

"Prevalence and outcome of Gastroduodenal lesion and H pylori Infection in Chronic kidney disease, pretransplant and End stage renal disease patients "

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ABSTRACT:

Background: Gastrointestinal mucosal lesions are widespread in chronic kidney disease, end-stage renal disease, and in prerenal transplant period. H. pylori infection is more common in uremic patients. Our study aimed to compare UGI endoscopic findings between uremic patients and renal transplant recipients. **Methods:** A cross-sectional study on 148 patients that were carried out in the Gastroenterology and Hepatology Unit, in Internal Medicine Department, and Nephrology department, Zagazig university hospitals from Jan 2023 till July 2023. We included patients with CKD classified according to eGFR. All patients underwent a clinical examination and a full history taking, Upper GIT endoscopy, Laboratory Investigations included CBC, KFT, LFT, eGFR and H. Pylori Ag in stool.

Results: Out of the 148 Patients, males were 88(59.5%) and females were 60(40.5%). The predominant Endoscopic finding found was erosive gastritis (35.1%), Majority of the subjects found in stage III and least was esophagitis (1.4%). According to indication of endoscopy we found 33.1% of subjects done for epigastric pain and 10.8% done as pretransplant preparation. There was a noteworthy distinction between the 5 groups regarding Urea and Creatinine with higher levels in the advanced grades. The presence of H. Pylori did not significantly differ between the groups.

Conclusions: most patients with chronic renal disease had upper GI involvement. Erosive gastritis is the most common findings in our study found in stage III.

Fatal complications such severe upper GI bleeding can be avoided with early diagnosis and treatment, which can also lower morbidity and mortality.

Keywords: Chronic Kidney Disease; H. Pylori; Gastroduodenal lesion; pretransplant; End stage renal disease.

Introduction

Chronic kidney disease (CKD) is a silent epidemic of the 21-century. It is characterized by declining kidney function and a gradual decrease in the glomerular filtration rate. This decline results from various underlying pathological processes. A recently updated classification categorizes CKD based on both kidney function (GFR) and albuminuria. This system aims to predict how quickly the disease will worsen. CKD is a clinical syndrome where the kidneys permanently stop working properly. This causes metabolic, excretory and synthetic failure that results in accumulation of non-protein nitrogenous substances and present with a lot of clinical manifestations (1).

End-stage renal disease (ESRD) is the final, most severe stage of CKD. Without life-sustaining treatments like dialysis or a transplant, ESRD will result in death. While CKD can have various causes, the common outcome is irreversible damage to the kidneys, leading to a disruption of the “Milieu interior” that affects all systems of the body, one of them is the GI System. Patients with chronic renal illness frequently experience GI symptoms (2).

While the specific symptoms can differ greatly based on geographical areas, GI issues are also influenced by kidney function as measured by glomerular filtration rate and serum creatinine (3). When kidney function declines, as indicated by rising serum creatinine and falling GFR, individuals often experience various GI problems. These can include anorexia, nausea, vomiting, hiccups, dyspepsia, esophagitis, epigastria pain, heart burn, dysphagia, duodenal ulcer, hematemesis, angiodysplasia, gastric erosion, and hiatus hernia (4).

Among upper GI lesions caused by CKD esophagitis, gastritis, and gastric ulcer are the most common lesions. Upper GI bleeding is a serious complication for people with CKD, causing death in 3 to 7% of cases. This problem is more common in patients with advanced CKD and significantly impacts their quality of life (5).

Various studies have been done to evaluate the relation between GI lesions and CKD patients. According to a study by Nardone and colleagues, the occurrence of upper GI issues in Italy is quite high, reaching 72.9% of the population. They also found that these issues primarily affect the stomach and duodenum. Research has shown that early detection and treatment of upper GI problems significantly improve the health and survival rates of patients with CKD (6). The study investigated how CKD affects the upper GI system and determine if the severity of these changes is linked to the stage of kidney disease (6).

