AN OBSERVATIONAL STUDY TO DETERMINE THE EFFECTIVENESS OF THE RAPID UREASE TEST FOR THE PRESENCE OF HELICOBACTER PYLORI INFECTION

Section A-Research paper

AN OBSERVATIONAL STUDY TO DETERMINE THE EFFECTIVENESS OF THE RAPID UREASE TEST FOR THE PRESENCE OF HELICOBACTER PYLORI INFECTION

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ABSTRACT

H. pylori infection is the most frequent around the globe, affecting 40–50% of the population in industrialized nations and 80–90% of the population in underdeveloped nations. The former categorization method recognized H. pylori PCR by culture, histology, or non-invasive tests such as stool sample antigen, UBT, or serology. While helpful, each of these tests has limits and may provide erroneous findings. Studies show that the Rapid Urease Test (RUT) is a simple, non-invasive method for H. pylori infection identification because of its high sensitivity and specificity. This study examined the Rapid Urease Test's sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) in detecting H. pylori infection following a stomach biopsy. Finally, the RUT reliably detects H. pylori infection and can replace histopathology in treating acid peptic illness and dyspepsia.

Keywords: H. Pylori**,** RUT, sensitivity, specificity**.**

3414

AN OBSERVATIONAL STUDY TO DETERMINE THE EFFECTIVENESS OF THE RAPID UREASE TEST FOR THE PRESENCE OF HELICOBACTER PYLORI INFECTION

Section A-Research paper

INTRODUCTION

Various studies have shown that Helicobacter pylori (H. pylori) is a spiral-shaped, microaerophilic, fastidious, motile, flagellated gram-negative bacterium that is recognized as the most common cause of chronic bacterial infection in humans, afflicting up to 50% of the global population.[1,2] It infects 40–50% of the population in developed nations and 80–90% of the population in developing countries, making it the most common infection on the planet.[3] Studies have shown that oral-oral and feco-oral routes have been reported, although person-to-person transmission is more common.[4] According to tradition classification approach, H. Pylori PCR can be diagnosed by culture, and histology, which require specimens from an upper gastrointestinal endoscopic biopsy, and non-invasive tests like H. pylori antigen in a stool sample, UBT (Urea Breath Test), and serology .Endoscopy is required for invasive tests like histological analysis, culture, and PCR, while serology and urea breath testing do not require it. Test selection depends on a number of factors, including the patient's clinical situation, the test's cost, and its sensitivity and specificity.[5] They further include biopsy collection, observer variability, stomach H. pylori distribution, and staining. These factors may skew the findings.[6] But, all these tests have their own limitations & may sometimes give false results .

Henceforth, for having the best management of H. pylori-related diseases,we need to have specific and accurate diagnosis, especially for treatment courses (pre-treatment and post-treatment of H. pylori infection).

In addition,according to past studies, the Rapid Urease Test (RUT) is a minimally complex yet invasive diagnostic tool that is utilized for the preliminary detection of H. pylori infection due to its elevated sensitivity and specificity. During the initial phases of H. pylori infection, endoscopy without a biopsy was found to be an inadequate diagnostic method.[7] Hence, the objective of our investigation was to determine the sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of the Rapid Urease Test for detecting Helicobacter pylori infection on gastric biopsy.

AIM

The goal of the research was to evaluate the sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and diagnostic accuracy of RUT and histopathological examination in detecting H. pylori infection.

AN OBSERVATIONAL STUDY TO DETERMINE THE EFFECTIVENESS OF THE RAPID UREASE TEST FOR THE PRESENCE OF HELICOBACTER PYLORI INFECTION

Section A-Research paper

INCLUSION CRITERIA

1. Patient who all reported with Acid Peptic Disorder and Dyspepsia were included in the study.

2. Patient age group of (18-75years) were included in the study.

EXCLUSION CRITERIA

Patients having active upper gastro intestinal bleeding.

MATERIALS & METHOD

TYPE OF STUDY – Our study was an observation hospital based type study.

STUDY DURATION- Our study started from December, 2018 and ended at June,2020.

STUDY SITE – Our study was conducted at the Krishna Hospital & Medical Research Center , Karad.

SOURCE OF DATA – Patients reported to the outpatient department in Krishna Hospital & Medical Research Center , Karad were included in our study. All patients with acid peptic disorder and dyspepsia were tested for H. pylori using endoscopic biopsy, the Rapid Urease Test, and histopathological assessment of biopsy samples.

