATEGIES

Non-operative management

Non-operative management with antibiotics has been established for the treatment of uncomplicated appendicitis. Despite evidence suggests that uncomplicated appendicitis often resolves with antibiotic therapy, the non-operative management of uncomplicated acute appendicitis remains largely unexplored [63,64]. However limited studies have shown that outcomes with only antibiotic therapy are equivalent to those of appendectomy [63–65]. In patients where advanced appendicitis or complications of

appendicitis is deemed less likely and confirmed by radiological tools, these patients can be managed with active observation along with antibiotic therapy. There are several combination of antibiotics described in the literature, all of them with good results [65,66]. Success rates have been reported as between 88% and 100%, with the incidence of recurrent appendicitis 5% to 38% with antibiotic treatment. The conservative management for acute appendicitis without complications consists of consists of bowel rest and parenteral fluids. Antibiotics active against both gram-negative and anaerobic organisms should be administered taking into account local resistance patterns and the potential for heterogeneous causes. Nearly 95% success rate is achieved in patients who are treated with non-operative management only. The progression to diffuse peritonitis during non-operative treatment for palpable periappendiceal mass is 0.6% to 5%. Progression to peritonitis is a concern in patients on chemotherapy, on prolonged steroids, on immunosuppression and in elderly patients, because these patients without a palpable mass may not have developed localization and isolation of appendicitis where early diagnosis would be missed leading to complications. In these kind of patients non-operative management should be avoided [63,64,67]. A recent meta-analysis of randomized controlled trials comparing antibiotics with appendectomy has shown that even though antibiotic treatment of acute appendicitis have high success rate of 77% to 95%.Inspite of high success rate

these studies also revealed a failure rate at 1 year of around 25–30% with need for

readmission or surgery as shown in table 6 [68].

Table.6 Studies comparing antibiotic vs surgery in patient with acute appendicitis

Study	Design	Patient sample	Age	Diagnosis	Antibiotics	Recovery rate	1 year failure rate
Eriksson et al (1995)[69]	RCT	400	18yrs	USG	IV 2 days, oral 8 days	95%	60%
Styrud et al (2006) [70]	Multicentre RCT	252	18-50yrs	clinical	IV 2 days Oral 10 days	88%	14%
Hansson et al (2009) [71]	RCT	369	>19yrs	Clinical & Imaging	IV 1 day Oral 9 days	91%	14%
Turhan et al (2009) [72]	prospective	290	>16 yrs	CT / USG	IV 3 days Oral 7 days	82%	10%
Vons et al (2011) [73]	Muticentre RCT	239	>18yrs	CT	IV 2 days Oral 8 days	88%	25%
Svensson et al (2015) [74]	RCT	50	5-15 yrs	USG/CT	IV 2days Oral 8 days	92%	5%
Di Saverio et al (2014) [75]	Prospective	159	>14 yrs	Clinical plus USG/CT	Total 5 to 7 days	88%	13%
APPAC study (2015) [76]	Multicenter RCT	530	18to60 yrs	confirmed by CT	IV 3 days Oral 7 days	94%	27%

Operative management

The patient's general condition and the state dictate the nature of surgical appendectomy. Traditionally, open appendectomy has been done through a muscle splitting gridiron incision over McBurney's point made perpendicular to a line joining the umbilicus and anterior superior iliac spine or through a more cosmetically acceptable Lanz's incision. The advents of laparoscopy lead to fall in the rate of open procedures done for appendicitis [24,77]. The median or a right medial paramedian pararectal incision are indicated in indicated in patients with diffuse peritonitis, in order to aspirate the septic secretion and to treat all complications. Abdominal drainage did not prove to have any benefit and drains are useful only in patient with walled of abscess cavities.

Timing of surgery

Controversy exits still regarding the timing of surgery in cases of acute appendicitis because of varied presentations in a day. A meta-analysis of 11 studies showed that short in-hospital delays of 12–24 hours in selected, stable patients were not associated with increased risk of perforation (odds ratio 0.97, 95% CI 0.78-1.19, p= 0.750) [24]. In patients with an equivocal diagnosis planned early diagnosis can improve the diagnostic rate and enable early discharge from hospital without increasing the risk of complications [27,78]. In selected cases by doing interval clinical assessment and

allowing a delay or, rather, a longer observation time in patients with equivocal signs, with increases diagnostic accuracy without raised risk of perforation in acute appendicitis [24]. Sometimes delays can help in avoidance of night-time operations and increased access to daytime technological resources when available [79].

Laparoscopy

In Children, obese individuals with favorable outcomes and a low risk profile cases, laparoscopy can be safely done without any complications. A systematic review found that laparoscopic appendectomy when compared to open surgery reduces wound infections, postoperative pain, length of hospital stay, and time taken to return to work in adults. In children, laparoscopic appendectomy reduced the number of wound infections and the length of hospital stay compared with open surgery. However there is no significant difference in postoperative pain, time to mobilization, or proportion of intra-abdominal abscesses were seen [80–82].

Duration of peri-operative and post-operative antibiotics

Peri-operative prophylactic antibiotic can be initiated as soon as the patient is scheduled for surgery and should be started before commencement of skin incision. Antibiotic with broad coverage to gram negative organism should be included in most of the cases .Most of the studies showed metronidazole have been used alone or in

combination. The antibiotic regimen selected should be effective against the bacterial flora found in the appendix, which consists chiefly of anaerobes and gram-negative coliforms. Anaerobes make up most of the colonic flora and include *Bacteroides*, *Clostridial*, and *Peptostreptococcus* species. Gram-negative aerobes, such as Escherichia coli, *Pseudomonas aeruginosa*, *Enterobacter*, and *Klebsiella*, are also important. For non-perforated appendicitis, a single agent such as cefoxitin, cefotetan, ampicillin/sulbactam, ticarcillin/clavulanate, or piperacillin/tazobactam is typically prescribed. In cases of perforated appendicitis, most surgeons select either traditional "triple" antibiotics (ampicillin, gentamycin, and clindamycin or metronidozole or piperacillin/tazobactam) or a combination such as ceftriaxone/metronidozole or ticarcillin/clavulante plus gentamycin [62,65,83] .A meta-analysis of randomized trials comparing prophylactic preoperative antibiotics to placebo showed a significant reduction of wound infection with either a single agent (11 studies, 2191 patients, odds ratio 0.34[95% CI 0.25-0.45]) or several agents (two studies, 215 patients, odds ratio 0.14 [95% CI 0.05-0.39]) [84].Postoperative antibiotic for simple inflamed appendix are not recommended [85]. Presently for complex perforated appendicitis 3–5 days of postoperative intravenous antibiotics are recommended .Literature also suggests that 3 days of post-operative antibiotic in acute appendicitis is as effective as 5 days [86].

Outcome

Appendectomy is a relatively safe procedure with a mortality rate for non-perforated appendicitis of 0.8 per 1000. The mortality and morbidity are related to the stage of disease and increase in cases of perforation; mortality after perforation is 5.1 per 1000. The average rate of perforation at presentation is between 16% and 30%, but this is significantly increased in elderly people and young children, in whom the rate can be up to 97%, usually because of a delay in diagnosis. Wound complications, ileum, and partial small bowel obstruction are the most common complications [21]. Mortality is reported as 1–4%, in low-income and middle-income countries, and therefore it might represent a useful marker for care and hospital quality across continents [87,88]. Patients from rural locations in both developed and developing countries have longer duration of symptoms with higher rates of perforation compared to urban population, however ethnic predisposition to perforation should be taken into account [89]. The negative appendectomy rates have fallen over the decades due to improved usage of imaging techniques in patients with equivocal cases and it ranges from 9% to 27.3% across India, China, sub-Saharan Africa, North Africa, and the Middle East [87,90]. These negative appendectomy rates are further reduced to 6% in USA and 6.1% in Switzerland; this is due to improved preoperative CT imaging and use of laparoscopic techniques [91,92]. Overall short term complication rates of 8.2-31.4%, wound infection rates of 3.3-10.3%, and pelvic abscess rates of up to 9.4%

have been reported [93]. Long term morbidity comparing open with laparoscopic surgery showed very little difference in relation to clinical relevance and data also showed that negative appendectomy was associated with increased mortality at 30 days and at 5 years compared with perforated appendicitis [94]. Mortality from appendectomies has been strongly linked to 2 factors in particular namely patient age and diagnosis at time of surgery [17,62].

Future Considerations

The appendix is still a mysterious organ for varied reasons. Despite the over 150 years of intense research and many thousands researches developed on all fields related to the appendix we still do not know what is the role of this organ. The pathophysiology of appendicitis is still not established and adenocarcinoma [95] being the main cancer of all the digestive system where as in appendix the characteristic tumor is the carcinoid [96]. Still function of appendix is controversial [5]. The advances in technology lead to better surgical decision and safer operations with best results without any complications .So correct application of technology, for both diagnosis and treatment, needs to be rationalized, justified, and optimized through formal research programs.
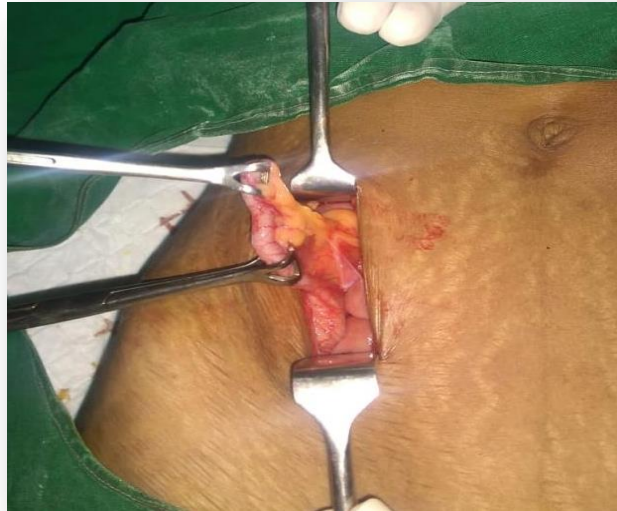
Fig 1: Normal appendix
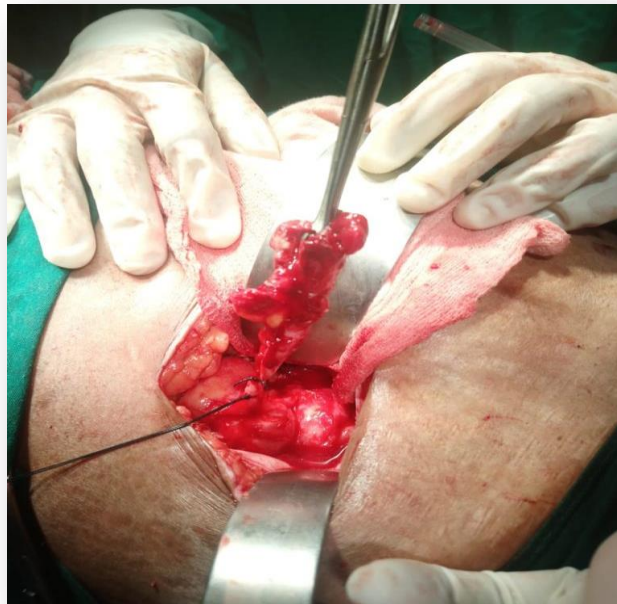
Fig 2: Perforated appendix

MATERIALS & METHODS

MATERIALS AND METHODS

TYPE OF STUDY: Prospective study

SETTING: Patients admitted to department of surgery with right iliac fossa pain and tenderness with symptoms suggestive of acute appendicitis at R.L.Jalappa Hospital and Research Centre, Tamaka, Kolar attached to SRI DEVARAJ URS MEDICAL COLLEGE between Dec-2016 and Nov 2018**.**

INCLUSION CRITERA:

- The study population includes adult patients presenting with right iliac fossa pain and tenderness with symptoms and signs suggestive of acute appendicitis.

EXCLUSION CRITERIA:

1. Pregnant women

2. Patients presenting with any form of non-RIF pain

3. Patients with right iliac fossa mass

4. those who had undergone other emergency laparotomy where appendectomy was also performed as part of the procedure

5. Patients with previous history of urolithiasis and Pelvic Inflammatory Disease

Sample size

A total sample size of 70 cases were required to achieve 90% power to detect a change in sensitivity from 0.8 to 0.967 using a two sided binomial test and 57% power to detect a change in specificity from 0.8 to 0.93 using a two sided binomial test. The target significance level is 0.05 and actual significance level achieved by the sensitivity test is 0.0335 and achieved by the specificity test is 0.0335.The prevalence of the disease was considered at 0.5. Sensitivity and specificity values were taken from the study by Muhammad Qasim Butt et al [46].