Helicobacter pylori (*H. pylori*) is a gram-negative, spiral-shaped, flagellated bacterium that usually live in the gastric mucosa. It commonly resides in the gastric mucosa and is extremely widespread, infecting about half of the global population. The infection rate is even higher, reaching 80%, in poorer countries. Research by Ankouane and colleagues in Yaoundé found

that this bacterium was present in a staggering 72.5% of hospital patients there. *H. pylori* is mainly spread from person to person, typically during the first 5 years of life. Factors that increase the risk of infection include low socioeconomic level, alcohol consumption, previous family history of *H. pylori* infection or gastritis, and smoking (7).

The diagnosis of *H. pylori* is done by noninvasive methods (the breath test, the rapid urease test, serology, stool antigen test) or invasive methods biopsy-based tests (histology and culture). Although the gold standard is histology, recent advancements in high-definition endoscopy have provided alternative diagnostic tools. While these disorders are often linked to gastroduodenal problems, some research suggests a possible connection between certain gastroduodenal disorders and CKD. Nonetheless, there is still insufficient evidence to confirm this link (8).

Methods:

A cross-sectional study on 148 patients ranging in age from 20 to 60 years old that were carried out in the Gastroenterology and Hepatology Unit, in Internal Medicine Department, and Nephrology department, Faculty of Medicine, Zagazig university hospitals from Jan 2023 till July 2023. The study was approved by the Research Ethics Committee of the hospital and Zagazig University Institutional Review Board (IRB)(ZU-IRB#10410/12-2-2023). Informed consent was taken from all participants upon starting the study according to the Declaration of Helsinki 2008.

Inclusion criteria were patients above 18 years old, diagnosed with CKD, End stage renal disease complaining of upper GIT symptoms and pre transplant patient as a part of preoperative assessment and both sexes were involved.

Exclusion criteria were participants with Chronic liver disease patient with any etiology (HCV, HBV), Cardiac patient with any etiology, Crohn's, celiac disease patients and Patient diagnosed with *H. pylori* in the past 6 months.

All subjects were submitted to: Full history taking, Full clinical examination, Upper GIT endoscopy and Laboratory Investigations including Liver function tests, Complete blood count, Blood urea and serum creatinine. INR, PT, PTT. Serum electrolytes: Na, Ca, K, Mg, Po₄. and *H. Pylori* Ag in stool.

Statistical analysis

- All data were collected, tabulated and then statistically analysed using SPSS 25.0 for windows (SPSS Inc., Chicago, IL, USA). Quantitative variables were presented as the mean \pm SD & median (range). Qualitative data were presented as frequencies and percentages.
- Chi-square test & Fisher-exact tests were used for comparing categorical data. To compare more than two groups of normally distributed variables, one-way ANOVA test was used, whereas the Kruskal Wallis test was used to compare more than two non-normally

distributed groups. To evaluate the correlation, Person Spearman's rank correlation coefficient was assessed, (+) sign indicate direct correlation & (-) sign indicate inverse correlation also values close to 1 indicate a strong-correlation while values close to 0 indicate a weak- correlation coefficient.

•At confidence interval 95% and P-value <0.05; the applied test was considered statistically significant. Whereas Significance means that the null hypothesis H₀ was rejected and the alternative hypothesis H₁ was accepted.

Results

A cross-sectional study on 148 patients were included in our study. There were 35 (70%) of them males, and 15 (30 %) females. The age of patients ranged between 20 and 60 years. The mean age \pm SD of study participants was 37.5 ± 11.86 years ,as shown in Table 1.

Among the studied patients, 29 (19.6%) patients were Stage I, 8 (5.4%) patients were Stage II, 50 (33.8%) patients were Stage III, 24 (16.2%) patients were Stage IV, and 37(25%) patients Stage V which include both pretransplant and ESRD patients as shown in Table 2.

As regard indication of upper GIT endoscopy showed in table3,23(15.54%) patients done for UGIB,15(10.13%), patients done for anemia,45(30.4%) patients done for vomiting ,49(33.1%) either epigastric pain and 16(10.8 %) patients done as pretransplant preparations.

The findings of upper GIT endoscopy in the studied group result were shown in Table 4 and figure 1. Most patients seen were erosive gastritis 52 (35.1 %) and less seen oesophgitis 2(1.4 %).