STUDY DESIGN

Patients referred from several departments at the Krishna Institute of Medical Sciences, Karad, as well as those in the Surgery Department, will take part in the study from December 2018 to July 2020. All patients with acid reflux or dyspepsia will be screened for H. pylori using an endoscopic biopsy, a rapid urease test, and a histological evaluation of the specimen.

INFORMED CONSENT

Prospective participants who met the study's eligibility criteria were provided with information regarding the study's purpose and subsequently enrolled after providing written informed consent.

ETHICAL CLEARANCE

The study obtained ethical clearance from the College and University Committee. Following the receipt of ethical clearance from the department director, a decision was made to proceed.

DATA COLLECTION

The study participants were systematically selected based on their adherence to the study selection criteria. The study participants were questioned regarding their age, gender,

3416

AN OBSERVATIONAL STUDY TO DETERMINE THE EFFECTIVENESS OF THE RAPID UREASE TEST FOR THE PRESENCE OF HELICOBACTER PYLORI INFECTION

Section A-Research paper

presenting symptoms, and comorbidities, if any. After conducting a clinical examination, the patients' findings, which encompassed vital signs and systemic examination vitals, were recorded. The researchers utilized an endoscopic approach to obtain a biopsy sample from both the body and the pyloric antrum of the stomach. Following the staining of the biopsy specimen with haematoxylin and eosin and Giemsa, the specimen was subjected to the Rapid Urease Test, while a separate biopsy specimen was subjected to histopathological examination. The aforementioned qualities were utilized to assess the slides.[8]

1. Chronic active gastritis with marked lymphoplasmacytic inflammation andneutrophils.

2. Active or neutrophilic inflammation prominent in the gastric pits, causingpititis.

3. Foveolar hyperplasia, features of degeneration, and, in severe cases, erosion, haemorrhage, and mucosal necrosis

4. Prominent lymphoid aggregates.

5. The organisms appear as slightly curved seagull wing–shaped rods, mostprominent in the gastric mucin and the lining surface.

6. Foveolar epithelium and gastric pits

These findings were recorded on a predesigned & pretested profoma.

PROFORMA

<u>Patient information</u>

Name: Age: Sex: Hosp. No: Contact information:

<u>Clinical characteristics</u>

Chief complaints:

Past history:

<u>Examination:</u>

• GPE:
• Vitals :
   PR: BP: SPO2:   RR: Temp:
Systemic examination:
   CVS-   RS-   CNS PA

<u>Investigations:</u>

• Endoscopic Findings:
• Rapid Urease Test:
• Histopathological Examination:

STASTICAL ANALYSIS

3417

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AN OBSERVATIONAL STUDY TO DETERMINE THE EFFECTIVENESS OF THE RAPID UREASE TEST FOR THE PRESENCE OF HELICOBACTER PYLORI INFECTION

Section A-Research paper

All traits were descriptively summarized. For continuous variables, we utilized the summary statistics of mean and standard deviation (SD). To define the categorical information, the data summaries and graphical representations used numbers and percentages. Using the chi-square (2) test, we looked at the connection between two categorical variables.

RESULT

1. AGE

The current investigation evaluated the distribution of patients according to age. As per the findings of our study, the age group of 31 to 40 years constituted the highest proportion of patients (22.4%), followed by individuals aged over 60 years (20.6%), those aged between 21 and 30 years (19.4%), those aged between 41 and 50 years (18.8%), those aged between 51 and 60 years (15.9%), and individuals aged less than 20 years (2.9%).

Age (Yrs)	N	Percent
≤20	5	2.9
21-30	33	19.4
31-40	38	22.4
41-50	32	18.8
51-60	27	15.9
>60	35	20.6
Total	170	100

Descriptive Statistics	Min	Max	Mean	SD
Age (Yrs)	17	75	45.1	16.4

TABLE 1: AGE DISTRIBUTION.

2. GENDER

In our present study, we assessed the gender-wise distribution of the patients. As we observed, 101 (59.4%) of the 170 patients in our study were male, while 69 (40.6%) were female. The male-to-female ratio was observed in the present study at 1.46.