Methodology

All the patients presenting with right iliac fossa pain and tenderness in surgical units of our tertiary care hospital will undergo clinical examination with relevant investigations after obtaining an informed consent. The data regarding demographics(age, gender), presenting symptoms(RIF pain, the migration of pain to the RIF, nausea and vomiting, anorexia and the duration of symptoms),clinical signs (RIF tenderness, guarding, rebound tenderness, Rovsing's sign and fever) and laboratory investigations (white cell count and urinalysis) will be recorded. In suspected/ equivocal cases imaging studies (USG/CT) will be taken as required by the surgeon. The decision on appendectomy will be solely based on surgeon's clinical judgment after taking into consideration all the findings of clinical, laboratory and

radiological investigation. RIPASA and Alvarado scores will only be done for the study purpose. A score of 7.5 is the optimal cut off threshold for RIPASA and 7 for Alvarado scoring system .Patients will be monitored following admission, surgery and till discharge from the Hospital. Daily follow up will include monitoring of vitals thrice a day, systemic examination once a day. Histopathology findings of the operated case will be collected and correlated with either score.

Statistical Analysis

Data were analysed using SPSS Version 21 (IBM Corp). Descriptive data were presented using Percentages or by using Mean and Standard deviation as the case may be. Chi square test was used to compare the categorical data. Parametric tests will be applied to the normally distributed data and nonparametric tests will be applied to data with normal distribution. Cross tables will be prepared for sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and the diagnostic accuracy values of the scoring systems. Cohen's kappa coefficient (κ) is a statistic which measures inter-rater agreement for qualitative (categorical) items will be applied to test the best among the two scoring system. P value of < 0.05 was considered as significant association.

RESULTS

RESULTS

Table. 7 Age wise distribution of study participants

Age (Years)	Frequency	Percentage
Less than 20	34	48.6
20 – 29	12	17.1
30 – 39	19	27.1
40 and above	5	7.1

Totally 70 cases (31 males& 39 females) were enrolled into the study, among them majority 39(55.7%) were females. 48.6% of the study participants were below less than 20 years of age followed by 17.1% between 20 to 29 years. The Mean ($\pm$ SD) age of the participants was 24.71$\pm$9.44 years (range20 to 60) as shown in table (7&8) and figure 3.

Gender distribution of the participants

39(55.7%)   31(44.3%)

■ Male   ■ Female
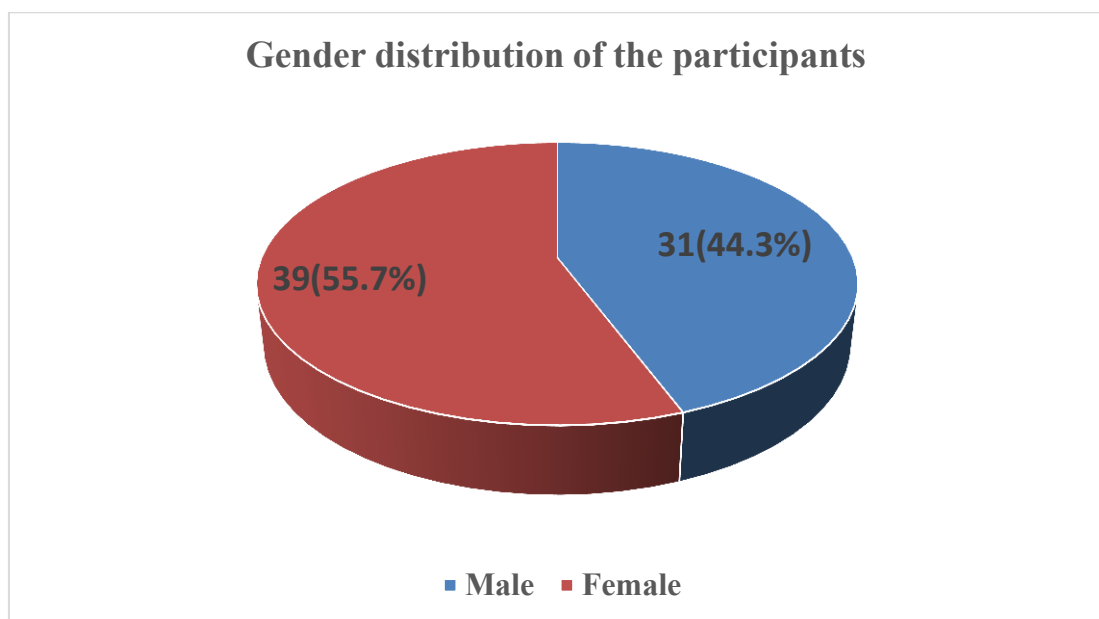
Figure 3.Gender distribution of study population

Table.8 Demographic characteristics of study group

Characteristic	Frequency	Percentage
Gender		
Male	31	44.3%
Female	39	55.7%
Age (Mean ± SD)	24.71 ± 9.44	
RIPASA group		
Appendicitis likely (score > 7.5)	29	41.4%
Appendicitis unlikely (score< 7.5)	41	58.6%
Alvarado group		
Appendicitis likely (score > 7)	38	54.3%
Appendicitis unlikely (score < 7)	32	45.7%
Characteristic	**Mean**	**S.D**
Hospital stay(in days)	5.04	1.05
Duration of illness(in hours)	41.04	26.10

The mean (± SD) duration of the illness was 41.04 ±26.10 hours and the mean duration of hospital stay was 5.04±1.05 days.
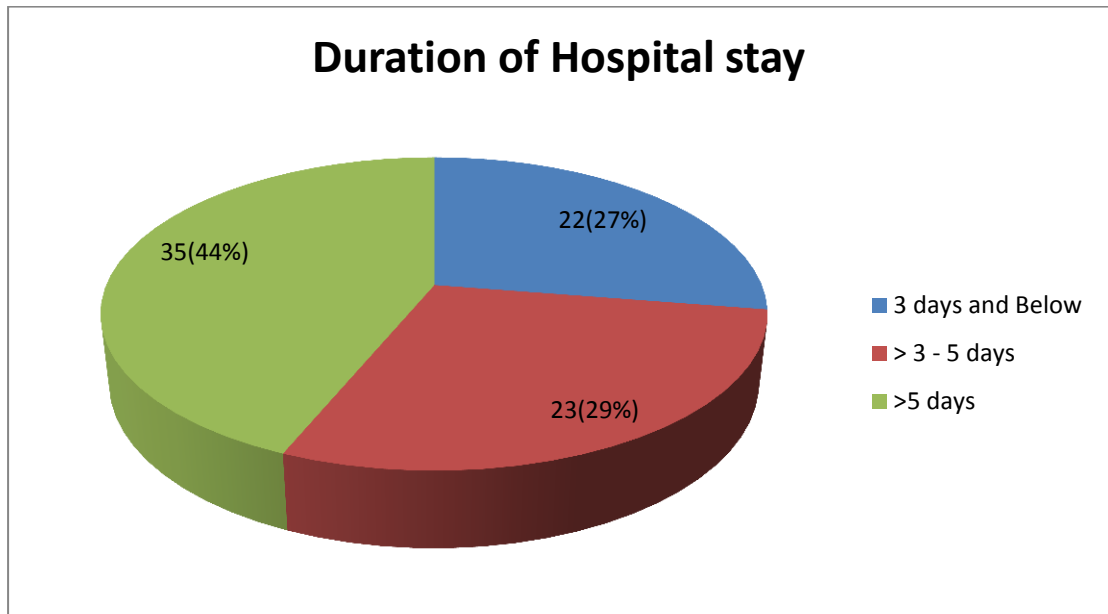
Figure.4. **Duration of hospital stays of the patients with appendicitis.**

35(44%) cases had hospital stay of more than 5 days followed by 23(29%) cases stayed for 3 to 5 days and 22(27%) cases stayed less than 3 days as shown in figure 4.

When RIPASA score of >7.5 was applied to the study population for diagnosis of acute appendicitis, 41(58.6%) of the cases had score lees than 7.5 ruling out appendicitis, while 29(41.4%) patients were diagnosed to have appendicitis. Application of Alvarado score of >7 for the same case for diagnosis of appendicitis there is an increase in the number of case with appendicitis (38 out of 70), whereas 32 (45.7%)cases had score of < 7 , ruling out appendicitis by Alvarado scoring system as shown in table 8.
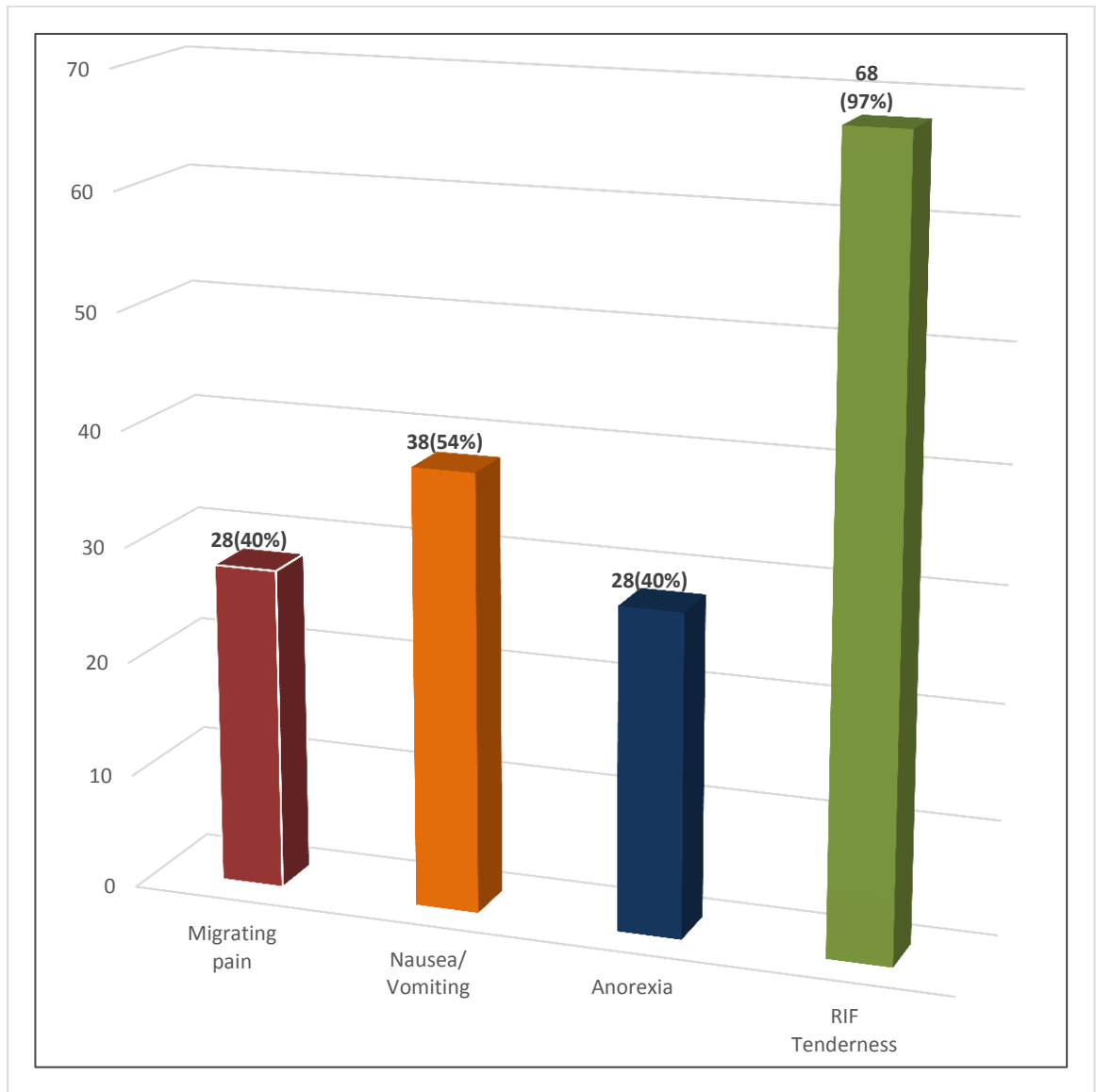
Figure.5 clinical characteristics of appendicitis cases