Regarding the hematological laboratory indices in the studied population, There was significant difference between the 5 groups regarding Urea and Creatinine with higher levels in the advanced grades and P-values 0.0001 and 0.0001 consecutively. Also, significantly lower eGFR was reported in the advanced groups with P-value 0.0001. as shown in Table 5.

Also, there was significant difference between the sex groups regarding H. Pylori presence with P-Value 0.0.001* as shown in Table 5, figure 2

Table 1: Demographic data of the studied groups

		Study Group (n=148)
Sex	Male	88 (59.5%)
	Female	60 (40.5%)
Age (years)	Mean± SD	37.84±10.68
	(Range)	(20-60)

Table 2: Distribution of study subjects

Subtypes	Number	%
Stage I	29	19.6
Stage II	8	5.4
Stage III	50	33.8
Stage IV	24	16.2
Stage V	37	25
	<ul style="list-style-type: none"> • Stage Va (ESRD) • Stage Vb (Pretransplant) 	21
	16	10.8

ESRD; end stage renal disease

Table 3: Indication of endoscopy

Subtypes	Number	%
UGIB	23	15.54
Anemia	15	10.13
Vomiting	45	30.4
Epigastric pain	49	33.1
Pretransplant	16	10.8

UGIB; upper git bleeding

Table4: findings of upper GIT endoscopy

.Subtypes	Number	%
Angio	9	6.1
Gastric Ulcer	10	6.8
Erosive Gastritis	52	35.1
Normal	15	10.1
Duodenal Ulcer	12	8.1
Hiatus Hernia	6	4.1
Duodenitis	9	6.1
Gastritis	11	7.4
Oesophegeal Ulcer	3	2.0
Gastro Oesphgitis	4	2.7
Pangastritis	4	2.7
Gastro-Duodenitis	11	7.4
Oesophegitis	2	1.4

Table 5: hematological laboratory indices in the studied population.

*(K.W): Kraskall-Wallis, (F): One-way anova, (X2): Chi-square ESRD; end stage renal

I (n= 29)		25 (20-53)	1.66±0.18	5.6±0.71	92.4±3.62	Negative:23 Positive:6
II (n= 8)		23 (21 - 34)	2.69±0.26	9.2±1.14	81.9±2.59	Negative:0 Positive:8
III (n= 50)		45 (26 – 52)	3.23±0.84	7.3±1.68	49.9±7.44	Negative:14 Positive:36
IV (n= 24)		88 (44 – 99)	5.15±0.92	6.99±2.16	25.2±4.03	Negative:15 Positive:9
V (n=37)	Va (ESRD) (n= 21)	81 (37 - 150)	10.13±1.33	7.6±1.4	8.3±3.29	Negative:13 Positive:8
	Vb (Pretransplant) (n= 16)	57 (36- 120)	12.5±1.84	8.14±1.62	8.1±2.5	Negative:12 Positive:4
Test		K.W=100.6 P=0.0001*	F=394.3 P=0.0001*	F=10.097 P=0.0001*	F=1017.9 P=0.0001*	X2=34.15 P=0.0001*