AN OBSERVATIONAL STUDY TO DETERMINE THE EFFECTIVENESS OF THE RAPID UREASE TEST FOR THE PRESENCE OF HELICOBACTER PYLORI INFECTION

Section A-Research paper

Sex	N	Percent
Male	101	59.4
Female	69	40.6
Total	170	100

TABLE 2: GENDER.

3. ACCORDING TO CLINICAL DIAGNOSIS

Out of a total of 170 patients, 123 (72.4%) exhibited symptoms indicative of acid peptic disease (APD), while 47 (27.6%) exhibited symptoms of dyspepsia.

Clinical Dx	N	Percent
APD	123	72.4
Dyspepsia	47	27.6
Total	170	100

TABLE 3: CLINICAL DIAGNOSIS.

4. ACCORDING TO OESOPHAGOGASTRODUODENO-SCOPY (OGD) DIAGNOSIS

We found that 50.6% of 170 patients had normal endoscopic findings, 40.6% exhibited diffuse endoscopic features, and 8.8% exhibited antral endoscopic findings.

OGD Dx	N	Percent
Antral Gastritis	15	8.8
Diffuse Gastritis	69	40.6
WNL	86	50.6
Total	170	100

TABLE 4: OESOPHAGOGASTRODUODENO- SCOPY (OGD) DIAGNOSIS

AN OBSERVATIONAL STUDY TO DETERMINE THE EFFECTIVENESS OF THE RAPID UREASE TEST FOR THE PRESENCE OF HELICOBACTER PYLORI INFECTION

Section A-Research paper

5. ACCORDING TO RUT FINDINGS

The findings of the Rapid Urease Test (RUT) indicated that 130 individuals (constituting 76.5% of the sample) exhibited positive results, while 40 individuals (representing 23.5% of the sample) displayed negative results.

R.U.T	N	Percent
Positive	130	76.5
Negative	40	23.5
Total	170	100

TABLE 5 : RUT FINDINGS .

6. ACCORDING TO HISTOPATHOLOGY REPORT

Upon histopathological analysis, it was observed that 132 individuals (77.6%) exhibited H. pylori infection, while 38 (22.4%) did not.

Histopathology report	N	Percent
Positive	132	77.6
Negative	38	22.4
Total	170	100

TABLE 6: HISTOPATHOLOGY REPORT.

7. COMPARISON OF CLINICAL DIAGNOSIS WITH OGD DIAGNOSIS

Out of 123 APD patients, 56 (45.5%) exhibited normal endoscopic findings within present limitations, whereas 54 (43%) exhibited diffuse gastritis. Antral gastroenteritis was diagnosed in the remaining 13 patients (10.6%). Of the 47 dyspepsia patients, 63.8% (30 patients) had normal endoscopic findings, 31.9% (15 patients) had diffuse gastritis, and 4.3% (2 patients) had antral gastritis.

3420

OGD Dx	APD		Dyspepsia		Total	p value
	N	%	N	%		
Antral Gastritis	13	10.6%	2	4.3%	15	0.082
Diffuse Gastritis	54	43.9%	15	31.9%	69	
WNL	56	45.5%	30	63.8%	86	
Total	123		47		170	

TABLE 7 : CLINIVCAL DIAGNOSIS WITH OGD DIAGNOSIS.

8.   CLINICAL DIAGNOSIS WITH RUT RESULTS

Out of the total number of APD patients, 96 individuals, accounting for 78%, yielded positive results in the RUT test, while only 27 individuals, which is 22% of the total, yielded negative results. Out of the 47 patients with dyspepsia, 34 (72.3%) were found to be positive for RUT, while 13 (27.7%) were negative.

Clinical Dx	RUT +ve		RUT -ve		Total	p value
	N	%	N	%		
APD	96	78.0%	27	22.0%	123	0.433
Dyspepsia	34	72.3%	13	27.7%	47	
Total	130		40		170	

TABLE 8 : CLINICAL DIAGNOSIS WITH RUT RESULTS.

9. COMPARISON   OF   CLINICAL   DIAGNOSIS   WITH   HISTOPATHOLOGY REPORT

98 (79.7%) of the 123 APD patients diagnosed had a positive histopathology finding, whereas 25 (20.3%) had a negative finding. Histopathology revealed 34 positive (72.3%) and 13 negative (27.7%) findings in 47 dyspepsia patients.