All 70 cases had RIF pain as presenting symptom and RIF tenderness was seen in 68(97%) of cases making it as the most common sign in our study. Clinical Symptoms such as fever, anorexia, nausea/vomiting and migrating pain was seen in 55(77%), 28(40%), 38(54%) and 28(40%) of cases respectively.
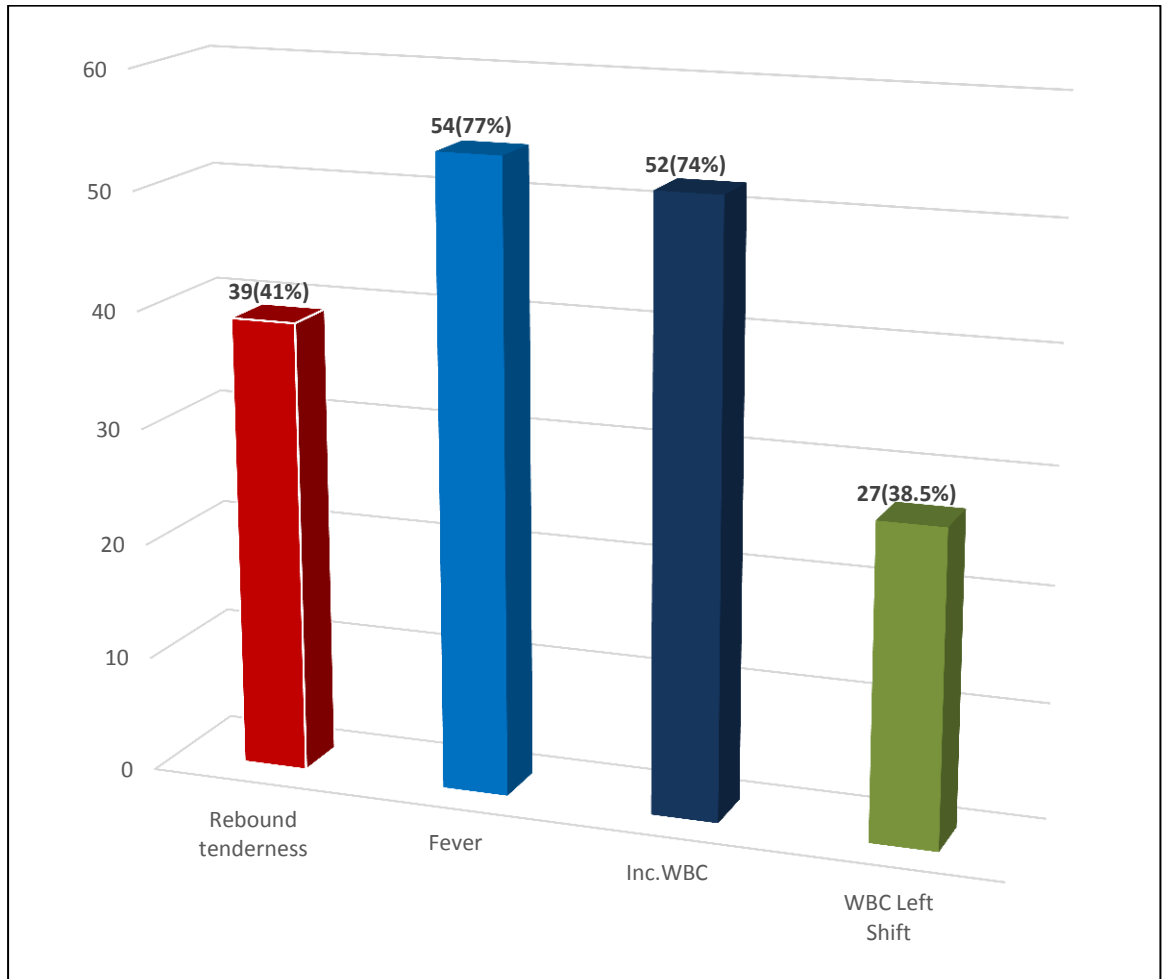
Figure.6 clinical characteristics of the appendicitis cases

Rebound tenderness, guarding and Rovsings sign was seen in 39(41%), 26(37%) and

4(5%) respectively. In laboratory analysis raised WBC count was seen in 52(74%) of

cases with left shift was seen in 27(38.5%) cases Urine analysis was normal in

48(69%) of the cases (figure5, 6&7).
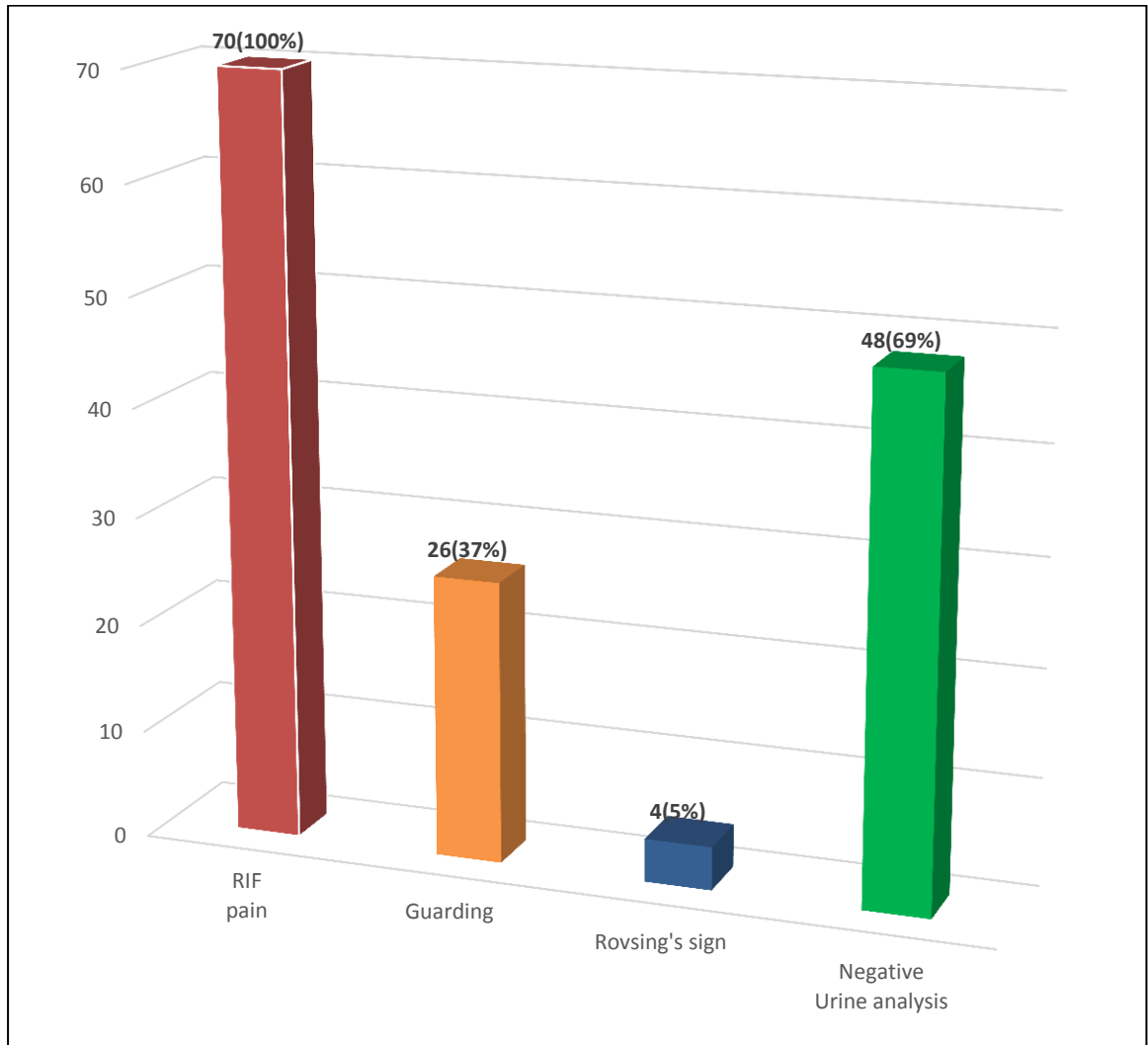
Figure.7 Clinical characteristics of appendicitis cases.

All 70 cases underwent appendectomy, in them 48(68.6%) cases underwent emergency appendectomy while appendectomy was delayed in 22(31.4%) cases due to equivocal clinical findings, imaging was required and added logistic reasons they cases had delay in undergoing surgery(table.11).

Table.9 **Distribution of patients according to Alvarado score**

Alvarado score	Positive Histology n (%)	Negative Histology n (%)
Alvarado Score >7	28 (82.35)	10 (27.76)
Alvarado Score <7	6 (17.65)	26 (72.24)

Out of 70 cases 36(51.4%) cases had histologically positive for appendicitis and in 34(48.6%) cases histology was inconclusive or negative. When Alvarado score of >7 (suggestive of appendicitis) was applied to the appendicitis cases the positive and negative histology were seen in 28(82.35) and 10 (27.76%) cases respectively. Alvarado score of less than 7 was seen in 6(17.65%) cases with positive histology and 26 (72.24%) cases with negative histology (table.9)

Table.10 Distribution of patients according to RIPASA score

RIPASA SCORE	Positive Histology n (%)	Negative Histology n (%)
RIPASA > 7.5	26 (76.48)	3 (8.33)
RIPASA < 7.5	8 (23.52)	33 (91.67)

Comparison of RIPASA SCORE with histology showed that, score > 7.5 had a positive and negative histology was seen in 26 (76.48%) and 3(8.33%) of cases respectively. Similarly comparison of score below score below 7.5 resulted in negative histology of 91.67% and 8(23.52%) cases with positive histology (table.10)

Table.11 Surgical characteristics of appendicitis cases

variable	N (%)
Management of the patients	
1. Delayed Appendectomy	22(31.4%)
2. Emergency Appendectomy	48(68.6%)
Total Emergency Appendectomy	
1. Histologically positive	36(51.4%)
2. Histology negative/Inconclusive	34(48.6%)
Mean Hospital Stay (Mean ± SD)	5.04 ± 1.06
Perforated Appendicitis	3(4.2%)
Postoperative wound infection	4(5.7%)
Patients Discharged without complications	66(94.3%)

Table.12 **Comparison of Diagnostic accuracy between RIPASA and Alvarado scoring**

Variable	RIPASA > 7.5	Alvarado > 7
Sensitivity	76.47	82.35
Specificity	91.67	72.22
Positive predictive value	89.65	73.68
Negative predictive value	80.49	81.25
Diagnostic accuracy	84.29	77.14

RIPASA score > 7.5 had a sensitivity and specificity of 76.47% and 91.67% respectively. Similarly, at optimal cutoff threshold of >7 the sensitivity and specificity of the Alvarado scoring system were 82.35% and 72.22% respectively. The positive predictive value and negative predictive value of RIPASA score was 89.65% and 80.49% respectively. The positive predictive value and negative predictive value of Alvarado score was 73.68% and 81.25% respectively. Even though the Sensitivity of RIPASA score is slightly low compared to Alvarado score, its overall performance as a screening test is superior to the latter, which is evident from a Diagnostic accuracy of 84.29% whereas the diagnostic accuracy of Alvarado score being 77.14 %(

table.12). Out of 70 cases 3(4.2%) cases had perforated appendicitis. Majority of the cases [66(94.3%)] were discharged without complications, only 4(5.7%) cases had wound infection.

Table.13 Predictive accuracy of Alvarado score

Predictive accuracy of Alvarado score	Histopathology		Kappa Statistic (κ)	P value
	Positive Histology n (%)	Negative Histology n (%)		
> 7 (Appendicitis likely)	28 (82.35)	10 (27.76)	0.544 (Moderate agreement)	**<0.0001**
< 7 (Appendicitis unlikely)	6 (17.65)	26 (72.24)		

Table.14 Predictive accuracy of RIPASA score

Predictive accuracy of RIPASA score	Histopathology		Kappa Statistic (κ)	P value
	Positive Histology n (%)	Negative Histology n (%)		
> 7.5 (Appendicitis likely)	26 (76.48)	3 (8.33)	0.684 (Strong agreement)	**<0.0001**
< 7.5 (Appendicitis unlikely)	8 (23.52)	33 (91.67)		

Cohen's **kappa** coefficient (κ) is a **statistic** which measures inter-rater agreement for qualitative (categorical) items. It is generally thought to be a more robust measure than simple percent agreement calculation, as κ takes into account the possibility of the agreement occurring by chance. A value of 1 indicates perfect agreement. A value of 0 indicates that agreement is no better than chance. Comparison of histology with Alvarado score, the predictive accuracy of Alvarado score had kappa coefficient **(κ)** of 0.554 with moderate agreement, which is statistically significant with p value 0.0001(table 13). RIPASA score has a far superior level of agreement with the gold

standard test, which is histopathology, as compared to Alvarado score with kappa coefficient **(к)** of 0.684(p=0.0001) stating having strong agreement compared to Alvarado score in predicting acute appendicitis(table14).

