"A COMPARATIVE STUDY TO ASSESS EFFICACY OF TZANAKIS SCORE AND ALVARADO SCORE FOR EFFECTIVE DIAGNOSIS OF PATIENTS WITH ACUTE APPENDICITIS AT KLE DR. PRABHAKAR KORE HOSPITAL AND MEDICAL RESEARCH CENTRE, BELGAUM - A ONE YEAR PROSPECTIVE ANALYTICAL STUDY"

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This is to certify that the dissertation entitled"**A COMPARATIVE STUDY TO ASSESS EFFICACY OF TZANAKIS SCORE AND ALVARADO SCORE FOR EFFECTIVE DIAGNOSIS OF PATIENTS WITH ACUTE APPENDICITIS AT KLE DR. PRABHAKAR KORE HOSPITAL AND MEDICAL RESEARCH CENTRE, BELGAUM - A ONE YEAR PROSPECTIVE ANALYTICAL STUDY**"is a bonafide research work done by **REG NO. BH0117010**

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ABBREVIATIONS

AA.	-	Acute Appendicitis
CA	-	Chronic Appendicitis
HPR	-	Histopathology Report
PPV	-	Positive Predicitve Value
NPV	-	Negative Predictive Value
RLQ	-	Right Lower Quadrant
RIF	-	Right Iliac Fossa
USG.	-	Ultrasonography
WBC	-	White blood cells
CT	-	Computed tomography
HIV	-	Human immunodeficiency virus
HBsAg	-	Hepatitis B surface antigen
vs	-	Versus
R/S	-	Respiratory system
CVS	-	Cardiovascular system
P/A	-	Per Abdomen
TLC	-	Total Leukocyte Count
DLC	-	Differential Leukocyte Count
ECG	-	Electrocardiogram

ABSTRACT

TITLE: - "A COMPARATIVE STUDY TO ASSESS EFFICACY OF TZANAKIS SCORE AND ALVARADO SCORE FOR EFFECTIVE DIAGNOSIS OF PATIENTS WITH ACUTE APPENDICITIS AT KLE DR. PRABHAKAR KORE HOSPITAL AND MEDICAL RESEARCH CENTRE, BELGAUM"

INTRODUCTION: -Acute appendicitis standout amongst the most widely recognized reasons for intense stomach torment. This condition warrants quick heath care and treatment. It is by and large connected with noteworthy dismalness and mortality. Anyway death rate has improved after the rise of anti-infection agents in 1940. Due to dietary propensities for the Asians the frequency of acute appendix is low when contrasted with western populace. The consistency of faeces, bowel travel time and development of appendicolith is diminished by dietary modifications.There is no ideal symptomatic assessment apparatus to distinguish acute appendix if indications are ambiguous, bringing about longer analytic procedure and it might prompt deferring of medical procedure and related increment in morbidity and fatality. In the meantime, speedy management may prompt negative appendectomy with expanded horribleness and consumption of treatment.

AIMS AND OBJECTIVES:-To establish the diagnosis of AA in a more efficacious manner by using Tzanakis score and Alvarado scoring system and evaluate the efficacy of both scoring system by comparison.

MATERIALS AND METHODS:- A Hospital based one year Prospective Study was conducted in the Department of General surgery , KLE'S Dr.Prabhakar Kore Hospital and Medical Research Centre, Belagavi from 1st January 2018to 31st December 2019 and required data was collected from 100 patient who were clinically diagnosed to have acute appendicitis and all patients were assessed using Alvarado score and Tzanakis score and HPR for all patients were used as gold standard to evaluate the efficacy of both scoring systems.

RESULTS: -

In the present study the age span ranged 19 to 93 years.Maximum patients were in age group 18 to 40 years (83%). Pain in right lower quadrant was the most common presenting complain (100%) followed by anorexia (61%) and nausea/Vomiting (48%).

The sensitivity and specificty of Tzanakis score was 80.6 % (at score >8) and 100% (at score >8) respectively. PPV in present study being 100% and NPV being 41.3%.

The sensitivity and specificty of Alvarado score was 11.3 % (at score >8) and 100% (at score >8) respectively .

The negative appendectomy rate in the present study is 12% which is comparable and acceptable (15-20%) among various studies.

CONCLUSION:-Although acute appendicitis is commonest surgical emergency, its management is still challenging. Tzanakis Score outperformed Alvarado score displaying higher sensitivity with similar specificity. Ultrasound is a useful tool in diagnosing patients of Acute appendicitis

KEYWORDS:-

Acute appendicitis, Tzanakis Score, Alvarado score.

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INTRODUCTION

Acute appendicitis standout amongst the most widely recognized reasons for intense stomach torment. This condition warrants quick heath care and treatment. It is by and large connected with noteworthy dismalness and mortality. Anyway death rate has improved after the rise of anti-infection agents in 1940.

Due to dietary propensities for the Asians the frequency of acute appendix is low when contrasted with western populace. The consistency of faeces, bowel travel time and development of appendicolith is diminished by dietary modifications.

The rate of acute appendix is most pervasive in the 10-19-year old and step by step decreases in the geriatric years. As of late, there is 6.3 % expansion in number of cases in patients matured 30-69.

There is no ideal symptomatic assessment apparatus to distinguish acute appendix if indications are ambiguous, bringing about longer analytic procedure and it might prompt deferring of medical procedure and related increment in morbidity and fatality.

In the meantime, speedy management may prompt negative appendectomy with expanded horribleness and consumption of treatment.

Analytic choices incorporate symptoms,physical examinations,laboratory discoveries and imaging methodology like ultrasonography and computed tomography (CT).

There are many scoring frameworks that have been defined for powerful conclusion of acute appendix. Alvarado and Tzanakis scoring frameworks are among one of many.

The Alvarado scoring framework for diagnosing acute appendix incorporates eight factors with aggregate of 10. Tzanakis scoring utilizes four factors and complete score of 15 for analysis of acute appendix.

Both score are mix of clinical assessment, ultrasonography and laboratory marker of inflammatory reaction.

The Alvarado score nowadays is considered as old system for diagnosing acute appendicitis.

Tzanakis score being a triple evaluation scale: two clinical examinations, one radiological: USG examination, and one blood investigation: Total leukocyte count.