AN OBSERVATIONAL STUDY TO DETERMINE THE EFFECTIVENESS OF THE RAPID UREASE TEST FOR THE PRESENCE OF HELICOBACTER PYLORI INFECTION

Section A-Research paper

Clinical findings	Histopathology report +ve		Histopathology report -ve		Total	p value
	N	%	N	%		
APD	98	79.7%	25	20.3%	123	0.305
Dyspepsia	34	72.3%	13	27.7%	47	
Total	132		38		170	

TABLE 9 : COMPARISON OF C.D. WITH HISTOPATHOLOGY REPORT.

10. COMPARISON OF OGD DIAGNOSIS WITH RUT RESULTS.

58 (67.4%) of 86 patients who had normal endoscopic findings had positive rut findings, whereas 28 (32.6%) had negative findings. Rut was a positive finding in 58 (84.1%) of the 69 patients who had diffuse gastroenteritis as determined by endoscopic imaging and a negative finding in 11 (15.9%). Fourteen of the fifteen patients who had antral gastroenteritis as an endoscopic finding tested positive for the disease on rut, whereas one (6.7%) tested negative.

OGD Dx	RUT +ve		RUT -ve		Total	p value
	N	%	N	%		
Antral Gastritis	14	93.3%	1	6.7%	15	
Diffuse Gastritis	58	84.1%	11	15.9%	69	0.014*
WNL	58	67.4%	28	32.6%	86	
Total	130		40		170	

TABLE 10: COMPARISON OF OGD DIADNOSIS WITH RUT RESULTS.

11. COMPARISON OF OGD DIAGNOSIS WITH HISTOPATHOLOGY REPORT

25 (29.1%) of the 86 patients who had normal endoscopic findings had a negative histopathology result, whereas 61 (70.9%) had a positive result. 10 (14.5%) of the 69 patients who were determined to have diffuse gastritis by endoscopic examination had a negative finding on histology, whereas 59 (85.5%) had a positive finding. Twelve (80%) of the 15

AN OBSERVATIONAL STUDY TO DETERMINE THE EFFECTIVENESS OF THE RAPID UREASE TEST FOR THE PRESENCE OF HELICOBACTER PYLORI INFECTION

Section A-Research paper

patients who had antral gastroenteritis as determined by endoscopic examination had a positive endoscopic finding on histopathology, whereas three (20%) had a negative endoscopic examination.

OGD Dx	Histopathology report +ve		Histopathology report -ve		Total	p value
	N	%	N	%		
Antral Gastritis	12	80.0%	3	20.0%	15	0.094
Diffuse Gastritis	59	85.5%	10	14.5%	69	
WNL	61	70.9%	25	29.1%	86	
Total	132		38		170	

TABLE 11 : COMPARISON OF OGD DIAGNOSIS WITH HISTOPATHOLOGY REPORT

12. COMPARISON OF RUT WITH HISTOPATHOLOGY REPORT

120 (92.3%) of the 130 patients who had a positive RUT finding also had a positive histopathology result, whereas 10 (7.7%) had a negative histopathology result. Out of a total of 40 patients who had a negative RUT result, 12 (30%) had a positive histopathology finding. Histopathological examination of patients with positive Rapid Urease Test findings revealed H. pylori infection.

R.U.T	Histopathology report +ve		Histopathology report -ve		Total	p value
	N	%	N	%		
Positive	120	92.3%	10	7.7%	130	<0.001*
Negative	12	30.0%	28	70.0%	40	
Total	132		38		170	

TABLE 12 : COMPARISON OF RUT WITH HISTOPATHOLGOY.

AN OBSERVATIONAL STUDY TO DETERMINE THE EFFECTIVENESS OF THE RAPID UREASE TEST FOR THE PRESENCE OF HELICOBACTER PYLORI INFECTION

Section A-Research paper

13. SENSITIVITY ANALYSIS OF RUT RESULT COMPARED TO HISTOPATHOLOGY REPORT

When the data from the previous slide is tabulated using statistical analysis formulas, we agree that the Rapid Urease Test has a sensitivity of 90.91% for correctly diagnosing patients with H. pylori infection, a specificity of 73.68%, a positive predictive value (PPV) of 92.31%, and a negative predictive value (NPV) of 70%. The Rapid Urease Test correctly identifies patients who have an H. pylori infection, with an accuracy rate of 87.06% as a result.