DISCUSSION
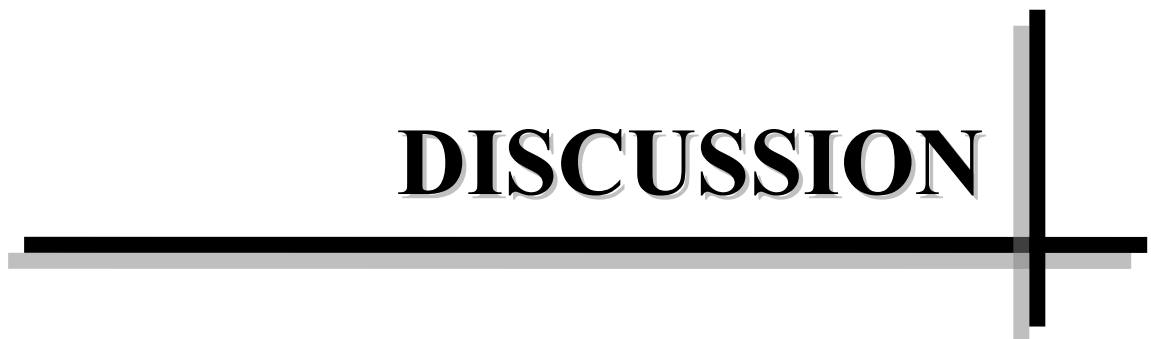
DISCUSSION

Despite being the most common surgical emergency encountered in surgical practice and emergency appendectomy constitute only 10% of the emergency abdominal surgery. Any patient presenting with acute abdominal pain, the possibility of acute appendicitis can be entertained. Still confident preoperative diagnosis of acute appendicitis remains as a challenge to clinicians. Various score have been evaluated till date since the inception of Alvarado score in 1986 [29] to diagnose acute appendicitis and aid in clinical diagnosis without need for imaging studies. Scoring system with high diagnostic accuracy is needed to reduce negative appendicectomy rates there by avoiding unwanted surgeries, however to improve diagnostic accuracy by these scores leads to delayed appendicectomy in some cases leading to complications such as perforation and peritonitis [97].so a good scoring system with high specificity with good diagnostic accuracy is needed to overcome these hurdles. Western literature quotes higher sensitivity and specificity of Alvarado scoring system, but studies show low sensitivity and specificity of Alvarado scoring system in Asian and Middle East population, suggesting a variation in ethnicity leads to poor diagnostic accuracy of Alvarado scoring system in our population. RIPASA scoring system recently developed exclusively for Asian population, shown to have promising diagnostic accuracy .So we compared Alvarado and RIPASA score in patients with

acute appendicitis. Appendicitis is more common between ages 10 to 20 yrs [98].Our study also reports higher percentage (48.6%) of appendicitis was noted below 20yeras of age. Usually appendicitis is more common in males and male to female ratio is 1.4:1. Females are more commonly [39(55.7%) females vs 31(44.3%) males] diagnosed with acute appendicitis with male to female ratio being 1:1.2 in our study, showing a changing trend thus confirming gender difference. Primary presenting feature of acute appendicitis being abdominal pain followed by vomiting with migration of the pain to the right iliac fossa as classically described by Murphy et al [99] is seen in 50% of cases, however the abdominal pain as presenting feature was seen only in all cases in our study. Early sign of appendicitis such as guarding and Roving's sign was present in 26(37%) and 4(5%) cases respectively, while rebound tenderness was seen in 39(41%).Higher incidence of rebound tenderness is due to delay in seeking medical attention by the patients in our study. The duration of symptoms was more than 1.5 days (41.04±26.10). Late clinical presentation and difficulty in assessing health care facilities are still problems faced by our people. Raised WBC count was seen in 52(74%) of cases with left shift was seen in 27(38.5%) cases which is higher compared to study by Saaiq et al [100] in similar group of population with same ethnic background. Urine analysis was normal in 48(69%) cases, but studies also show urine abnormalities can be seen up to 40% in cases of appendicitis. Robust investigation and biomarkers have been used in the past decade

in diagnosis, but CRP along Leukocytosis can help in aiding diagnosis of acute appendicitis [101]. In 22(31.4%) cases due to equivocal clinical findings, imaging was required and added logistic reasons these cases had delay in undergoing surgery. There was a higher percentage of negative appendicectomy 48.6 %(n=36) in our study because the decision on appendectomy was solely based on surgeon's clinical judgment after clinical, laboratory and radiological investigation. The negative appendicectomy rates of Alvarado and RIPASA score were 27.76% and 8.3% respectively. When Alvarado score of >7 was applied, the positive and negative histology were seen in 28(82.35) and 10 (27.76%) cases respectively. Similarly when comparison of RIPASA score > 7.5 with histology showed that the positive and negative histology was seen in 26 (76.48%) and 3(8.33%) of cases respectively. Comparison of both scores shows that RIPASA score clearly reduces the negative appendicectomy rate drastically by 19%. Literature quotes that, the criteria for good diagnostic quality, score should have 15% rate of negative appendectomies and 10% rate of negative laparotomies [48,49]. In our study negative appendicectomy had already surpassed the required rate making RIPASA score an absolute score for ruling out appendicitis, thereby avoiding unnecessary surgery and cost burden on the patients.

At the cut off score of 7 as criteria for diagnosing appendicitis, the sensitivity and specificity of the Alvarado scoring system in our study was found to be 82.35% and 72.22% respectively. Positive and negative predictive values were73.68% and 81.25%

respectively and diagnostic accuracy was 77.14% which is lower than study done by Memon et al [37] showed that Sensitivity and specificity of the Alvarado scoring system were found to be 93.5% and 80.6% respectively. Positive and negative predictive values were 92.3% and 83.3%, respectively, and accuracy was 89.8% in their study in Asian population. Similar study was done by Khan et al [32] in an Asian population and found that Alvarado scoring system achieved a sensitivity and specificity of 59% and 23%, respectively, with a negative appendicectomy rate Of 15.6%.This clearly shows that Alvarado scoring system varies with our population and predictive value is low which is evident from our study also.

RIPASA score > 7.5 had a sensitivity and specificity of 76.47% and 91.67% respectively. The positive predictive value and negative predictive value of RIPASA score was 89.65% and 80.49% respectively. This was similar to study done by Chong et al [3] in Southeast Asian population and found that the sensitivity and specificity achieved by RIPASA score was 88% and 67%, respectively, with a diagnostic accuracy of 81%.The sensitivity, specificity and positive predictive value achieved by RIPASA score is comparable to the Alvarado score when the latter was applied in western population [29]. Similar study by Sarang Rathod et al [53] in Indian population showed that RIPASA score had sensitivity and specificity of 82.61% & 88.89%

respectively. It had a PPV of 96.61%, NPV of 57.14%, and a diagnostic accuracy rate of 83.91% with results in accordance with our study.

Even though the Sensitivity of RIPASA score is slightly low compared to Alvarado score, its overall performance as a screening test is superior to the latter, which is evident from a Diagnostic accuracy of 84.29% whereas the diagnostic accuracy of Alvarado score being 77.14%. Comparison of histology with Alvarado score, the predictive accuracy of Alvarado score had kappa coefficient **(κ)** of 0.554 with moderate agreement, which is statistically significant with p value 0.0001. RIPASA score has a far superior level of agreement with the gold standard test, which is histopathology, as compared to Alvarado score with kappa coefficient **(κ)** of 0.684(p=0.0001) stating having strong agreement compared to Alvarado score in predicting acute appendicitis. The main limitation of our study was small sample size and prospective evaluation of scores were not used in diagnosis of acute appendicitis, as diagnosis was solely based on surgeons clinical judgement and laboratory data ,so due to these restrictions, associations should be interpreted with caution.

SUMMARY

SUMMARY

- Totally 70 cases (31 males& 39 females) were enrolled into the study, among them majority 39(55.7%) were females. 48.6% of the study participants were below less than 20 years of age followed by 17.1% between 20 to 29 years.

- . The Mean (± SD) age of the participants was 24.71±9.44 years (range20 to 60)

- The mean (± SD) duration of the illness was 41.04 ±26.10 hours and the mean duration of hospital stay was 5.04±1.05 days

- . Rebound tenderness, guarding , Rovsings sign, Raised WBC count with normal urine analysis was seen in 39(41%), 26(37%) ,4(5%) , 52(74%)and 48(69%) of the cases respectively.

- All 70 cases had RIF pain as presenting symptom and RIF tenderness was seen in 68(97%) of cases making it as the most common sign in our study.

- Clinical Symptoms such as fever, anorexia, nausea/vomiting and migrating pain was seen in 55(77%), 28(40%), 38(54%) and 28(40%) of cases respectively

- All 70 cases underwent appendectomy, in them 48(68.6%) cases underwent emergency appendectomy while appendectomy was delayed in 22(31.4%) cases

- Out of 70 cases 36(51.4%) cases had histologically positive for appendicitis and in 34(48.6%) cases histology was inconclusive or negative.

- The negative appendicectomy rates of Alvarado and RIPASA score were 27.76% and 8.3% respectively

- The sensitivity and specificity of the Alvarado scoring system in our study was found to be 82.35% and 72.22% respectively. Positive and negative predictive values were73.68% and 81.25% respectively and diagnostic accuracy was 77.14%

- RIPASA score > 7.5 had a sensitivity and specificity of 76.47% and 91.67% respectively. The positive predictive value and negative predictive value of RIPASA score was 89.65% and 80.49% respectively with diagnostic accuracy of 84.29%

CONCLUSION
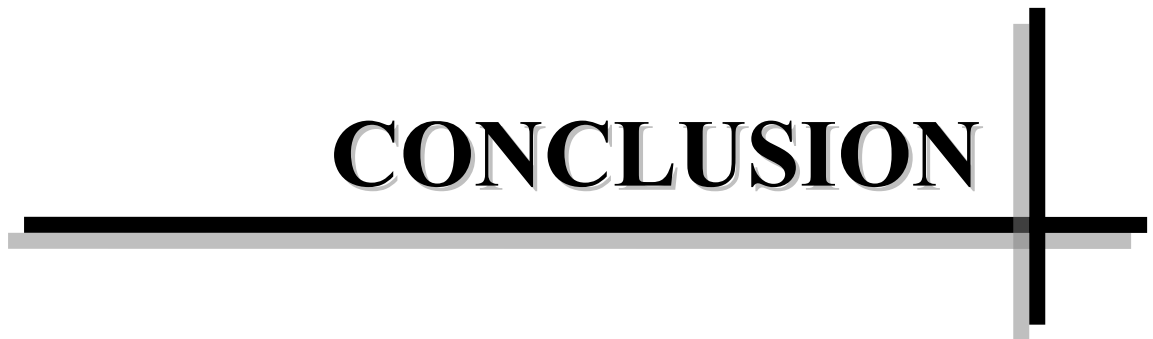
CONCLUSION

Despite being so common, a poor understanding of the causes of appendicitis and an absence of reliable discriminators for disease severity still persist. Scoring system such as RIPASA will be definitely helpful in reducing false appendicectomy rates .This new appendicitis scoring system is easy and simple to apply as the majority of the parameters can be obtained from a routine history and clinical examination. RIPASA score is specifically developed for our local patient group, but it is likely to be applicable to the South East Asian region, which has populations of similar ethnic origins and diets thereby avoiding ethnic difference and results will be promising when applied prospectively .Thus RIPASA score in our population had high specificity with diagnostic accuracy and it has low negative appendicectomy rates. This simple scoring system is useful and helps in aiding diagnosis of acute appendicitis.

BIBLIOGRAPHY

BIBLIOGRAPHY

1. Stephens PL, Mazzucco JJ. Comparison of ultrasound and the Alvarado score for the diagnosis of acute appendicitis. Conn Med. 1999 ;63:137–40.

2. Shrivastava UK, Gupta A, Sharma D. Evaluation of the Alvarado score in the diagnosis of acute appendicitis. Trop Gastroenterol Off J Dig Dis Found. 2004 ;25:184–6.