OBJECTIVES

To establish the diagnosis of AA in a more efficacious manner by using Tzanakis score and Alvarado scoring system and evaluate the efficacy of both scoring system by comparison.

REVIEW OF LITERATURE

Historical review:

It was Reginald Fitz in 1886 who distinguished appendix as reason for right iliac fossa pain and proclaimed the term 'appendicitis' and early careful mediation. [1] [7]

The credit for depicting anatomy of appendix goes to Berengario-da-Carpi, Fleming and Andreas Vesalius

Claudius Amyand, a British surgeon is credited for performing first appendectomy in 1735.

Charles McBurney was best donor in the progression in the treatment of acute appendix. In 1889, he depicted the McBurney point.

In 1982, it was Kurt Semm who performed first fruitful laparoscopic appendectomy.

Alvarado score was portrayed in 1986. Later it was altered by Kalan.

Tzanakis score was first presented in 2005.

Embryology of appendix:

The subordinates of the midgut are:

• The small intestine

• The appendix, caecum and ascending colon along with right two/third of the transverse colon.

The cecal diverticulum shows up in the sixth week as a swelling on the antimesentric outskirt of the caudal appendage of the midgut circle (Fig 1A)

The development of the apex lacks when contrasted with its remainder, making, the appendix a little diverticulum of the cecum at first .The length of the appendix increases quickly so that during childbirth it is a generally long cylinder emerging from the distal end of the cecum. (Fig 1B, 1C)

After birth the wall of the cecum develops inconsistent, with the outcome that the appendix comes to enter its medial side. (Fig 1D,1E)

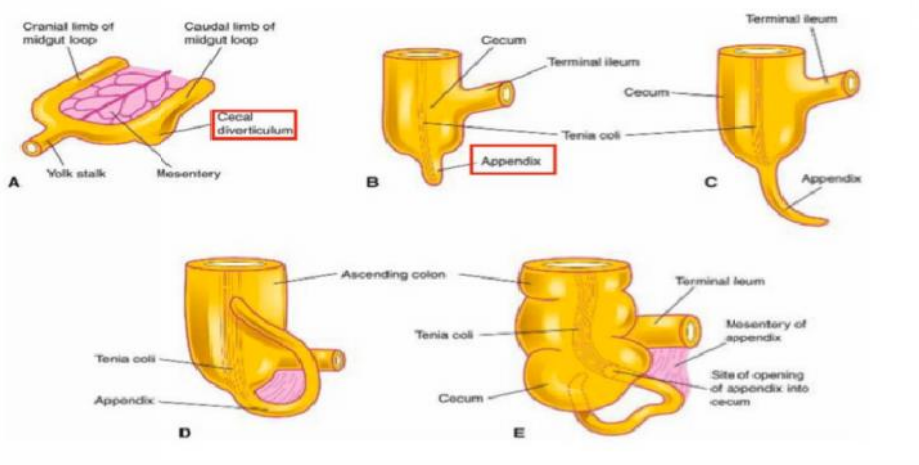


Fig 1: Development of appendix

The base of appendix usually lies where the three tenia coli meet at the surface of caecum, usually 2.5 cm below and posteromedially to ileocecal junction. [9]

In inadequate revolution of the gut, caecum may lie at a higher level underneath the liver in connection to duodenum and gall bladder. In this position signs of acute appendicitis mirror acute cholecystitis. [10]

As in some cases when the caecum is long and mobile the appendix may lie in the pelvis.

All around once in a while, caecum and appendix is positioned to left iliac fossa in cases of situsinversus, in such cases acute appendix mirrors acute diverticulitis of sigmoid colon.

Most common position of appendix is retro-caecal (74%) followed by pelvic (21%) andparacaecal (2%). Other less common positions are preileal, postileal and subcaecal.

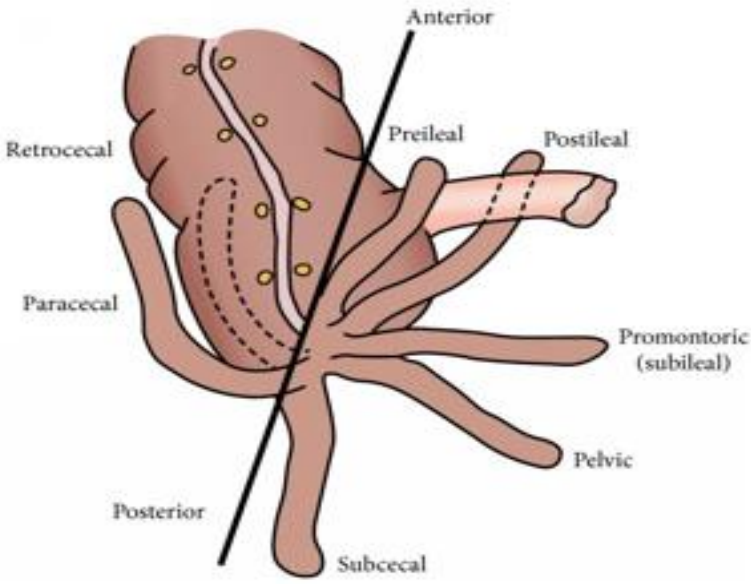


Fig 2 : Positions of appendix

The posteromedial side of the caecum offers starting point to the vermiform index .Anteriorly it is associated with the omentum and ileum. Posteriorly it is related toiliopsoas muscle. The appendiceal wall is like the wall of the colon.

Appendiceal wall has following layers from without outwards:mucosa,submucosa which is rich in lymphoid tissue, circular and longitude muscle layers and outermost layer of serosa.

The mesentery of terminal ileum give rise to appendicular mesentery. Fold of Treves is the only antimesenteric fat pad which connects terminal ileum and appendix .Mesentery of appendix contains appendicular artery which supplies appendix.