TP (True Positive)	RUT +ve, HPR +ve	120
FP (False Positive)	RUT +ve, HPR -ve	10
FN (False Negative)	RUT -ve, HPR +ve	12
TN (True Negative)	RUT -ve, HPR -ve	28

Sensitivity	90.91%
Specificity	73.68%
Positive Predictive Value (PPV)	92.31%
Negative Predictive Value (NPV)	70.00%
Accuracy	87.06%

TABLE 13 : SENSTIVITY ANALYSIS OF RUT COMPARED TO HISTOPATHOLOGY .

14. FLOW CHART (CD WITH RUT RESULTS & HPR).

APD was diagnosed in 123 of 170 patients. RUT findings were positive for 96 of 123 APD patients and negative for 27. 96 RUT-positive patients had 88 positive and 8 negative histopathology findings. Histopathology findings were positive in 10 RUT-negative patients. Dyspepsia was diagnosed in 47 of 170 patients. 34 RUT-positive dyspeptic patients and 13 RUT-negative. 32 RUT-positive and two RUT-negative patients reported positive

3424

AN OBSERVATIONAL STUDY TO DETERMINE THE EFFECTIVENESS OF THE RAPID UREASE TEST FOR THE PRESENCE OF HELICOBACTER PYLORI INFECTION

Section A-Research paper

histopathology findings. Two of the thirteen patients who had a negative RUT test result had a positive histopathology finding, whereas the other eleven did not.

Clinical Dx	RUT	Histopathologyreport	N	%
APD (123)	RUT +ve (96)	HPR +ve	88	51.8%
		HPR -ve	8	4.7%
	RUT -ve (27)	HPR +ve	10	5.9%
		HPR -ve	17	10.0%
Dyspepsia (47)	RUT +ve (34)	HPR +ve	32	18.8%
		HPR -ve	2	1.2%
	RUT -ve (13)	HPR +ve	2	1.2%
		HPR -ve	11	6.5%
Total			170	100.0%

TABLE 14 : CD WITH RUT & HPR

15. FLOW CHART OF PATIENTS OF OGD DIAGNOSIS WITH RUT & HPR

Fifteen patients out of a total of 170 investigated had anterior gastritis. Fifteen patients with antral gastroenteritis were tested, with 14 testing positive and one testing negative for RUT. There were 12 positive HPR findings among the RUT-positive patients and two negative ones. Negative findings on HPR were likewise seen in the other RUT-negative subject. Diffuse gastroenteritis was seen in 69 of the 170 patients analyzed. There were 58 RUT-positive and 11 RUT-negative patients among the 69 people diagnosed with diffuse gastritis. Fifty-five of the 58 RUT-positive patients had a positive finding on HPR, whereas three had a negative one. There were 4 positive findings on HPR and 7 negative findings among the 11 RUT-negative patients. Of the 170 patients analyzed, 86 had negative findings on endoscopy. There were 58 RUT-positive patients and 28 RUT-negative patients among the 86 total. Fifty-three patients out of 58 who tested positive for RUT had a positive finding on HPR,

AN OBSERVATIONAL STUDY TO DETERMINE THE EFFECTIVENESS OF THE RAPID UREASE TEST FOR THE PRESENCE OF HELICOBACTER PYLORI INFECTION

Section A-Research paper

whereas five patients tested negative. Eight of the RUT-negative patients had a positive HPR finding, whereas the other twenty-eight did not.

OGD Dx	RUT	Histopathology report	N	%
Antral Gastritis (15)	RUT +ve (14)	HPR +ve	12	7.1%
		HPR -ve	2	1.2%
	RUT -ve (1)	HPR +ve	0	0.0%
		HPR -ve	1	0.6%
Diffuse Gastritis (69)	RUT +ve (58)	HPR +ve	55	32.4%
		HPR -ve	3	1.8%
	RUT -ve (11)	HPR +ve	4	2.4%
		HPR -ve	7	4.1%
WNL (86)	RUT +ve (58)	HPR +ve	53	31.2%
		HPR -ve	5	2.9%
	RUT -ve (28)	HPR +ve	8	4.7%
		HPR -ve	20	11.8%
Total			170	100.0%

TABLE 15: PATIENTS OF OGD WITH RUT & HPR.