3. Chong CF, Adi MIW, Thien A, Suyoi A, Mackie AJ, Tin AS, et al. Development of the RIPASA score: a new appendicitis scoring system for the diagnosis of acute appendicitis. Singapore Med J. 2010;51:220–5.

4. Deshmukh S, Verde F, Johnson PT, Fishman EK, Macura KJ. Anatomical variants and pathologies of the vermix. Emerg Radiol. 2014 ;21:543–52.

5. Barlow A, Muhleman M, Gielecki J, Matusz P, Tubbs RS, Loukas M. The vermiform appendix: a review. Clin Anat N Y N. 2013 ;26:833–42.

6. Schumpelick V, Dreuw B, Ophoff K, Prescher A. Appendix and cecum. Embryology, anatomy, and surgical applications. Surg Clin North Am. 2000;80:295–318.

7. Spalluto LB, Woodfield CA, DeBenedectis CM, Lazarus E. MR imaging evaluation of abdominal pain during pregnancy: appendicitis and other nonobstetric causes. Radiogr Rev Publ Radiol Soc N Am Inc. 2012;32:317–34.

8. Conell PRO, Norman S. Williams, Christopher Bulstrode. Bailey & Love's Short Practice of Surgery. 26th ed. London: Taylor & Francis; 1199–1203 p.

9. Shives, Spencer, Daly, Fisher. Schwartz Principles of Surgery. 7th ed. Vol. vol 2. Philadelphia: Tata McGraw Hill; 1583–94 p.

10. Heaton KW. Aetiology of acute appendicitis. BMJ. 1987;1632–3.

11. Anderson JE, Bickler SW, Chang DC, Talamini MA. Examining a common disease with unknown etiology: trends in epidemiology and surgical management of appendicitis in California, 1995-2009. World J Surg. 2012 ;36:2787–94.

12. Walker AR, Segal I. Appendicitis: an African perspective. J R Soc Med. 1995 ;88:616–9.

13. Walker AR, Shipton E, Walker BF, Manetsi B, Van Rensburg PS, Vorster HH. Appendicectomy incidence in black and white children aged 0 to 14 years with a discussion on the disease's causation. Trop Gastroenterol Off J Dig Dis Found. 1989 ;10:96–101.

14. Hamill JK, Hill AG. A history of the treatment of appendicitis in children: lessons learned. ANZ J Surg. 2016;86:762–7.

15. Birnbaum BA, Wilson SR. Appendicitis at the millennium. Radiology. 2000;215:337–48.

16. Graffeo CS, Counselman FL. Appendicitis. Emerg Med Clin North Am. 1996 ;14:653–71.

17. Hawkins JD, Thirlby RC. The accuracy and role of cross-sectional imaging in the diagnosis of acute appendicitis. Adv Surg. 2009;43:13–22.

18. Prystowsky JB, Pugh CM, Nagle AP. Current problems in surgery. Appendicitis. Curr Probl Surg. 2005;42:688–742.

19. Livingston EH, Woodward WA, Sarosi GA, Haley RW. Disconnect between incidence of nonperforated and perforated appendicitis: implications for pathophysiology and management. Ann Surg. 2007;245:886–92.

20. Ortega-Deballon P, Ruiz de Adana-Belbel JC, Hernández-Matías A, García-Septiem J, Moreno-Azcoita M. Usefulness of laboratory data in the management of right iliac fossa pain in adults. Dis Colon Rectum. 2008 ;51:1093–9.

21. Lane R, Grabham J. A useful sign for the diagnosis of peritoneal irritation in the right iliac fossa. Ann R Coll Surg Engl. 1997 ;79:128–9.

22. Erdem H, Çetinkünar S, Daş K, Reyhan E, Değer C, Aziret M, et al. Alvarado, Eskelinen, Ohhmann and Raja Isteri Pengiran Anak Saleha Appendicitis scores for diagnosis of acute appendicitis. World J Gastroenterol WJG. 2013 ;19:9057–62.

23. Rybkin AV, Thoeni RF. Current concepts in imaging of appendicitis. Radiol Clin North Am. 2007;45:411–22, vii.

24. Bhangu A, Søreide K, Di Saverio S, Assarsson JH, Drake FT. Acute appendicitis: modern understanding of pathogenesis, diagnosis, and management. Lancet Lond Engl. 2015 ;386:1278–87.

25. Bolandparvaz S, Vasei M, Owji AA, Ata-Ee N, Amin A, Daneshbod Y, et al. Urinary 5-hydroxy indole acetic acid as a test for early diagnosis of acute appendicitis. Clin Biochem. 2004 ;37:985–9.

26. Hernandez R, Jain A, Rosiere L, Henderson SO. A prospective clinical trial evaluating urinary 5-hydroxyindoleacetic acid levels in the diagnosis of acute appendicitis. Am J Emerg Med. 2008 ;26:282–6.

27. Andersson M, Rubér M, Ekerfelt C, Hallgren HB, Olaison G, Andersson RE. Can new inflammatory markers improve the diagnosis of acute appendicitis? World J Surg. 2014 ;38:2777–83.

28. Yu C-W, Juan L-I, Wu M-H, Shen C-J, Wu J-Y, Lee C-C. Systematic review and meta-analysis of the diagnostic accuracy of procalcitonin, C-reactive protein and white blood cell count for suspected acute appendicitis. Br J Surg. 2013 ;100:322–9.

29. Alvarado A. A practical score for the early diagnosis of acute appendicitis. Ann Emerg Med. 1986 ;15:557–64.

30. Kalan M, Talbot D, Cunliffe WJ, Rich AJ. Evaluation of the modified Alvarado score in the diagnosis of acute appendicitis: a prospective study. Ann R Coll Surg Engl. 1994 ;76:418–9.

31. Al-Hashemy AM, Seleem MI. Appraisal of the modified Alvarado Score for acute appendicits in adults. Saudi Med J. 2004 ;25:1229–31.

32. Khan I, ur Rehman A. Application of alvarado scoring system in diagnosis of acute appendicitis. J Ayub Med Coll Abbottabad JAMC. 2005;17:41–4.

33. Ohle R, O'Reilly F, O'Brien KK, Fahey T, Dimitrov BD. The Alvarado score for predicting acute appendicitis: a systematic review. BMC Med. 2011;9:139.

34. McKay R, Shepherd J. The use of the clinical scoring system by Alvarado in the decision to perform computed tomography for acute appendicitis in the ED. Am J Emerg Med. 2007 ;25:489–93.

35. Gwynn LK. The diagnosis of acute appendicitis: clinical assessment versus computed tomography evaluation. J Emerg Med. 2001;21:119–23.

36. Goldman RD, Carter S, Stephens D, Antoon R, Mounstephen W, Langer JC. Prospective validation of the pediatric appendicitis score. J Pediatr. 2008 ;153:278–82.

37. Memon ZA, Irfan S, Fatima K, Iqbal MS, Sami W. Acute appendicitis: diagnostic accuracy of Alvarado scoring system. Asian J Surg. 2013 ;36:144–9.

38. Gunes Tatar I, Yilmaz KB, Sahin A, Aydin H, Akinci M, Hekimoglu B. Evaluation of Clinical Alvarado Scoring System and CT Criteria in the Diagnosis of Acute Appendicitis. Radiol Res Pract. 2016;2016:9739385.

39. Jang SO, Kim BS, Moon DJ. [Application of alvarado score in patients with suspected appendicitis]. Korean J Gastroenterol Taehan Sohwagi Hakhoe Chi. 2008 ;52:27–31.

40. Jalil A, Shah SA, Saaiq M, Zubair M, Riaz U, Habib Y. Alvarado scoring system in prediction of acute appendicitis. J Coll Physicians Surg--Pak JCPSP. 2011 ;21:753–5.

41. Yildirim E, Karagülle E, Kirbaş I, Türk E, Hasdoğan B, Tekşam M, et al. Alvarado scores and pain onset in relation to multislice CT findings in acute appendicitis. Diagn Interv Radiol Ank Turk. 2008;14:14–8.

42. Winn RD, Laura S, Douglas C, Davidson P, Gani JS. Protocol-based approach to suspected appendicitis, incorporating the Alvarado score and outpatient antibiotics. ANZ J Surg. 2004;74:324–9.

43. Yüksel Y, Dinç B, Yüksel D, Dinç SE, Mesci A. How reliable is the Alvarado score in acute appendicitis? Ulus Travma Ve Acil Cerrahi Derg Turk J Trauma Emerg Surg TJTES. 2014 ;20:12–8.

44. Heineman J. Towards evidence based emergency medicine: Best BETs from the Manchester Royal Infirmary. BET 1: An evaluation of the Alvarado score as a diagnostic tool for appendicitis in children. Emerg Med J EMJ. 2012;29:1013–4.

45. Mán E, Simonka Z, Varga A, Rárosi F, Lázár G. Impact of the Alvarado score on the diagnosis of acute appendicitis: comparing clinical judgment, Alvarado score, and a new modified score in suspected appendicitis: a prospective, randomized clinical trial. Surg Endosc. 2014 ;28:2398–405.

46. Butt MQ, Chatha SS, Ghumman AQ, Farooq M. RIPASA score: a new diagnostic score for diagnosis of acute appendicitis. J Coll Physicians Surg--Pak JCPSP. 2014 ;24:894–7.

47. Walczak DA, Pawełczak D, Żółtaszek A, Jaguścik R, Fałek W, Czerwińska M, et al. The Value of Scoring Systems for the Diagnosis of Acute Appendicitis. Pol Przegl Chir. 2015 ;87:65–70.

48. Park JS, Jeong JH, Lee JI, Lee JH, Park JK, Moon HJ. Accuracies of diagnostic methods for acute appendicitis. Am Surg. 2013 ;79:101–6.

49. Linam LE, Munden M. Sonography as the first line of evaluation in children with suspected acute appendicitis. J Ultrasound Med Off J Am Inst Ultrasound Med. 2012 ;31:1153–7.

50. Kanumba ES, Mabula JB, Rambau P, Chalya PL. Modified Alvarado Scoring System as a diagnostic tool for acute appendicitis at Bugando Medical Centre, Mwanza, Tanzania. BMC Surg. 2011; 17;11:4.

51. Oyetunji TA, Ong'uti SK, Bolorunduro OB, Cornwell EE, Nwomeh BC. Pediatric negative appendectomy rate: trend, predictors, and differentials. J Surg Res. 2012 :16–20.

52. N N, Mohammed A, Shanbhag V, Ashfaque K, S.A. P. A Comparative Study of RIPASA Score and ALVARADO Score in the Diagnosis of Acute Appendicitis. J Clin Diagn Res JCDR. 2014;8:NC03–5.

53. Rathod S, Ali I, Bawa APS, Singh G, Mishra S, Nongmaithem M. Evaluation of Raja Isteri Pengiran Anak Saleha Appendicitis score: A new appendicitis scoring system. Med J Dr Patil Univ. 2015;8:744.

54. Díaz-Barrientos CZ, Aquino-González A, Heredia-Montaño M, Navarro-Tovar F, Pineda-Espinosa MA, Espinosa de Santillana IA. The RIPASA score for the diagnosis of acute appendicitis: A comparison with the modified Alvarado score. Rev Gastroenterol Mex. 2018 ;83:112–6.

55. Poortman P, Oostvogel HJM, Bosma E, Lohle PNM, Cuesta MA, de Lange-de Klerk ESM, et al. Improving diagnosis of acute appendicitis: results of a diagnostic pathway with standard use of ultrasonography followed by selective use of CT. J Am Coll Surg. 2009;208:434–41.

56. Doria AS. Optimizing the role of imaging in appendicitis. Pediatr Radiol. 2009 Apr;39 Suppl 2:S144-148.

57. Parks NA, Schroeppel TJ. Update on imaging for acute appendicitis. Surg Clin North Am. 2011 ;91:141–54.

58. Hussain S, Rahman A, Abbasi T, Aziz T. Diagnostic accuracy of ultrasonography in acute appendicitis. J Ayub Med Coll Abbottabad JAMC. 2014;26:12–7.

59. Shelton T, McKinlay R, Schwartz RW. Acute appendicitis: current diagnosis and treatment. Curr Surg. 2003 ;60:502–5.

60. Hlibczuk V, Dattaro JA, Jin Z, Falzon L, Brown MD. Diagnostic accuracy of noncontrast computed tomography for appendicitis in adults: a systematic review. Ann Emerg Med. 2010;55:51-59.

61. Krajewski S, Brown J, Phang PT, Raval M, Brown CJ. Impact of computed tomography of the abdomen on clinical outcomes in patients with acute right lower quadrant pain: a meta-analysis. Can J Surg J Can Chir. 2011 ;54:43–53.