disease

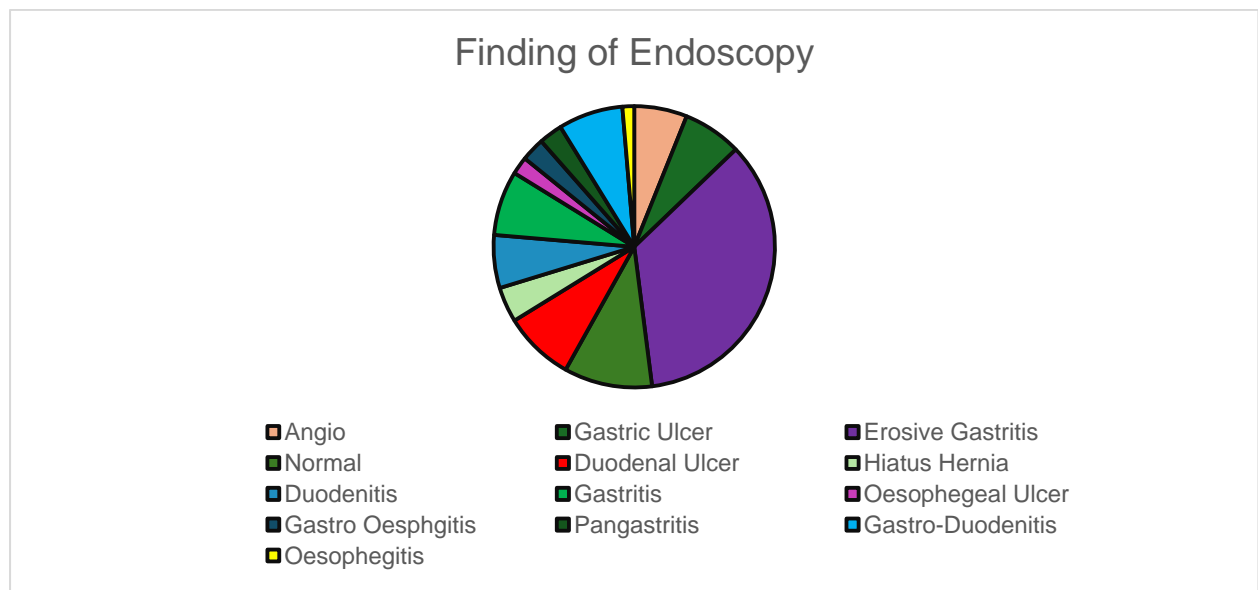


Figure 1: findings of UGI endoscopy.

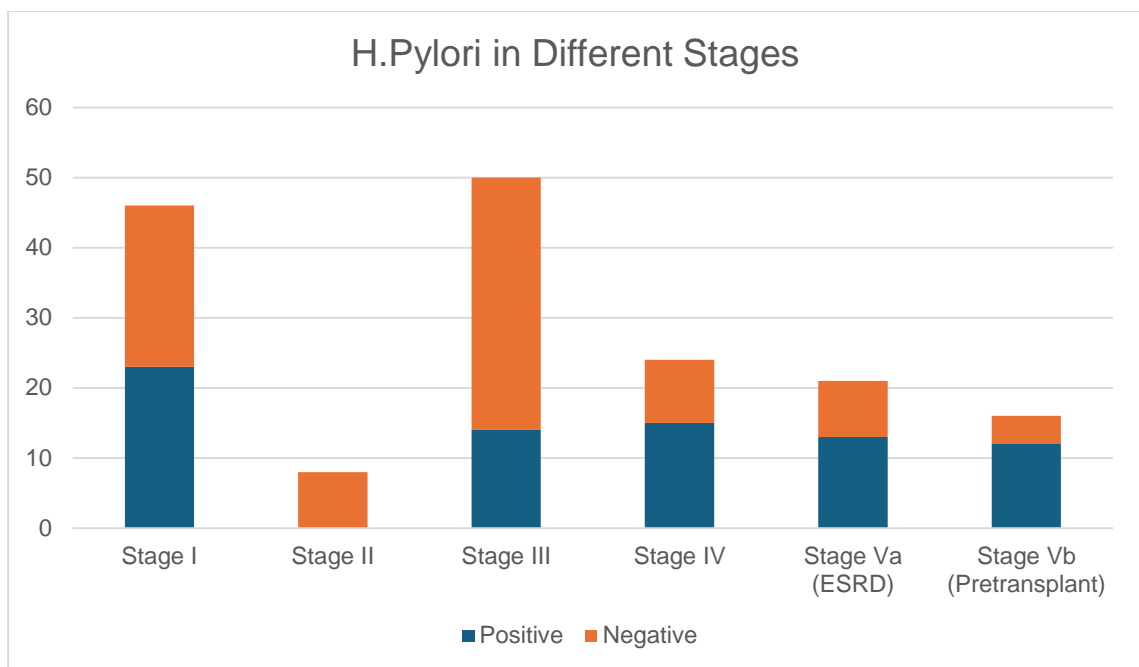


Figure 2: *H. Pylori in different stages.*

Discussion

Upper GI disorders are common among CKD patients. While there are many factors that can cause the condition, H. pylori infection is a known cause. Additionally, the rate of H. pylori infection among patients with CKD varies.