FLOW CHART OF PATIENTS CD WITH OGD , RUT & HPR

Out of 170 patients who were studied, 123 patients had APD. Out of 123 APD patients, 13 patients had Antral Gastritis on endoscopy. Out of those 13 Antral Gastritis patients, 12 patients were positive on RUT and 1 patient was negative. Out of those 12 RUT positive patients, 10 patients had positive finding on Histopathology and 2 had negative finding. And the 1 RUT negative patient also had negative finding on Histopathology. Out of 123 APD patients, 54 patients had Diffuse Gastritis on endoscopy. Out of those 54 Diffuse Gastritis patients, 44 patients were positive on RUT and 10 were negative. Out of those 44 RUT positive patients, 41 patients had positive finding on Histopathology and 3 patients had negative finding. Out of those 10 RUT negative patients, 3 patients had positive finding on Histopathology and 7 patients had negative finding. Out of 123 APD patients, 56 patients had normal finding on endoscopy. Out of those 56 normal finding patients, 40 patients were positive on RUT and 16 were negative. Out of those 40 RUT positive patients, 37 patients had positive finding on Histopathology and 3 patients had negative finding. Out of those 16 RUT negative patients, 7 patients had positive finding on Histopathology and 9 patients had negative finding. Out of 170 patients who were studied, the remaining 47 patients had

3426

Dyspepsia. Out of 47 Dyspeptic patients, 2 patients had Antral Gastritis on endoscopy. Those 2 patients when further testing was done came positive for RUT and also for Histopathology.Out of 47 Dyspeptic patients, 15 patients had Diffuse Gastritis on endoscopy. Out of those 15 Diffuse Gastritis patients, 14 patients were positive on RUT and 1 was negative. Out of those 14 RUT positive patients, all 14 of them came positive on Histopathology. And the remaining 1 RUT negative patient turned out to be positive on Histopathology. Out of 47 Dyspeptic patients, 30 patients had normal finding on endoscopy. Out of those 30 normal finding patients, 18 patients were positive on RUT and 12 were negative. Out of those 18 RUT positive patients, 16 patients had positive finding on Histopathology and 2 patients had negative finding. Out of those 12 RUT negative patients, 1 patient had positive finding on Histopathology and 11 patients had negative finding.

Clinical Dx	OGD Dx	RUT	Histopathology report	N	%
APD (123)	Antral Gastritis (13)	RUT +ve (12)	HPR +ve	10	5.9%
			HPR -ve	2	1.2%
		RUT -ve (1)	HPR +ve	0	0.0%
			HPR -ve	1	0.6%
	Diffuse Gastritis (54)	RUT +ve (44)	HPR +ve	41	24.1%
			HPR -ve	3	1.8%
		RUT -ve (10)	HPR +ve	3	1.8%
			HPR -ve	7	4.1%
	WNL (56)	RUT +ve (40)	HPR +ve	37	21.8%
			HPR -ve	3	1.8%
		RUT -ve (16)	HPR +ve	7	4.1%
			HPR -ve	9	5.3%
Dyspepsia	Antral Gastritis (2)	RUT +ve (2)	HPR +ve	2	1.2%
			HPR -ve	0	0.0%
		RUT -ve (0)	HPR +ve	0	0.0%
			HPR -ve	0	0.0%
	Diffuse	RUT +ve (14)	HPR +ve	14	8.2%
			HPR -ve	0	0.0%

AN OBSERVATIONAL STUDY TO DETERMINE THE EFFECTIVENESS OF THE RAPID UREASE TEST FOR THE PRESENCE OF HELICOBACTER PYLORI INFECTION

Section A-Research paper

(47)	Gastritis (15)	RUT -ve (1)	HPR +ve	1	0.6%
			HPR -ve	0	0.0%
	WNL (30)	RUT +ve (18)	HPR +ve	16	9.4%
			HPR -ve	2	1.2%
		RUT -ve (12)	HPR +ve	1	0.6%
			HPR -ve	11	6.5%
Total				170	100.0%

TABLE 16 : FLOW CHART OF CD WITH OGD , RUT & HPR.