62. Evans SRT. Appendicitis 2006. Ann Surg. 2006;244:661–2.

63. Cobben LP, de Van Otterloo AM, Puylaert JB. Spontaneously resolving appendicitis: frequency and natural history in 60 patients. Radiology. 2000;215:349–52.

64. Khairy G. Acute appendicitis: is removal of a normal appendix still existing and can we reduce its rate? Saudi J Gastroenterol Off J Saudi Gastroenterol Assoc. 2009 ;15:167–70.

65. Lee SL, Islam S, Cassidy LD, Abdullah F, Arca MJ, 2010 American Pediatric Surgical Association Outcomes and Clinical Trials Committee. Antibiotics and appendicitis in the pediatric population: an American Pediatric Surgical Association Outcomes and Clinical Trials Committee systematic review. J Pediatr Surg. 2010 ;45:2181–5.

66. Mason RJ. Surgery for appendicitis: is it necessary? Surg Infect. 2008 ;9:481–8.

67. Campbell MR, Johnston SL, Marshburn T, Kane J, Lugg D. Nonoperative treatment of suspected appendicitis in remote medical care environments: implications for future spaceflight medical care. J Am Coll Surg. 2004;198:822–30.

68. Varadhan KK, Neal KR, Lobo DN. Safety and efficacy of antibiotics compared with appendicectomy for treatment of uncomplicated acute appendicitis: meta-analysis of randomised controlled trials. BMJ. 2012 ; 5;344.

69. Eriksson S, Granström L. Randomized controlled trial of appendicectomy versus antibiotic therapy for acute appendicitis. Br J Surg. 1995 ;82:166–9.

70. Styrud J, Eriksson S, Nilsson I, Ahlberg G, Haapaniemi S, Neovius G, et al. Appendectomy versus antibiotic treatment in acute appendicitis. a prospective multicenter randomized controlled trial. World J Surg. 2006 ;30:1033–7.

71. Hansson J, Körner U, Khorram-Manesh A, Solberg A, Lundholm K. Randomized clinical trial of antibiotic therapy versus appendicectomy as primary treatment of acute appendicitis in unselected patients. Br J Surg. 2009 ;96:473–81.

72. Turhan AN, Kapan S, Kütükçü E, Yiğitbaş H, Hatipoğlu S, Aygün E. Comparison of operative and non operative management of acute appendicitis. Ulus Travma Ve Acil Cerrahi Derg Turk J Trauma Emerg Surg TJTES. 2009 ;15:459–62.

73. Vons C, Barry C, Maitre S, Pautrat K, Leconte M, Costaglioli B, et al. Amoxicillin plus clavulanic acid versus appendicectomy for treatment of acute uncomplicated appendicitis: an open-label, non-inferiority, randomised controlled trial. Lancet Lond Engl. 2011 ;377:1573–9.

74. Svensson JF, Patkova B, Almström M, Naji H, Hall NJ, Eaton S, et al. Nonoperative treatment with antibiotics versus surgery for acute nonperforated appendicitis in children: a pilot randomized controlled trial. Ann Surg. 2015 ;261:67–71.

75. Di Saverio S, Sibilio A, Giorgini E, Biscardi A, Villani S, Coccolini F, et al. The NOTA Study (Non Operative Treatment for Acute Appendicitis): prospective study on the efficacy and safety of antibiotics (amoxicillin and clavulanic acid) for treating patients with right lower quadrant abdominal pain and long-term follow-up of conservatively treated suspected appendicitis. Ann Surg. 2014 ;260:109–17.

76. Salminen P, Paajanen H, Rautio T, Nordström P, Aarnio M, Rantanen T, et al. Antibiotic Therapy vs Appendectomy for Treatment of Uncomplicated Acute Appendicitis: The APPAC Randomized Clinical Trial. JAMA. 2015 ;313:2340–8.

77. Adisa AO, Alatise OI, Arowolo OA, Lawal OO. Laparoscopic appendectomy in a Nigerian teaching hospital. JSLS. 2012 ;16:576–80.

78. Decadt B, Sussman L, Lewis MP, Secker A, Cohen L, Rogers C, et al. Randomized clinical trial of early laparoscopy in the management of acute non-specific abdominal pain. Br J Surg. 1999 ;86:1383–6.

79. Drake FT, Mottey NE, Farrokhi ET, Florence MG, Johnson MG, Mock C, et al. Time to appendectomy and risk of perforation in acute appendicitis. JAMA Surg. 2014 ;149:837–44.

80. Markides G, Subar D, Riyad K. Laparoscopic versus open appendectomy in adults with complicated appendicitis: systematic review and meta-analysis. World J Surg. 2010 ;34:2026–40.

81. Bhandarkar D, Shah R. A novel technique for extraction of the appendix in laparoscopic appendectomy. Surg Laparosc Endosc Percutan Tech. 2002 ;12:117–8.

82. Liu Z, Zhang P, Ma Y, Chen H, Zhou Y, Zhang M, et al. Laparoscopy or not: a meta-analysis of the surgical effects of laparoscopic versus open appendicectomy. Surg Laparosc Endosc Percutan Tech. 2010 ;20:362–70.

83. Morrow SE, Newman KD. Current management of appendicitis. Semin Pediatr Surg. 2007;16:34–40.

84. Andersen BR, Kallehave FL, Andersen HK. Antibiotics versus placebo for prevention of postoperative infection after appendicectomy. Cochrane Database Syst Rev. 2005 ; 20:CD001439.

85. Daskalakis K, Juhlin C, Påhlman L. The use of pre- or postoperative antibiotics in surgery for appendicitis: a systematic review. Scand J Surg SJS Off Organ Finn Surg Soc Scand Surg Soc. 2014;103:14–20.

86. van Rossem CC, Schreinemacher MHF, Treskes K, van Hogezand RM, van Geloven A a. W. Duration of antibiotic treatment after appendicectomy for acute complicated appendicitis. Br J Surg. 2014;101:715–9.

87. Ali N, Aliyu S. Appendicitis and its surgical management experience at the University of Maiduguri Teaching Hospital Nigeria. Niger J Med J Natl Assoc Resid Dr Niger. 2012 ;21:223–6.

88. Ohene-Yeboah M, Togbe B. An audit of appendicitis and appendicectomy in Kumasi, Ghana. West Afr J Med. 2006 ;25:138–43.

89. Kong VY, Van der Linde S, Aldous C, Handley JJ, Clarke DL. Quantifying the disparity in outcome between urban and rural patients with acute appendicitis in South Africa. South Afr Med J Suid-Afr Tydskr Vir Geneeskd. 2013 ;103:742–5.

90. Charfi S, Sellami A, Affes A, Yaïch K, Mzali R, Boudawara TS. Histopathological findings in appendectomy specimens: a study of 24,697 cases. Int J Colorectal Dis. 2014 ;29:1009–12.

91. Güller U, Rosella L, McCall J, Brügger LE, Candinas D. Negative appendicectomy and perforation rates in patients undergoing laparoscopic surgery for suspected appendicitis. Br J Surg. 2011 ;98:589–95.

92. SCOAP Collaborative, Cuschieri J, Florence M, Flum DR, Jurkovich GJ, Lin P, et al. Negative appendectomy and imaging accuracy in the Washington State Surgical Care and Outcomes Assessment Program. Ann Surg. 2008 ;248:557–63.

93. National Surgical Research Collaborative. Multicentre observational study of performance variation in provision and outcome of emergency appendicectomy. Br J Surg. 2013;100:1240–52.

94. Andersson RE. Short-term complications and long-term morbidity of laparoscopic and open appendicectomy in a national cohort. Br J Surg. 2014;101:1135–42.

95. van Nistelrooij AMJ, Dinjens WNM, Wagner A, Spaander MCW, van Lanschot JJB, Wijnhoven BPL. Hereditary Factors in Esophageal Adenocarcinoma. Gastrointest Tumors. 2014 ;1:93–8.

96. Boudreaux JP, Klimstra DS, Hassan MM, Woltering EA, Jensen RT, Goldsmith SJ, et al. The NANETS consensus guideline for the diagnosis and management of

neuroendocrine tumors: well-differentiated neuroendocrine tumors of the Jejunum, Ileum, Appendix, and Cecum. Pancreas. 2010 ;39:753–66.

97.   Velanovich V, Satava R. Balancing the normal appendectomy rate with the perforated appendicitis rate: implications for quality assurance. Am Surg. 1992 ;58:264–9.

98.   The epidemiology of appendicitis and appendectomy in the United States. - PubMed - NCBI [Internet]. [cited 2018 Oct 15]. Available from: https://www.ncbi.nlm.nih.gov/pubmed/2239906/

99.   Murphy J. Two thousand operations for appendicitis, with deductions from his personal experience. Am J Med Sci 1904. 128:187–211.

100. Saaiq M, Niaz-Ud-Din null, Jalil A, Zubair M, Shah SA. Diagnostic accuracy of leukocytosis in prediction of acute appendicitis. J Coll Physicians Surg--Pak JCPSP. 2014 ;24:67–9.

101. Thompson MM, Underwood MJ, Dookeran KA, Lloyd DM, Bell PR. Role of sequential leucocyte counts and C-reactive protein measurements in acute appendicitis. Br J Surg. 1992;79:822–4.

ANNEXURES

PROFORMA

Name: HOSP NO.:

Age/ Sex:

Address: DOA:

Chief Complaints:

1. Pain

2. Vomiting/nausea

3. Fever

4. Diarrhea/constipation

5. Distention of abdomen

6. Other complaints

History of Presenting illness:

1. **PAIN**

   a) Duration

   b) Time and onset

   c) Site of pain: RIF/epigastric/periumblical/diffuse

   d) Shifting of pain

   e) Migration or radiation of pain

   f) Character of pain

g) Aggravating factors

h) Relieving factors

2.VOMITING

a) Episodes

b) Relation to pain

c) Frequency and quantity

d) Character:projectile/effortless

e) Colour and nature of vomitus

3.FEVER

a) Mild/moderate/severe

b) Continuous/intermittent/remittent

4.BOWELS

a) Diarrhea

b) Constipation

c) Tenesmus

5.MICTURITION

a) Painful/burning

b) Frequency

c) Quantity

d) Colour

6. OTHER COMPLAINTS

Past History:

Personal History:

Family History:

Menstrual history:

GENERAL PHYSICAL EXAMINATION:

Vital Data: Temp: Pulse:

          BP   :   RR:

BMI: Weight (kg)/Height (m)^2:

Pallor: Icterus: Cyanosis:

Clubbing: Lymphadenopathy: Pedal edema:

SYSTEMIC EXAMINATION:

EXAMINATION OF ABDOMEN:

1. Inspection:

2. Palpation:

3. Percussion:

4. Auscultation:

5. Digital Rectal Examination:

6. Vaginal examination:

CVS:

RS:

CNS:

INVESTIGATIONS:

Hb%:   TC: DC: ESR:

BT: CT: Blood grouping and typing:

Blood urea: Serum Creatinine:

RBS: FBS: PPBS:

Urine routine:

Albumin: Microscopy:

ECG: HIV: HbsAg:

Erect X-ray abdomen:

USG abdomen:

Others:

Pre-Operative diagnosis:

Surgery: Emergency/Elective:

Operative findings:

Anaesthesia: Spinal/General/Epidural

Sample for HPE: YES/NO

HISTOPATHALOGICAL REPORT:

Sl.No	Name/ ID.No	Age/Sex	Abd.pain	Anorexia	Nausea/Vomiting	Others	RIF/T	RE/T	Fever	Others	Increased WBC	U/S Diagnosis	Total	Per.Op Findings	HPE Findings	

STUDY TITLE:

A COMPARATIVE STUDY OF RIPASA SCORE AND ALVARADO SCORE IN THE DIAGNOSIS OF ACUTE APPENDICITIS

Study site: R.L Jalappa hospital, Tamaka, Kolar.

Aim:

1. To test the compare efficacy of ripasa score and alvarado in diagnosing acute appendicitis.

2. To compare the Intra-operative findings and histo-pathological reports with Alvarado sore and ripasa score and assessing the results.

Patients coming with right lower quadrant pain will be examined and investigated. If patient is suspected to have acute appendicitis, patient will be admitted and worked up further. Pre-operatively, ripasa score will be applied and alvarado will be done. Patients are explained thoroughly about the surgical procedure. Written and informed consent is taken. Patient will be taken up for surgery. Intra-operative findings and histo-pathological reports will be followed up and the results will be compared with ripasa score and Alvarado score.