Blood supply

Arterial supply of appendix is via appendicular artery, which arises from ileocolic artery. Venous drainage is via appendicular vein which drains into ileocolic vein .In some cases an accessory branch from posterior ceacal artery can supply appendix ; which is named after Dr T Sheshachalam who described it first . [13]

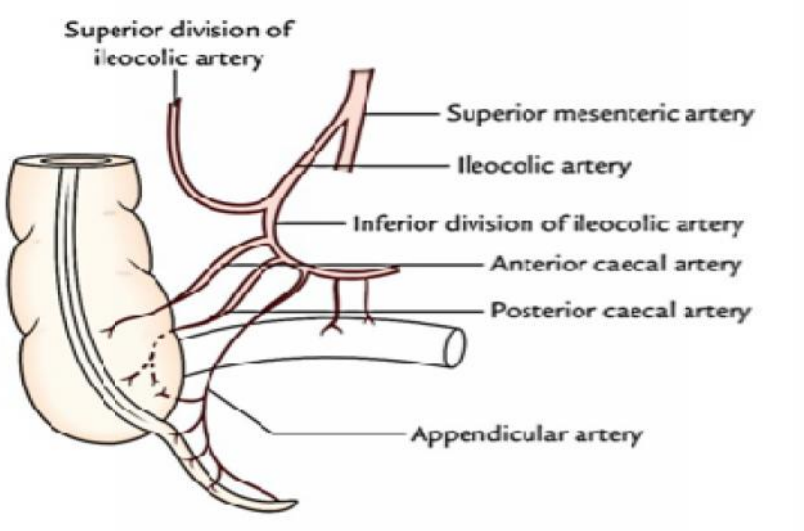


Fig 3 : Arterial blood supply of appendix

Lymphatic drainage:

Appendicular lymphatics drains into anterior ileocolic lymph nodes which in turn drains into superior mesenteric lymph nodes.

Nerve supply:

Appendix gets its nervous drainage from superior mesenteric plexus, vagus forms the parasympathetic supply and sympathetic supply is from T10-T12 level .

Acute Appendicitis:

It is inflammation of appendix. It is the commonest reason for acute abdomen. Occlusion of the lumen being the main driver.

There is 12 % chances for men and 25 % for ladies to undergo appendectomy in a lifetime, with around 7 % surprisingly experiencing appendectomy during their lifetime. It is most common in twenties to forties of life and is more common in males [30]

Etiology

Diminished dietary fiber and more utilization of refined sugars prompts formation of fecoliths and resultant hindrance of appendicular lumen . Intestinal parasites, Pinworm specifically can multiply in the appendix and block the lumen [11]

Pathogenesis

Luminal impediment is the overwhelming reason in intense a ruptured appendix. Fecoliths being most regular cause.Others being, hypertrophy of lymphoid tissue, tumors, vegetable seeds, intestinal parasites.

There is an anticipated sequelae of occasions prompting appendiceal burst. The proximal obstacle of the appendiceal lumen delivers a shut circle check with continuing discharge by the appendiceal mucosa creating enlargement. The luminal limit is very less and even a small amount of secretion distal to impediment increases pressure in lumen.

Appendicular distention invigorates the stretch fibers, delivering obscure dull pain around umbilicus.

With progression in distention of appendix, firstly venous outflow will be stopped and arterial blood flow will be maintained initially leading to engorgement of appendix and at later stage arterial blood flow also get stopped leading to ischemia and perforation. The zone with the least fortunate blood supply endure the most. Ellipsoidal infarcts are seen in the antimesenteric border of appendix . [12]

Microscopy:

The mucosa is edematous, hyperemic, penetrated with polymorphonuclear leucocytes and in spots with putrefaction. There is additionally polymorphs penetration found in submucosa and muscularis. Vascular thrombosis is common in perforated appendicitis. The lymphoid follicles are hyperplastic, necrotic.

The veins of the serosa are frequently widened and on the serous surface there might be a fine fibrinous exudate. More often than not, a limited part in the wall of appendix is totally necrotic. The fibro-fatty tissue of the mesoappendix is generally edematous and hyperemic.

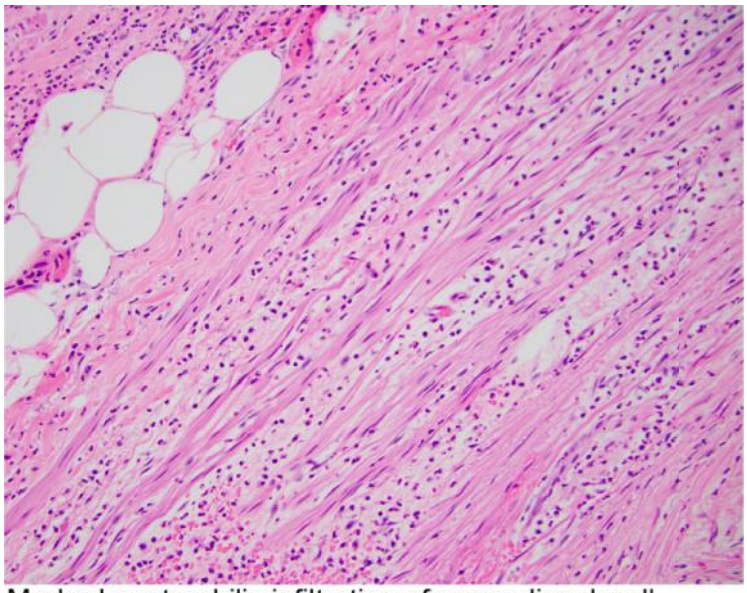


Fig: 4Histology of acute appendicitis

Bacteriology

Typical gastrointestinal tract flora is present in appendix such as facultative aerobes (E.Coli) and anaerobes (Bacteriods) . The culture of peritoneal fluid is helpful in proving polymicrobial character of flora in cases of perforated appendicitis.

Clinical highlights

Pain is main manifestation. Firstly located periumbilically due to dermatomal innervation and with involvement of regional parietal peritoneum it gets focused to right iliac fossa .Varieties in the anatomic position of appendix represent changing head loci of pain .

Anorexia is usually associated with an acute appendix. Vomiting is present in nearly three fourth of all cases .First symptom to occur usually is loss of appetite after which pain in abdomen appears and following that vomiting appears.

Signs

Physical signs are governed by anatomic position of the appendix.

1)classical rebound tenderness - Macburney point .

2)On examination, pressure is applied at RIF and suddenly on removal of the pressure patient will have pain - this is known as Blumberg's sign (rebound tenderness).

3)On palpation and applying pressure on LIF, patient feels pain in RIF because of shifting of intestinal loops in RIF which in turn irritates the parietal peritoneum - this is known as Rovsing’s sign.