DISCUSSION

AGE

With a maximum age of 75 years, our study found that the average age was 45.1±16.4 years. The majority of patients (22.4%) were in the age group of 31 to 40, followed by 20.6% in the age group of more than 60, 19.4% in the age group of 21 to 30, 18.8% in the age group of 41 to 50, 15.9% in the age group of 51 to 60, and 2.9% in the age group of less than 20. Shiwani Sharma et al. found that the average age was 40.3412.35 years old, with a range of 16 to 70 years old, and that the maximum number of patients (29%) belonged to the age group of 31 to 40 years old.[9]

GENDER

In our study, we have examined the gender-wise distribution of participants. We come to conclusion that, 101 (59.4%) of the 170 patients in our study were male, while 69 (40.6%) were female. MDU Islam et al. (80) observed in their study that 51.85% of the participants were male and 48.15 percent were female, yielding a male-to-female ratio of 1.07:1.[10]

CD (CLINICAL DIAGNOSIS)

In our study of 170 patients, 123 (72.4%) had symptoms of acid peptic disease (APD). On histopathology, 98 (79.6%) of the 123 APD patients tested positive for H. pylori infection, while 96 tested positive on the Rapid Urease Test. The remaining 47 patients (27.6%) had dyspepsia-like symptoms. Thirty-four (72.34%) of the 47 patients tested positive for histopathology, whereas 32 tested positive for the rapid urine test. Similar findings were observed in studies undertaken by Javed Yakoob et al.,[11] ,Shiwani Sharma et al.,[9] and Jeh-En Tzeng et al.,[12] who observed the majority of patients suffering from dyspepsia and chronic gastritis.

AN OBSERVATIONAL STUDY TO DETERMINE THE EFFECTIVENESS OF THE RAPID UREASE TEST FOR THE PRESENCE OF HELICOBACTER PYLORI INFECTION

Section A-Research paper

OGD (ESOPHAGOGASTRODUODENOSCOPY) DIAGNOSIS

Our study included 170 oesophagogastroduodenoscopy patients. 86 (50.6%) of 170 patients had normal endoscopic findings, 61 (70.9%) tested positive for H. pylori by histopathology, and 58 (58.1%) by the Rapid Urease Test. Among 170 patients, 69 (40.6%) showed diffuse gastritis features, 59 (85.5%) had positive histopathology, and 58 (85.6%) had positive Rapid Urease Test findings. 15 (8.8%) patients with antral gastritis features had 12 (80%) positive histopathology findings and 14 (7.2%) positive Rapid Urease Test findings. In a related study, Nanivadekar et al., found gastritis to be the most common finding.[13]

RUT IN COMPARISON WITH HISTOPATHOLOGY EXAMINATION

130 of the 132 patients in our study who tested positive for H. pylori infection on histopathology passed the Rapid Urease Test. Histopathological features of H. pylori infection were associated with a positive rapid urine test in most patients. Our study found that the Rapid Urease Test's sensitivity to identify H. pylori infection was 90.91%, specificity was 73.68%, PPV was 92.31%, NPV was 70%, and diagnostic accuracy was 87.06%. Similar findings have been found in other research. A study by Virendra S. Athavale et al. (78) found that RUT had a sensitivity of 96.83%, a specificity of 74.47%, a PPV of 95.24%, and an NPV of 81.25%.

Studies	Sensitivity	Specificity	PPV	NPV
Present study	90.91%	73.68%	92.31%	70%
Virendra S. Athavale et al	96.83%	74.47%	95.24%	81.25%
Shiwani Sharma et al	100%	59%	55.7%	100%
S.Redeen et al	90%	98%	96%	95%
JavedYakoob et al	71.9%	80%	82.1%	69%

TABLE 17 : DIFFERENT STUDIES FOR ACCURACY OF RUT

3429

AN OBSERVATIONAL STUDY TO DETERMINE THE EFFECTIVENESS OF THE RAPID UREASE TEST FOR THE PRESENCE OF HELICOBACTER PYLORI INFECTION

Section A-Research paper

CONCLUSION

86 patients in our study received normal endoscopic results. 58 of 86 patients had positive RUT results, and 28 had negative results. Thus, we conclude that normal OGD results do not rule out H. pylori infection. All OGD patients should undergo a mucosal biopsy from the stomach's antrum and body to confirm H. pylori infection, regardless of endoscopic diagnosis. We conclude that anti-H. pylori treatment may be started for RUT-positive patients based on the sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of RUT found in this study. To conclude, our study reveals that the RUT is accurate for the diagnosis of H. pylori infection and will be a good alternative to histopathology in the treatment of acid peptic disease and dyspepsia patients.

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3431

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