This information is intended to give you the general background of the study. Please read the following information and discuss with your family members. You can ask any question regarding the study. If you agree to participate in the study we will collect information (as per proforma) from you or a person responsible for you or both. Relevant history will be taken. This information collected will be used only for dissertation and publication.

All information collected from you will be kept confidential and will not be disclosed to any outsider. Your identity will not be revealed. This study has been reviewed by the Institutional Ethics Committee and you are free to contact the member of the Institutional Ethics Committee. There is no compulsion to agree to this study. The care you will get will not change if you don't wish to participate. You are required to sign/ provide thumb impression only if you voluntarily agree to participate in this study.

For any further clarification you can contact the study investigator:

Dr. Paul Dhinakaran M.D.S

Mobile no: 9500810814

E-mail id: pauldhina.91@gmail.com

ರೋಗಿಯಮಾಹಿತಿಹಾಳೆ

ರೋಗಿಯಮಾಹಿತಿಹಾಳೆಅಧ್ಯಯನದಶೀರ್ಷಿಕೆ:ಆಫ್ RIPASA ಸ್ಕೋರ್ಮತ್ತು ALVARADO

ಸ್ಕೋರ್ತುಲನಾತ್ಮಕಅಧ್ಯಯನರೋಗಲಕ್ಷಣಗಳಕೊರತೆಕಂಡುಬಂದರೆ**ಸ್ಟಡಿಸ್ಯೆಟ್:**   R.L

Jalappaಆಸ್ಪತ್ರೆ, Tamaka,ಕೋಲಾರ.

ಉದ್ದೇಶ:

1. ripasaತೀವ್ರಕರುಳುವಾಳವಿಶ್ಲೇಡಿಸುವಾಗಸ್ಕೋರ್ಮತ್ತುಅಲ್ವರಾಡೊಸಂಯೋಜಿತಪರಿಣಾಮಕಾರಿತ್ವವನ್ನುಪರೀಕ್ಷಿ ಸುವುದು.

2.   ಇಂಟ್ರಾಆಪರೇಟಿವ್ಆವಿಷ್ಕಾರಗಳನ್ನುಮತ್ತುಅಲ್ವರಾಡೊನೋಯುತ್ತಿರುವಮತ್ತುripasaಜೊತೆಹಿಸ್ಟೋ-ರೋಗವರದಿಗಳುಹೋಲಿಸಿಸ್ಕೋರ್ಮತ್ತುಫಲಿತಾಂಶಗಳುನಿರ್ಣಯಿಸುವುದು.

ಬಲಕಡಿಮೆಚತುರ್ಥನೋವುಬರುವರೋಗಿಗಳುಪರೀಕ್ಷಿಸಿತನಿಖೆಮಾಡಲಾಗುತ್ತದೆ.ಒಂದುವೇಳೆರೋಗಿಯುತೀವ್ರ ಕರುಳುವಾಳಶಂಕಿಸಲಾಯಿತು, ರೋಗಿಯಒಪ್ಪಿಕೊಂಡರುಮತ್ತುಮತ್ತಪ್ಪುಕೆಲಸನಡೆಯಲಿದೆ.ಶಸ್ತ್ರಚಿಕಿತ್ಸೆಯಾದಪೂರ್ವ, ripasaಸ್ಕೋರ್ಅನ್ವಯಿಸಲಾಗುತ್ತದೆಮತ್ತುಅಲ್ವರಾಡೊಮಾಡಲಾಗುತ್ತದೆ.ರೋಗಿಗಳುಶಸ್ತ್ರಚಿಕಿತ್ಸಾವಿಧಾನದಲ್ಲಿಬಗ್ಗೆ ಸಂಪೂರ್ಣವಾಗಿವಿವರಿಸಲಾಗಿದೆ.ಬರೆದುಸಮ್ಮತಿತೆಗೆದುಕೊಳ್ಳಲಾಗಿದೆ.ರೋಗಿಯಶಸ್ತ್ರಚಿಕಿತ್ಸೆ ಅಪ್ಟೆಗೆದುಕೊಳ್ಳಲಾಗು ವುದು.ಇಂಟ್ರಾಆಪರೇಟಿವ್ಆವಿಷ್ಕಾರಗಳನ್ನುಮತ್ತುಹಿಸ್ಟೋ-

ರೋಗವರದಿಗಳುಅನುಸರಿಸಬೇಕಾದಮತ್ತುripasaಸ್ಕೋರ್ಮ್ತ್ತುಅಲ್ಬರಾಡೊಅಂಕಗಳೊಂದಿಗೆಫಲಿತಾಂಶಗಳು ಹೋಲಿಸಿದರೆನೆಡೆಯಲಿದೆ.ಈಮಾಹಿತಿಯನ್ನುನೀವುಅಧ್ಯಯನದಸಾಮಾನ್ಯಹಿನ್ನೆಲೆನೀಡಲುಉದ್ದೇಶಿಸಲಾಗಿದೆ.ಕೆಳಗಿ ನಮಾಹಿತಿಯನ್ನುಓದಲುಮತ್ತುನಿಮ್ಮಕುಟುಂಬಸದಸ್ಯರೊಂದಿಗೆಚರ್ಚೆ.ನೀವುಅಧ್ಯಯನದಬಗ್ಗೆಯಾವುದೇಪ್ರಶ್ನೆಕೇಳ ಬಹುದು.ನೀವುಅಧ್ಯಯನದಲ್ಲಿಭಾಗವಹಿಸಲುಒಪ್ಪಿದರೆನಾವುನೀವುಅಥವಾನೀವುಅಥವಾಯಾರೂನಿರ್ವಹಿಸುವವ್ಯಕ್ತಿ ರಿಂದ (Proformaಪ್ರಕಾರ) ಮಾಹಿತಿಸಂಗ್ರಹಿಸುತ್ತದೆ.ಸಂಬಂಧಿತಇತಿಹಾಸತೆಗೆದುಕೊಳ್ಳಲಾಗುವುದು.ಸಂಗ್ರಹಿಸಿದಈಮಾಹಿತಿಯನ್ನುಪ್ರೌಢಪ್ರ ಬಂಧದಲ್ಲಿಮತ್ತುಪ್ರಕಟಣೆಬಳಸಲಾಗುತ್ತದೆ.ನೀವುಸಂಗ್ರಹಿಸಿದಎಲ್ಲಾಮಾಹಿತಿಯನ್ನುಗೌಪ್ಯವಾಗಿಇಡಲಾಗುತ್ತದೆಮತ್ತು ಯಾವುದೇಹೊರಗಿನವರಬಹಿರಂಗಮಾಡಲಾಗುವುದಿಲ್ಲ.ನಿಮ್ಮಗುರುತನ್ನುಬಹಿರಂಗಸಾಧ್ಯವಿಲ್ಲ.

ಈಅಧ್ಯಯನವುನ್ಯೈತಿಕಸಮಿತಿಯವಿಮರ್ಶೆಮತ್ತುನೀವುನ್ಯೈತಿಕಸಮಿತಿಯಸದಸ್ಯಸಂಪರ್ಕಿಸಲುಉಚಿತ.

ಈಅಧ್ಯಯನದಲ್ಲಿಒಪ್ಪುತ್ತೀರಿಯಾವುದೇಕಡ್ಡಾಯಇಲ್ಲ.

ನೀವುಭಾಗವಹಿಸಲುಇಚ್ಛಿಸದಿದ್ದರೆನೀವುಪಡೆಯುತ್ತಾನೆಆರೈಕೆಬದಲಾಗುವುದಿಲ್ಲ. ನೀವುಸ್ವೈನ್ / ನೀವುಸ್ವಯಂಪ್ರೇರಣೆಯಿಂದಈಅಧ್ಯಯನದಲ್ಲಿಭಾಗವಹಿಸಲುಒಪ್ಪುತ್ತೀರಿಮಾತ್ರಹೆಬ್ಬೆಟ್ಟಿನಗುರುತುಒದಗಿಸುವಲಗ ತ್ಯವಿದೆ

ಯಾವುದೇಸ್ಪಷ್ಟೀಕರಣನೀವುಅಧ್ಯಯನಸಂಶೋಧಕಸಂಪರ್ಕಿಸಬಹುದು:

Dr. Paul Dhinakaran M.D.S

Mobile no: 9500810814

E-mail id: pauldhina.91@gmail.com

SURGERY AND FURTHER MANAGEMENT

Patient name –   **Address –**

Age –

Sex –

Hospital number –   **Ward –**

Date –   **Time –**

Study number –

If you agree to participate in the study we will collect information (as per proforma) from you or a person responsible for you or both. We will collect the treatment and relevant details from your hospital record. This information collected will be used for only dissertation and publication. This study has been reviewed by the institutional ethical committee. The care you will get will not change if you don't wish to participate. You are required to sign/ provide thumb impression only if you voluntarily agree to participate in this study.

I understand that I remain free to withdraw from the study at any time and this will not change my future care. I have read or have been read to me and understood the purpose of the study, the procedure that will be used, the risk and benefits associated with my involvement in the study and the nature of information that will be

collected and disclosed during the study. I have had the opportunity to ask my questions regarding various aspects of the study and my questions are answered to my satisfaction. I, the undersigned agree to participate in this study and authorize the collection and disclosure of my personal information for dissertation.

Subject name-

(Parents / Guardians name)

DATE: SIGNATURE /THUMB IMPRESSION

Attendantsname –

SIGNATURE /THUMB IMPRESSION

Relation to patient –

ಮಾಹಿತಿಯುಕ್ತಸಮ್ಮತಿಯನಮೂನೆ

ಇದುಸೂಕ್ತಪೂರ್ವಸೂಚಕಲಂಶಗಳಲ್ಲಿಜ್ಞಾನತೀವ್ರನಿಗಾಚಿಕಿತ್ಸೆಯಅಗತ್ಯಹೆಚ್ಚಿನಅಪಾಯರೋಗಿಗಳಆರಂಭಿಕಗುರು ತಿನಲುಪಯುಕ್ತಇರಬಹುದುಭರವಸೆಯಿದೆ   .
ನೀವುಅಧ್ಯಯನದಲ್ಲಿಭಾಗವಹಿಸಲುಒಪ್ಪುತ್ತೀರಿವೇಳೆನೀವುಅಥವಾನೀವುಅಥವಾಎರಡೂಜವಾಬ್ದಾರಿವ್ಯಕ್ತಿಯಿಂದಮಾ
ಹಿತಿ   (ಪ್ರತಿproformaಮಾಹಿತಿ   )   ಸಂಗ್ರಹಿಸುತ್ತದೆ   .
ನಿಮ್ಮಆಸ್ಪತ್ರೆದಾಖಲೆಯಿಂದಚಿಕಿತ್ಸೆಮತ್ತುಸೂಕ್ತವಿವರಗಳನ್ನುಸಂಗ್ರಹಿಸುತ್ತದೆ   .
ಸಂಗ್ರಹಿಸಿದಈಮಾಹಿತಿಮಾತ್ರಪ್ರೌಢಪ್ರಬಂಧದಲ್ಲಿಮತ್ತುಪ್ರಕಟಣೆಬಳಸಲಾಗುತ್ತದೆ   .
ಈಅಧ್ಯಯನವುಸಾಂಸ್ಥಿಕನ್ಯೆತಿಕಸಮಿತಿಯುವಿಮರ್ಶಿಸುತ್ತದೆಮಾಡಲಾಗಿದೆ   .
ನೀವುಭಾಗವಹಿಸಲುಇಚ್ಛಿಸದಿದ್ದರೆನೀವುಪಡೆಯುತ್ತಾನೆಆರ್ಕೆಬದಲಾಗುವುದಿಲ್ಲ   .
ನೀವುಸ್ವಯಂಪ್ರೇರಣೆಯಿಂದಈಅಧ್ಯಯನದಲ್ಲಿಭಾಗವಹಿಸಲುಒಪ್ಪಿಕೊಂಡಲ್ಲಿಹೆಬ್ಬೆಟ್ಟಿನಗುರುತುಸೈನ್   /
ಒದಗಿಸುವಅಗತ್ಯವಿದೆ   .