4)On doinghyperextension of right hip, patient feels pain in RIF secondary to psoas irritation by retrocaecally placed appendix.

5)On doing internal rotation of right hip joint, patient feels pain in RIF secondary to obturator interns irritation by appendix placed in pelvic position.

6) On digital rectal examination tenderness is present in right side of rectum, commonly seen in appendix placed in pelvic position.

7) A triangle bounded by public symphysis, umbilicus and ASIS is known 'Sherren's triangle'. In cases of acute appendicitis hyperaesthesia will be present in this triangle. [6] [19]

Varying features as per age/condition:

Infants: chances are very rare, but if acute appendicitis is there , it is associated with high chances of perforation and mortality .

Children: localization does not occur , chances of developing peritonitis is more . It requires prompt surgical intervention

Elderly: It is usual to find gangrenous and perforated appendicitis. [15]

Pregnancy: By virtue of of gravid uterus, appendix tends to displace up in abdomen due to this, pain tends to be located more higher and lateral as compared to usual presentation. After two trimesters there is significant increase in maternal mortality by ten folds and also associated with risk of premature labor.

SCORING SYSTEM

Alvarado Score

This system consists of 4-symptoms, 1-sign , 3-labarotory findings .

There is one point each for anorexia, vomiting, rebound tenderness,migratory pain to RLQ, fever, neutrophilia and two points each for pain in RLQ and white blood cell count more than ten thousand per cubic millimeter in blood.

Total score is 10, less than four is less likely suggestive of appendicitis and more than 8 is highly suggestive of acute appendicitis. [4]

Drawbacks : It was based on data collected retrospectively

Tzanakis score:

Four points are given for right iliac fossa tenderness, two points are given for white blood cell counts greater than twelve thousand in blood, three points are given for rebound tenderness and ultrasonography findings confirming acute appendicitis is awarded with six point.

A total more than eight is highly suggestive of acute appendicitis. [20]

Imaging Modalities:

ULTRASONOGRAPHY

Ultrasound abdomen pelvis is usually done to count out other similar mimicking conditions such as ectopic gestation, stones in ureter.

USG also affirms the presence of appendicular abscess or mass. [5][14]

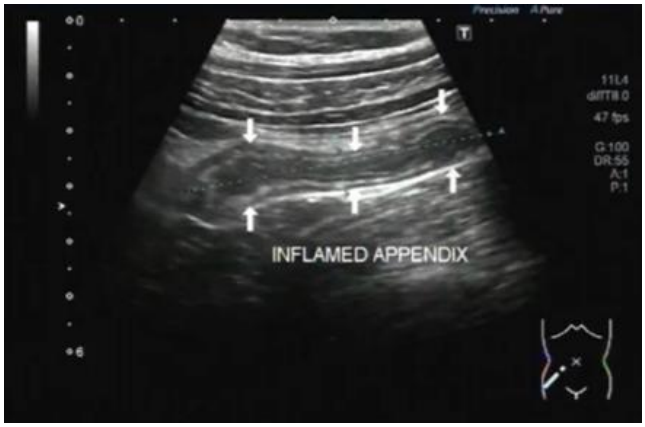


Fig:5 USG view of acute appendicitis

COMPUTERIZED TOMOGRAPHY

Contrast CT scan plays a pivotal role to correctly diagnose acute appendicitis in doubtful cases, specially in elderly people because clinical signs are not much profound in them. [24]

Differential Diagnosis

- Ruptured or twisted ovarian cyst
- Meckel's diverticulitis - common in children
- Mesenteric lymphadenitis
- Ruptured ectopic pregnancy
- Crohn's disease -common in elderly
- Right ureteric colic
- Salpingo-oophoritis

TREATMENT

Antibiotics

Most patients with severely inflamed appendix are overseen by brief careful removal of the appendix.It is wise to give preoperative antibiotics to cover broad spectrum of microorganisms and reduces chances of intraabdominal abscess formation .

In cases of perforated appendicitis parenteral antibiotics are given even after surgery till the patient is not febrile , usually second generation cephalosporin or quinolone/ metronidazole is administered.

SURGERY – Appendectomy

Approaches :

1) Grid iron incision : incision perpendicular to spinoumbilical line at McBurney point .
2) Lanz incision : along the langers line
3) RockeyDewis horizontal incision :with Fowler weir medial muscle splitting extension or Rutherford Morrison lateral muscle splitting extension .
4) Right paramedian incision : rarely done now a days
5) Lower midline laparotomy : in difficult cases like perforated appendicitis with peritonitis .
6) Laparoscopic approach : getting popular now

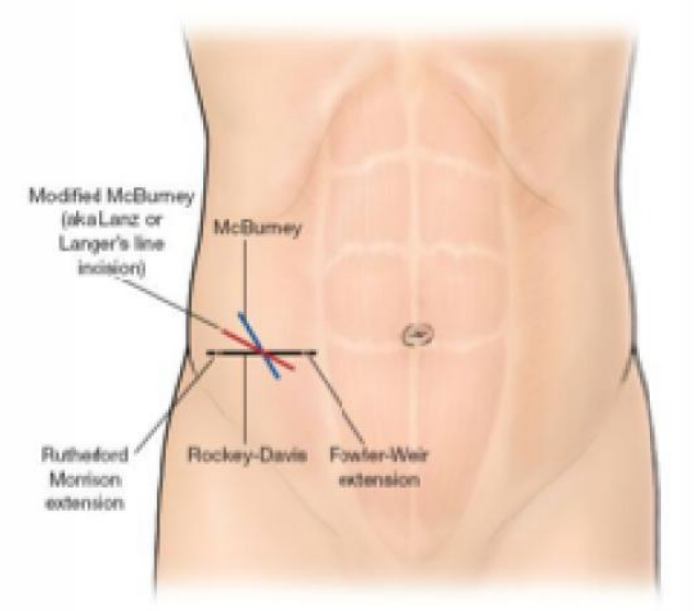


Fig: 6 Incisions for open appendectomy

OPEN APPENDECTOMY:

Under all aseptic precautions parts painted and draped , grid iron incision is taken and same is deepened to visualize fires of aponeurosis of external oblique muscle. These fibresare split along it's fibers . Internal oblique muscle fibers are separated along its fibers and like wise transverse abdominis muscle fibers were separated along its fibers. Peritoneum is opened.