In this study, the prevalence of H. pylori infection and gastroduodenal lesions were evaluated by examining patients through upper GI endoscopy and concomitant Histological analysis. Although our sample size was larger than calculated, many patients could not be included in the study because they were treated with proton pump inhibitors in an almost systematic manner; and this will lead to a bias in estimating the prevalence of H. pylori infection (9). In our study we find that the prevalence of H. pylori infection in CKD patients was 47.9%. In contrast, Nardone et al. reported a higher prevalence of H. pylori in CKD patients near 74%, this can be explained by low chloride level, low gastric motility, elevated uremia and immunosuppression in CKD patients could be synergistic risk factors for gastric colonization with H. pylori (10).

In consistent with our results, Thomas et al reported lower prevalence of H. pylori infection in CKD patients 44%, The variation in these results may be associated with various diagnostic methods, and the type of patients chosen. Scientists still don't fully understand how H. pylori infection and chronic kidney disease are related (11)

We found no association between age or gender and H. pylori infection or frequency of GIT lesions CKD, similar result reported by Nga W et al who found no relation between age and gender and H. Pylori. (12)

We found that there is relation between CKD stage and H pylori infection as There was significant difference between the six groups regarding H. Pylori presence, on contrary to finding reported by Wijarnpreecha et al. who found no significant different between different CKD stages and frequency of H pylori (13)

In our study the frequency of upper git lesion in CKD is 89.8% Previous studies as Gerardo Nardon's research shows that 75% of patients with CKD have multiple abnormalities in the upper GI tract, as seen by endoscopy (10). Our result like Elzahraa et al who found upper git endoscopic finding in all symptomatic CKD patients having upper GIT endoscopy (14)

Habas et al found that frequency of git lesion in endoscopy in CKD pt as follow erosive gastritis in 52 patients (35.1%), Gastroduodenitis in 11 pt (7.4%), Duodenal ulcer in 12 patients (8.1%), and duodenal ulcer in 1 patient (3.3%). (15)

Indication for UGIB are multiple most 2 common indication in our study were Epigastric pain and vomiting, Habas et al who conduct study in Libya on 90 CKD patients he found upper GIT bleeding and vomiting are most common indication of upper git endoscopy in CKD (15)

The pathogenesis of upper GI mucosal lesions in CKD patients is still undefined. There are different theories about it, but none are proven. However, one idea is that the uremia building up in the blood due to kidney failure increases hydrogen ions back-diffusion across the mucosa that might induce damage to the mucosal lining of the stomach and intestines, making them more vulnerable. In addition, CKD is associated with lower clearance of gastrin. This, along with CKD itself, contributes to increased acid production, and damaging the stomach lining. Additionally, gastrin weakens the pyloric sphincter, allowing bile to flow back into the stomach and further worsening the mucosal injury. (17)

In this study we found no significant association between stage of CKD and the type of gastroduodenal lesions in consistent with Wang et al who found there was no significant association between all stages of CKD and PUD. (16)

Erosive gastritis was the most comm lesion observed followed by gastroduodenitis (42.5 vs 7.4%). The current result agrees with that of Renu et al who showed erosive gastritis as the most common biopsy finding followed by ulcerative esophagitis and duodenitis (17)

The limitation of study is small sample size. It needs to be repeated on a larger scale and the lack of follow-up does not allow us to evaluate the long-term impact of CKD on H. pylori infection and the evolution of endoscopic lesions.

Viswanathen and colleagues found that most patients (84%) had abnormal findings during endoscopy, even though only a third experienced symptoms. The most common issues were antral erosions and gastritis. About a quarter of patients had ulcers, and one had a bleeding ulcer. Surprisingly, many patients 22 (84%) were without symptoms still had abnormal endoscopic results. Additionally, roughly a third of patients 14 (36%) were infected with H. pylori bacteria. (18)

Conclusions

People with CKD are more likely to have H. pylori infection compared to those without kidney problems. However, the rate of stomach and duodenal ulcers is similar in both groups. We need more research to understand how CKD and long-term dialysis affect H. pylori infection and stomach problems over time.

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