            ನಾನುಯಾವುದೇಸಮಯದಲ್ಲಿಅಧ್ಯಯನದಿಂದಹಿಂತೆಗೆದುಕೊಳ್ಳುವಂತೆಮತ್ತುಈನನ್ನಮುಂದಿನಆರ್ಕೆ
ಬದಲಾಗುವುದಿಲ್ಲಉಚಿತಉಳಿಯಲುಎಂದುಅರ್ಥ   .
ನಾನುಒದಲುಅಥವಾನನಗೆಒದಲುಮಾಡಲಾಗಿದೆಮತ್ತುಅಧ್ಯಯನದಉದ್ದೇಶ,   ಬಳಸಲಾಗುವವಿಧಾನ,
ಅಧ್ಯಯನಮತ್ತುಅಧ್ಯಯನದಸಮಯದಲ್ಲಿಸಂಗ್ರಹಿಸಿದಮತ್ತುಬಹಿರಂಗನಡೆಯಲಿದೆಮಾಹಿತಿಯನ್ನುಪ್ರಕೃತಿಯಲ್ಲಿನ
ನ್ನಬಳಗೊಳ್ಳುವಿಕೆಸಂಬಂಧಿಸಿದಅಪಾಯಮತ್ತುಲಾಭಗಳನ್ನುಅರ್ಥ   .
ನಾನುಅಧ್ಯಯನಮತ್ತುನನ್ನಪ್ರಶ್ನೆಗಳಿಗೆವಿವಿಧಅಂಶಗಳನ್ನುನನ್ನತೃಪ್ತಿಉತ್ತರಿಸುವಬಗ್ಗೆನನ್ನಪ್ರಶ್ನೆಗಳನ್ನುಕೇಳಲುಅವ
ಕಾಶಹೊಂದಿದ್ದರು   .   ನಾನು,
ಈಅಧ್ಯಯನದಲ್ಲಿಭಾಗವಹಿಸಲುಮತ್ತುಪ್ರೌಢಪ್ರಬಂಧದಲ್ಲಿನನ್ನವೈಯಕ್ತಿಕಮಾಹಿತಿಯಸಂಗ್ರಹಣೆಮತ್ತುಡಿಸ್ಕ್ಲೋಸ
ರ್ಅಧಿಕೃತಗೊಳಿಸಲುಒಪ್ಪುತ್ತೀರಿರುಜುಮಾಡಿರುವ .

ವಿಷಯದಹೆಸರು-

(ಪಾಲಕರು / ಗಾರ್ಡಿಯನ್ಸ್ಲ್ಲಿ ಸರು)
DATE : ಸಹಿ / ಹೆಬ್ಬೆಟ್ಟಿನಗುರುತು

ಒಪ್ಪಿಗೆತೆಗೆದುಕೊಳ್ಳುವವ್ಯಕ್ತಿಯಹೆಸರುಮತ್ತುಸಹಿ:

DATE :

MASTERCHART KEYS

1. Management of patient

   0= Delayed appendicectomy

   1= Emergency Appendicectomy

2.Histopathology (HPE)

   0= Normal

   1= Acute appendicitis

3. Duration of hoapital stay

   3= < 3 days

   4= > 3 to < 5 days

   5= > 5 days

4.RIPASA score

 0= < 7.5 score

 1= > 7.5 score

5.Alvarado scoring system

   0= < 7 score

   1= > 7 score

6.Migrating pain

   0= Absent

   1= Present

7.Anorexia

   0= Absent

   1= Present

8.Vomiting/ Nausea

   0= Absent

   1= Present

9.RIF tenderness

   0= Absent

   1= Present

10.Rebound Tenderness

   0= Absent

   1= Present

11.fever

   0= Absent

   1= Present

12.Increased WBC

   0= Absent

   1= Present

13.Left shift of WBC

   0= Absent

   1= Present

IP/ OP NO	Age	Sex	Duration.Hrs	Management	HPE	Mean_stay	RIPASA_group	Alvarado_group	Migrating_pain	Anorexia	Nausea_vomiting	RIF_tend	Rebound_tend	Fever	Inc.WBC	Left_shift	RIF_pain	Guarding	Rovsings	Neg_U.A	RIPASA score	Alvarado score
467960	24	2	24	1	1	3	1	1	1	0	1	1	1	1	1	0	1	0	0	1	11.5	8
461108	29	1	24	1	0	3	1	1	1	1	0	1	1	1	1	0	1	1	0	1	10	9
388232	16	2	32	1	0	3	0	0	0	1	0	1	0	1	0	0	1	0	0	0	5.5	3
457909	16	1	90	1	1	3	0	0	0	0	1	1	0	1	1	0	1	0	0	0	9	8
452665	15	2	100	1	1	3	1	1	1	1	0	1	1	1	1	1	1	0	0	1	8.5	6
457780	33	2	8	0	0	3	0	0	1	0	0	1	0	1	1	0	1	0	0	0	9	9
453421	12	2	24	0	1	3	1	0	1	0	1	1	1	0	0	0	1	1	0	1	6.5	4
442247	32	2	8	1	1	3	1	1	0	0	1	1	1	1	1	1	1	1	1	1	6.5	4
439376	14	1	12	1	0	3	0	0	0	1	0	1	0	1	0	0	1	0	0	0	11	9
431876	19	1	36	1	0	3	1	0	0	0	1	1	1	0	1	0	1	0	0	1	5.5	4
430321	33	1	12	1	0	3	0	0	0	0	1	1	0	1	1	0	1	0	0	0	9.5	8
416220	38	2	24	1	1	3	1	1	1	1	0	1	1	1	1	1	1	1	0	1	9.5	5
410072	15	2	60	1	1	3	1	1	0	0	1	1	1	1	1	1	1	1	0	1	7	6
426615	18	2	36	0	1	3	1	1	1	0	0	1	1	1	1	1	1	1	0	1	10.5	8
426003	27	2	60	1	0	3	0	0	0	0	1	1	0	0	1	0	1	0	0	0	12	9
418565	38	1	30	1	0	3	0	0	0	0	1	0	1	1	0	1	0	0	0	0	4.5	3
415879	15	2	72	1	0	3	1	1	1	0	1	1	1	1	1	1	1	0	0	1	6.5	4
415886	35	2	64	1	1	3	0	0	0	0	0	1	1	0	1	1	1	1	0	1	5.5	5
413328	16	1	36	1	0	3	0	0	0	0	0	1	0	0	1	0	1	1	0	1	13	8
410620	17	2	24	1	0	3	0	0	0	0	1	1	0	0	0	0	1	0	0	0	11.5	9
404956	18	1	40	0	0	3	0	0	0	0	1	1	0	0	0	0	1	0	0	1	9.5	8
371483	34	1	97	0	1	3	1	1	0	1	1	1	1	1	1	1	1	1	0	1	10.5	6
397006	17	2	72	1	0	5	0	0	1	0	0	1	0	1	1	0	1	0	0	0	6	5
380196	25	1	24	1	0	4	0	0	1	1	0	1	0	0	0	0	1	0	0	0	10.5	9
391973	12	1	72	0	1	4	1	1	1	1	0	1	1	1	1	1	1	1	0	1	11.5	9
388636	35	1	46	1	1	4	1	0	0	0	1	1	0	1	0	0	1	0	0	1	9.5	8
385954	46	1	72	0	1	4	1	1	1	0	1	1	1	1	1	0	1	1	0	1	6.5	5
384621	19	2	8	1	0	4	0	0	0	1	0	1	1	0	0	0	1	0	0	1	9.5	9
386232	18	2	90	0	0	4	0	0	0	0	1	1	0	1	0	0	1	0	0	0	10	8
371340	18	2	96	1	0	4	0	0	0	1	0	1	0	1	0	0	1	0	0	1	9.5	9
382562	27	2	72	1	1	4	1	0	0	0	0	1	1	1	1	0	1	0	0	1	8	6
377347	33	2	36	1	1	4	1	1	0	1	0	1	1	1	1	1	1	0	0	1	8	6
374711	14	2	12	0	0	4	0	0	0	0	1	1	0	0	1	0	1	0	0	0	9	6
380206	16	1	24	0	1	4	1	1	1	0	1	1	1	0	1	1	1	1	0	1	11.5	9
437688	19	2	6	0	1	4	1	1	1	1	0	1	1	1	1	0	1	0	0	1	9.5	5
366604	24	2	32	0	1	4	1	1	1	0	1	1	1	1	1	1	1	0	0	1	5.5	5
389587	27	1	46	0	0	4	0	0	0	0	1	1	0	0	1	1	1	0	0	0	8.5	4
179944	32	2	56	1	1	4	1	0	0	0	1	1	0	1	1	0	1	0	0	1	11	8
397543	34	1	8	0	0	4	1	0	0	0	1	1	0	1	0	0	1	1	0	1	6.5	6
351759	45	1	42	1	1	4	1	1	0	1	1	1	1	1	1	1	1	0	0	1	10.5	8
349024	13	2	32	1	1	4	1	1	0	1	1	1	1	0	1	1	1	1	0	1	6	4
359439	16	2	72	0	1	4	1	1	1	1	0	1	1	1	1	1	1	0	0	1	9.5	8
469663	19	2	36	0	1	4	1	1	1	0	0	1	1	1	1	1	1	0	0	1	6.5	4
356784	24	2	12	0	0	4	1	1	1	0	1	1	1	1	1	1	1	0	0	1	12	8
353809	25	1	24	1	1	4	1	1	0	0	1	1	1	1	1	1	1	0	0	1	11	9
397542	29	2	12	1	0	4	0	0	0	1	0	1	0	1	0	0	1	0	0	0	12.5	9
348131	32	1	72	1	1	4	1	1	1	0	1	1	1	1	1	1	1	1	0	1	8	6
348199	17	2	24	0	0	5	0	0	0	0	0	1	0	1	1	0	1	0	0	0	10.5	8
338992	35	1	56	1	1	5	1	1	1	1	0	1	1	1	1	0	1	1	0	1	5.5	4
338450	13	2	6	1	1	5	1	1	1	0	1	1	1	1	1	1	1	1	0	1	5.5	4
389616	16	2	24	1	0	5	1	1	1	1	0	1	0	1	0	0	1	0	0	0	9.5	8
329939	18	2	60	1	1	5	1	1	1	1	0	1	1	1	1	1	1	1	1	0	12.5	9
329428	27	1	72	1	1	5	1	0	0	1	0	1	1	1	0	0	1	1	0	1	7	4
325884	40	1	40	1	0	5	1	1	0	1	1	1	1	1	1	0	1	0	0	1	6	6
300921	14	1	12	1	0	5	0	0	0	0	1	0	0	1	1	0	1	0	0	0	6	6
323917	18	1	24	1	0	5	0	0	0	0	1	0	0	1	1	0	1	0	0	0	8	6
431876	19	2	24	1	0	5	0	0	0	1	0	1	0	1	0	0	1	0	0	1	13	8
421434	30	1	50	0	1	5	1	1	1	1	0	1	1	1	1	1	1	1	1	1	5.5	4
421474	33	1	12	0	1	5	1	1	1	1	1	1	0	1	1	1	1	0	0	1	7	6
424221	46	2	18	1	1	5	1	0	0	0	0	1	1	0	1	1	1	1	0	1	10.5	8
428507	16	2	36	1	0	5	0	0	0	0	0	1	0	1	0	0	1	0	0	1	6.5	3
443217	18	1	36	1	0	5	0	0	0	0	1	1	0	1	0	0	1	0	0	0	5.5	4
457927	35	1	24	1	1	5	0	0	0	0	1	1	1	0	1	0	1	0	0	1	6	6
472637	45	2	24	1	1	5	1	1	0	0	1	1	1	1	1	1	1	1	1	1	13.5	9
487347	33	2	96	1	1	5	1	1	1	1	0	1	1	0	1	1	0	1	0	0	9.5	9
487351	17	2	72	0	1	5	1	1	1	1	1	1	1	1	0	1	0	0	0	1	12	8
487353	35	2	60	1	0	5	0	0	0	1	0	1	0	1	1	0	1	0	0	0	8.5	6

IP/ OP NO	Age	Sex	Duration.Hrs	Management	HPE	Mean_stay	RIPASA_group	Alvarado_group	Migrating_pain	Anorexia	Nausea_vomiting	RIF_tend	Rebound_tend	Fever	Inc.WBC	Left_shift	RIF_pain	Guarding	Rovsings	Neg_U.A	RIPASA score	Alvarado score
487357	18	2	56	1	0	5	0	0	0	1	1	1	1	0	0	0	1	0	0	0	6	4
487361	30	1	36	1	1	5	1	0	0	0	1	1	0	1	0	1	1	1	0	1	10.5	5
487363	24	1	24	0	0	5	0	0	1	0	0	1	0	1	0	0	1	0	0	1	6.5	6