At the convergence of Taenia coli appendicular base is identified. Mesoappendix dissection is done and mesoappendix with appendicular artery ligated. Appendicular base crushed , doubly ligated and cut . Antiseptic is applied at stump. [16]

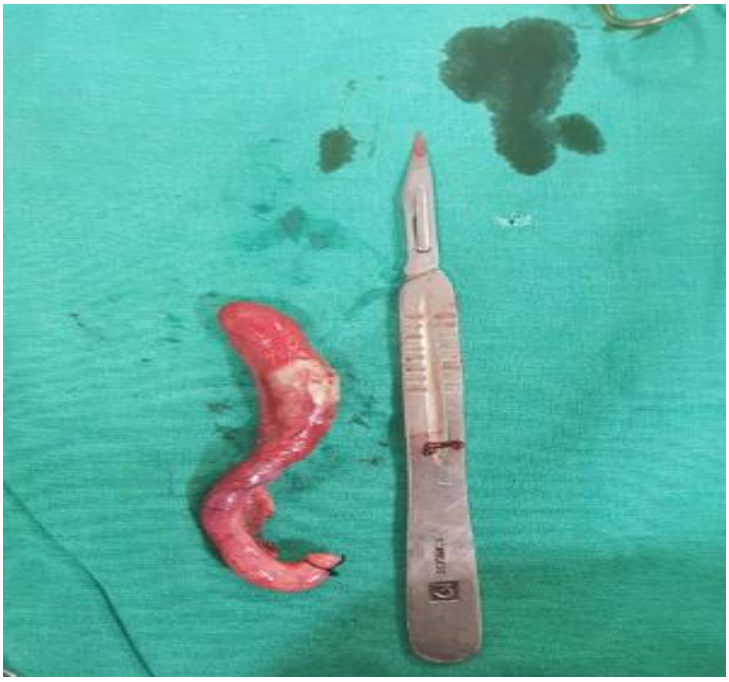


Fig:7Specimen of acute appendicitis

LAPAROSCOPIC APPENDECTOMY

Under all aseptic precautions parts painted and drapped , 10 mm umbilical port is placed , under direct vision 10 mm supra umbilical port and 5 mm port on left side lateral to rectus muscle in between initial two ports are placed .

Omega manoeuvre is done , appendix is visualised , mesoappendix dissected and appendicular artery clipped . Base of the appendix is doubly ligated with Roeder's knot and cut above the knot with proximal ligation with another knot . Specimen is retrieved via 10 mm umbilical port .

Now a days single incision laparoscopic appendectomy is also popular with excellent cosmetic outcome. [25]

METHODOLOGY

Over a period of one year (Jan 2018 to Dec 2018) , hundred patients suspected of acute appendicitis on the basis of clinical examination were compared with two different scoring system first one being Alvarado score and second one being Tzanakis score.

Inclusion Criteria:

Patients≥ 18 years of age attending general surgery out patient department and have been diagnosed and getting admitted for acute appendicitis in KLE Dr.Prabhakar Kore Hospital and Medical Reasearch Centre, Belagavi.

Exclusion Criteria:

- Medically unfit patients
- Patient not willing to give consent for the study.
- Patients having perforation of appendix, mass formation.

Collection of data

Sample Size

Formula used

n=4*sensitivity*(100-sensitivity) / L2 * P

L- permissible error upto 5 %

P-prevalence of appendicitis in our hospital — 6.8%

Sensitivity- 95.4% [sensitivity of Tzanakis score as found in original study]

METHODOLOGY

Applying in the above formula, n=26 there by minimal sample size was 26.Total 100 samples were taken and both the scores were applied to each case.Every year an average of 300 patients of acute appendicitis get admitted and operated on. By stratified random sampling every 3rd patient was selected for the study. Both the scoring systems were applied in all patients and scores tallied accordingly.

Alvarado Score

Alvarado score	
Feature	**Score**
Migration of pain	1
Anorexia	1
Nausea	1
Tenderness in right lower quadrant	2
Rebound pain	1
Elevated temperature	1
Leucocytosis	2
Shift of white blood cell count to the left	1
Total	**10**

Tzanakis score:

Tzanakis Score

1. Rt lower abdominal tenderness = 4
2. Rebound tenderness = 3
3. WBC's> 12,000 in the blood = 2
4. Positive USS firdings of appendicitis = 6

- Total score = 15

Following decisions were taken:

Patients having score in between one to four were observed.

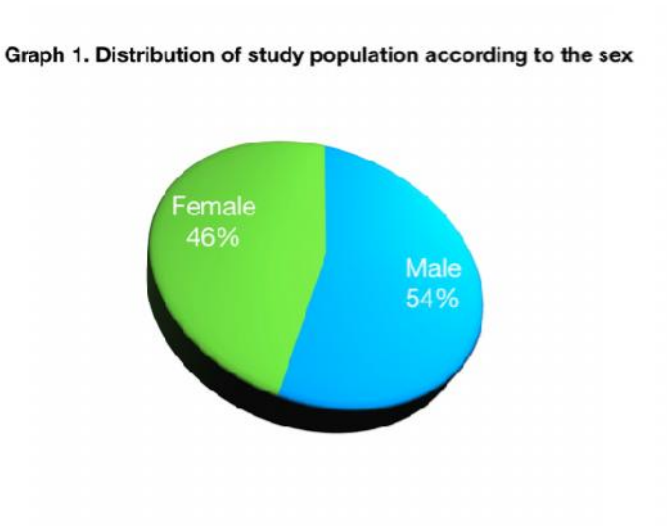
Patients having score of 5-8 were observed for next 24 hours, reevaluated. At any time if clinical condition of patient worsens then he/she was subjected to surgery.Both scoring systems were compared with final Histopathology analysis report.

RESULTS

Statistical analysis in tabular form is as follows:

Table 1: Distribution of study population according to sex.

SEX	NUMBER	PERCENTAGE (%)
MALE	54	54
FEMALE	46	46
TOTAL	100	100

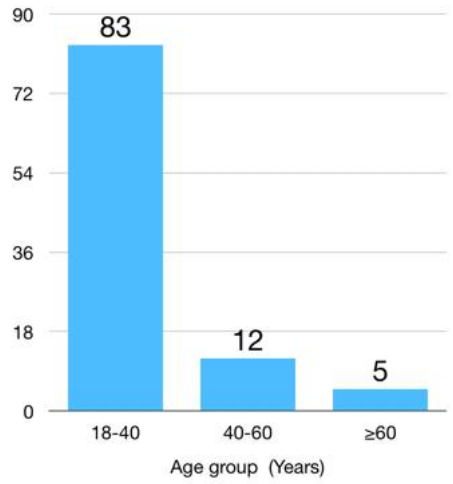


In this study male patients (54) were more than female patients

Table 2: Distribution of the study population according to the age

AGE GROUP (years)	NUMBER	PERCENTAGE (%)
18-40	83	83.00
40-60	12	12.00
>60	5	5.00
TOTAL	100	100.00

Graph 2. Distribution of the study population according to the age



In this study most of the patients were agreed between 18-40 years (83%).

Table 3. Distribution of the study population according to USG findings

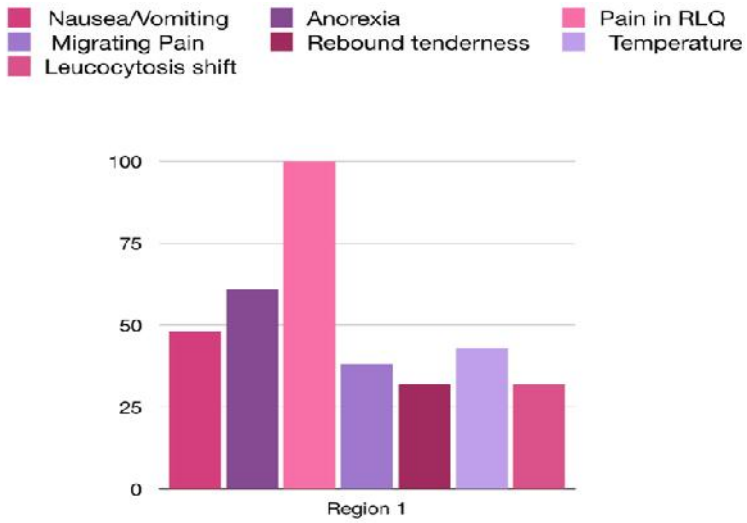
USG FINDINGS	ACUTE APPENDICITIS	PROBE TENDERNESS
NUMBER	70	30
PERCENTAGE (%)	70.00	30.00

Ultrasound could diagnose appendicitis in 70 patients.

Table 4. Distribution of the study population according to the frequency of signs / symptoms

S. No.	SIGN/SYMPTOMS	NUMBER	PERCENTAGE
1	Nausea/Vomiting	48	48.00
2	Anorexia	61	61.00
3	Pain RIQ	100	100.00
4	Migrating Pain	38	38.00
5	Rebound Tenderness	32	32.00
6	Temperature (>37.3C)	43	43.00
7	Leucocytosis Shift	32	32.00

In this study, pain in RLQ was most common symptom, presenting in 100 individuals.Anorexia was present in 61 patients, vomiting was present in 48 patients, fever was present in 43 patients

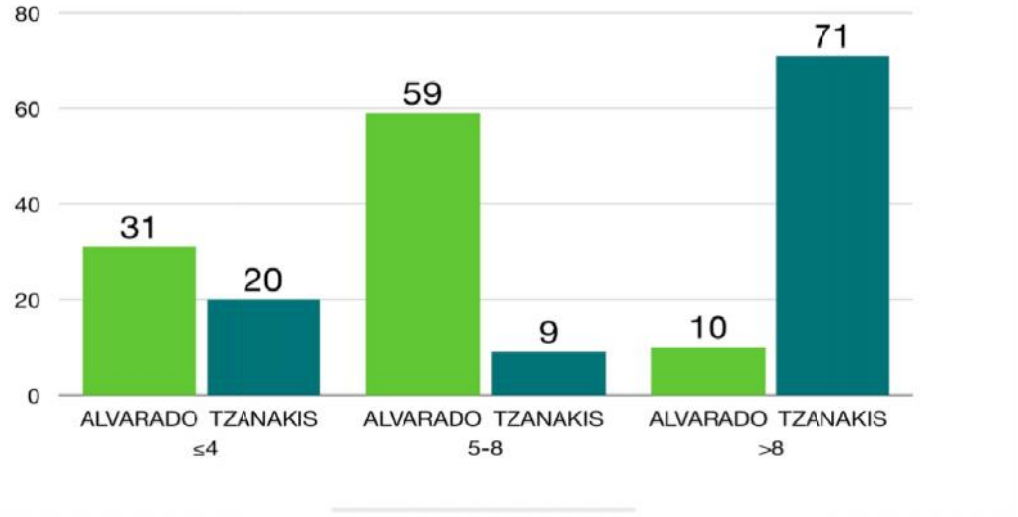


Graph 3. Distribution of the study population according to the frequency of signs / symptoms

Table 5. Distribution of the study population according to SCORES

SCORE	ALVARO	TZANAKIS	HPR
≤4	31	20	Acute appendicitis 88
5-8	59	9	Chronic appendicitis 12
>8	10	71	
Total	100	100	100

Graph 4. Distribution of the study population according to SCORES



Maximum number of patients were present in score range of >8, with 71 patients being grouped by Tzanakis score and 10 patients grouped by Alvarado score.

Table 6. ALVARADO with HPR

SCORE	AA	CA	TOTAL
>8	10	0	10
≤8	78	12	90
TOTAL	88	12	100

Alvarado score (at score >8) correctly diagnosed in 10 individuals with zero false positive cases.

Table7. TZANAKIS with HPR

SCORE	AA	CA	TOTAL
>8	71	0	71
≤8	17	12	29
TOTAL	88	12	100

Tzanakis score could diagnose 71 cases of acute appendicitis (at score >8) with no false positive cases.

DISCUSSION

Surgeon's great clinical appraisal is viewed as most significant essential in analysis of appendicitis. A few other condition can emulates this clinical condition. Even after the advent of various imaging modalities diagnosis of acute appendicitis still remains a daunting task. [17]

The utilization of USG or CT in associated patients with appendicitis is normal. CT ought to be utilized specifically to limit introduction to ionizing radiation. False negative outcomes may defer medical procedure and associated morbidity. [24]

Choice to surgically intervene depending on physical assessment, resulted in higher negative appendectomies which can lead to financial burden and morbidity.

Tzanakis score can be utilized to avert negative appendectomy . It was created in 2005 in Greece dependent on tentatively gathered information of factors with autonomous prognostic worth utilizing a numerically increasingly suitable strategy for the development. [26]

A scoring framework ought to be of straightforward structure so as to help in basic formulation of diagnosis and aid in treatment of patients when there is doubt regarding the certainity of diagnosis .[18]

In this present study slight male preponderance was noted with 54% of the patients male and 46% females. The ratio between female and male was 1:1.17. This sex distribution pattern was consistent with a single center comparative observational study conducted by Atreya A et al. where 57.14% of the patients were male and 42.86% of the patients were female.[27]

In the present study the age span ranged 19 to 93 years.Maximum patients were in age group 18 to 40 years (83%) which is comparable with a single

centercomparative observational study conducted by Atreya A et al. where 73.4% of the study population were in the same age group.[27]

In this study pain in right lower quadrant was the most common presenting complain (100%) followed by anorexia (61%) and nausea/Vomiting (48%). In a similar single center comparative observational study conducted by Shashikala V et al. majority of study population presented with pain abdomen (90%) followed by fever (58%) and vomiting (36%).

In this study an attempt was made to evaluate the efficiency of Tzanakis score and compare it with Alvarado score[28]

Table 8 : Results

	Tzanakis	Alvarado
Score	>8	>8
Sensitivity	80.6%	11.3%
Specificity	100%	100%
PPV	100%	100%
NPV	41.3%	13.3%

The sensitivity and specificty of Tzanakis score was 80.6 % (at score >8) and 100% (at score >8) respectively in the present study, was similar to study conducted by Malla BR et al. single center comparative observational study where the sensitivity was 86.95% and specificity was 75%. The PPV and NPV among these two studies are also comparable, with PPV in present study being 100% and NPV being 41.3%. The PPV in the study done by Malla BR et al. was 97.5 % and NPV 33.3 %.[22]

Original study conducted by Tzanakis et al forwarded 95.4% sensitivity and specificity of 97.4% which is again comparable with present study.

The sensitivity and specificty of Alvarado score was 11.3 % (at score >8) and 100% (at score >8) respectively in the present study similar to Castro et al. where sensitivity was 29% and specificity was 95%. Whereas PPV and NPV among these two studies are not comparable, with PPV in present study being 100% and NPV being 13.3%. The PPV in the study done by Castro et al. was 77 % and NPV 70 %.[17]

In the study done by Malla BR et al. PPV and NPV of Alvarado score are comparable with the present study with PPV being 97.2% and NPV being 21.42%. [22]

The results of the present study were similar to the studies of Malla BR et al., Shashikala V et al.

The negative appendectomy rate in the present study is 12% which is comparable and acceptable (15-20%) among various studies.

CONCLUSION

Although acute appendicitis is commonest surgical emergency, its management is still challenging. Tzanakis Score outperformed Alvarado score displaying higher sensitivity with similar specificity.

Ultrasound is a useful tool in diagnosing patients of AA.

SUMMARY

- The study was done in tertiary care KLE Dr PK hospital and MRC, Belagavi.
- In a study of 100 patients of suspected cases of acute appendicitis, males comprised 54% and females 46%.
- Maximum patients belong to the age group 18 to 40 years
- Pain in right lower quadrant was the most common symptom followed by anorexia and vomiting.
- Histopathology which was the gold standard used in this study reported 88 cases as acute appendicitis and 12 cases as chronic appendicitis.
- Majority of patients were in score range >8 , with 10 classified by Alvarado and 71 being classified by Tzanakis Score .
- At score >8 Tzanakis demonstrated a sensitivity of 80.6% and specificity of 100%.
- At score >8 Alvarado demonstrated a sensitivity of 11.3% and specificity of 100%.
- USG is a safe, reliable modality for patients with acute appendicitis. In the present study it diagnosed 70% patients accurately with acute appendicitis
- In the present study Tzanakis score outperformed Alvarado score.
- Scoring systems should help in correct diagnosis in order to reduce negative appendectomies.

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ANNEXURE I

CONSENT STATEMENT

Title of Research Study: **A COMPARATIVE STUDY TO ASSESS EFFICACY OF TZANAKIS SCORE AND ALVARADO SCORE FOR EFFECTIVE DIAGNOSIS OF PATIENTS WITH ACUTE APPENDICITIS AT KLE DR. PRABHAKAR KORE HOSPITAL AND MEDICAL RESEARCH CENTER , BELGAUM .**— A ONE YEAR PROSPECTIVE ANALYTICAL STUDY

Principal Investigator: - DR.——————— Post Graduate Student, Department of General Surgery, J.N. Medical College, Belgavi-10

INTRODUCTION AND PURPOSE:-

Co-investigator: -DR. _____ Associate Professor, Department of General Surgery, J.N. Medical College, Belagavi-10

You are requested to participate in a study that is an attempt to find out the effectiveness of Tzanakis score vs Alvarado score in diagnosis of acute appendicitis. Appendicitis is the most common abdominal emergency worldwide .Acute appendicitis has a lifetime risk of 8.6 % in men and 6.7 % in females The accuracy of clinical examination in diagnosing acute appendicitis is 70-87% Approx. 20-33 % of patients with suspected acute appendicitis have atypical findings making clinical diagnosis difficult .

In an effort to avoid the above mentioned problems, this study has been undertaken to reduce the negative appendectomy rate by effective diagnosis of acute appendicitis clinically.

This study is simple, effective and safe which aims to facilitate effective diagnosis of acute appendicitis clinically which leads to decrease negative appendectomy rates and thereby effective management. In this study, there will be comparison of the Tzanakis scoring with Alvarado scoring in 100 cases of suspected acute appendicitis This study will be conducted by Dr. Post Graduate in Department of Surgery, under the direct supervision and guidance of Dr Associate Professor, Department of Surgery, J. N. Medical College, BELAGAVI.

BENEFITS: -This study leads to effective diagnosis of acute appendicitis.RISK INVOLVED:-The side effects of this study are nil

COMPENSATION:-Taking part in the study will not affect the cost of treatment i.e. it will be similar to the cost of standard procedure. In the event that you become injured as a result of taking part in this study, treatment will be offered to you or you will be given information about where to receive medical care. But you/your insurance company will be responsible for the costs. However, no reimbursement, compensation or free medical care will be given.

CONFIDENTIALITY: - Every effort will be made to protect the confidentiality of the information you provide. This means that the researchers will not let anyone, not a part of the study, see the information you provide. Only Dr. and Dr. will have access to the information collected. Results of this study may be published but your name will not be revealed.

VOLUNTARY PARTICIPATION / WITHDRAWAL: - Taking part in this study is voluntary; you may choose not to enroll in this study. Your decision will not change the present or future health care services offered to you at KLES Dr. Prabhakar Hospital, BELAGAVI.

If you have any queries about the study, you may contact Dr. ____ and Dr. ____. If you need any further information regarding your rights as a study participant, you may also contact Dr.Roopa M. Bellad (Mobile No.9448113403), Chairman of Institutional Ethics Committee, JNMC, and Belagavi-10

CONSENT TO PARTICIPATE IN THE STUDY

I Mr./Ms, have been explained about the research study, the need of the study, the intervention, their risks, benefits and alternatives available in my own vernacular language.

I voluntarily agree to participate in this study by signing up this form below. I understand that I may withdraw at any time from this study. I have been given adequate time to clarify my doubts about the study and my rights as a study participant.

My signature / thumb impression below indicates that I have read or explained information in the consent including the risks and benefits in my own vernacular language and have cleared my doubts.

Name of participant: Signature/LTI:

Name of legally authorized
Representative
(if applicable):
Relationship with participant: Signature/LTI

Name of co-nvestigator: Signature
(Guide/ Direct supervisor)

Name of principal investigator: Signature:

ANNEXURE II.ETHICAL CLEARANCE.

K.L.E.UNIVERSITY'S
JAWAHARLAL NEHRU MEDICAL COLLEGE,
NEHRU NAGAR, BELAGAVI-590010 (KARNATAKA-INDIA)
(Accredited 'A' Grade by NAAC)

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Fax No. +91 (0)831 - 2470759

Ref: MDC/DOME/21 **Date: 22/11/2017**

To.

Dr. Dron Sharma,
PG student in Surgery,
J.N.Medical College,
BELAGAVI.

Sub: Institutional Ethical Clearance for the study.

With reference to the above, we wish to inform you that your proposed research project titled **"A COMPARATIVE STUDY TO ACCESS EFFICACY OF TZANAKIS SCORE AND ALVARADO SCORE FOR EFFECTIVE DIAGNOSIS OF PATIENTS WITH ACUTE APPENDICITIS AT KLE DR. PRABHAKAR KORE HOSPITAL AND MEDICAL RESEARCH CENTRE, BELAGAVI – A ONE YEAR PROSPECTIVE ANALYTICAL STUDY"**, is ethical and justifiable. The proposed research project has been cleared by the JNMC Institutional Ethics Committee on Human Subjects Research.

(Dr. Arathi Darshan)
Member Secretary
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belagavi.

(Dr. Roopa M Bellad)
Chairman,
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belagavi.

ANNEXURE III - PROFORMA

PROFORMA / QUESTIONNAIRE TO BE USED FOR DATA COLLECION The proposed proforrna / questionnaire to be used for data collection for the study titled A COMPARATIVE STUDY OF TZANAKIS SCORE AND ALVARADO SCORE FOR PATIENTS WITH ACUTE APPENDICITIS AT KLE DR. PRABHAKAR KORE HOSPITAL AND MEDICAL RESEARCH CENTER BELGAUM — A ONE YEAR PROSPECTIVE ANALYTICAL STUDY is as follows:-

A) PATIENT IDENFICIATION DATA

1) Name:

2) IP No.:

3) Age:

4) Sex:

5) D.O.A:

6) Address:

7) Religion:

8) Marital Status:

9) Occupation:

B) CHIEF COMPLAINTS:

C) HISTORY OF PRESENTING ILLNESS:

D) PAST HISTORY :(including: history of diabetes mellitus, hypertension, asthma, previous surgeries,drugtherapy)

E) PERSONAL HISTORY:

F) FAMILY HISTORY:

G) GENERAL PHYSICAL EXAMINATION:

1)Built and Nourishment:

2) Pallor / Icterus / Cyanosis / Clubbing / Edema / Lymphadenopathy (To be ticked if present)

3)Vital Signs: PR: /min; BP: mmHg; RR: /min; Temp:

H)PER ABDOMINAL EXAMINATION

1) Inspection:

2) Palpation: (with special mention for right iliac fossa tenderness)

3) Percussion:

3) Auscultation: BS

I)SYSTEMIC EXAMINATION

1)CNS:

2)CVS:

3)R S:

K) INVESTIGATIONS:

1) Total WBC Counts:

2) Neutrophils:

3) USG (Abdomen and Pelvis)

L) CLINICAL IMPRESSION / DIAGNOSIS:

M) MANAGEMENT:

N) HISTOPATHOLOGY REPORT:

SCORING CONTENT	ALVARADO SCORE	TZANAKIS SCORE
1) NAUSEA/ VOMITING		
2)ANOREXIA		
3)MIGRATION OF PAIN TO RIGHT ILIAC FOSSA		
4)TENDERNESS IN RIGHT ILIAC FOSSA		
5) REBOUND TENDERNESS		
6)BODY TEMPERATURE FEVER OF 37.3 DEGREE CELCIUS OR MORE		
7)WBC COUNTS A) >10,000 FOR ALVARADO SCORE B) >12,000 FOR TZANAKIS SCORE		
8)NEUTOPHILIA >70%		
9)USG FINDINGS : + SCAN SUGGESTIVE OF ACUTE APPENDICITIS		
10) TOTAL		

ANNEXURE IV - KEY TO MASTERCHART

P	–	Present
HPR	–	Histopathology Report