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Study of Upper Gastrointestinal Endoscopic Findings in Chronic Kidney Disease and Dialysis Patients at Zagazig University Hospitals

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ABSTRACT

Background: People with end-stage kidney disease have an unusually high risk of upper gastrointestinal bleeding (UGIB), but no one knows why. Researchers have looked into the causes and frequency of these lesions using upper GI endoscopy.

Objective: To investigate how often different UGI symptoms and abnormalities detected by endoscopy are in individuals with chronic kidney disease (CKD).

Patients and methods: This cross-sectional study was conducted on a total 116 CKD patients with GIT symptoms. The Clinical Pathology Department and laboratories of Zagazig University Hospitals followed a specific protocol for the laboratory investigations, which comprised a full blood count, liver and kidney functions, PT, PTT, and INR. Following an overnight fast, a fiberoptic endoscopic examination of the upper gastrointestinal tract was carried out.

Results: We found that 65.5% of the patients were G5, 23.3% were G4, and 11.2% were G3. 43.1% of the patients presented with anorexia, 36.2% presented with nausea, 38.8% presented with vomiting, 23.3% presented with heart burn, 20.7% presented with epigastric pain, 7.8% presented with hiccup, and 14.7% presented with GI bleeding. 39.7% of the patients showed esophagitis, 51.7% showed gastritis, 14.7% showed duodenitis, 20.7% showed gastric ulcer, 3.7% showed duodenal ulcer, and 7.8% showed hiatus hernia. There were 15 patients who showed positive H. pylori by biopsy. significant differences were found between the groups regarding anorexia, vomiting, esophagitis and gastritis (p=0.001, 0.003, 0.044, 0.004 respectively).

Conclusion: Endoscopy on patients with end-stage renal disease (ESRD) can help in early detection of commonly occurring GI lesions and proper management for prevention of serious complications.

Keywords: Upper gastrointestinal endoscopy, Chronic kidney disease, Dialysis.

INTRODUCTION

Chronic kidney disease (CKD) is a long-term ailment that can develop as a result of kidney damage caused by many medical disorders. Consistent with the Kidney Disease Outcomes Quality Initiative's (KDOQI) clinical practice guidelines, a diagnosis of CKD requires either a glomerular filtration rate (GFR) below 60 ml/min/1.73m^2 or signs of structural damage in the kidneys that have persisted for more than three months [(1)].

Many people suffer from gastrointestinal (GI) diseases, which can greatly diminish their quality of life [(2)]. Additionally, 32–85% of dialysis patients experience gastrointestinal symptoms, and ESRD patients as a whole are prone to these issues [(3)].

Patients on predialysis, hemodialysis, or peritoneal dialysis all have a comparable incidence of these problems; however, symptoms tend to worsen as renal failure progresses [(4)].

Medications needed for treatment, changes in lifestyle, elevated levels of uremic toxin, or the effects of dialysis are the main causes of gastrointestinal symptoms [(5)].

Among patients with CKD, nausea, vomiting, stomach discomfort, diarrhea, and constipation are the most prevalent gastrointestinal symptoms. Additionally, between 11% and 33% of these patients suffer from inflammatory bowel disorders [(6)].

The high incidence of UGIB in patients with end-stage renal disease remains unknown. It is also unclear how factors connected to dialysis, such as uremia-induced platelet dysfunction and heparin exposure, contribute to the increased risk of UGIB [(7)].

Researchers have utilized upper GI endoscopy to examine the frequency and cause of these lesions. It appears that individuals with CKD have a higher prevalence of upper GI lesions than the general population, despite inconsistent data from research that have utilized this approach [(8)].

We aimed at this work to investigate how often different UGI symptoms and abnormalities detected by endoscopy are in individuals with CKD.

PATIENTS AND METHODS

From 2022 to 2024, 116 patients with chronic kidney disease (CKD) and gastrointestinal (GI) symptoms were enrolled in this cross-sectional study at the Nephrology Unit of the Internal Medicine Department, Faculty of Medicine, Zagazig University Hospitals.

Inclusion criteria:

- According to the KDIGO criteria, patients are considered to be in stage 3-5 of CKD if their GFR is less than 60 mL/min/1.73 m^2.

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- Patients who were older than 18 years old from both sexes who were on conservative treatment, hemodialysis, and peritoneal dialysis.

Exclusion criteria:

- Stage 1 and stage 2 CKD patients.
- Uremic encephalopathy patients.
- Patients having a history of acid peptic disease.
- Patients with history of NSAIDS or steroids intake.
- Smokers.
- Corrosive poisoning.
- Patients with liver cirrhosis and esophageal varices.

All subjects of this study were subjected to the following:

Thorough history taking and clinical examination.

1) Full History:

The patient's full name, date of birth, gender, place of residence, profession, smoking status, co-morbidities, and medication history were all part of the comprehensive medical history.

Particular attention to the patient's gastrointestinal history, including episodes of vomiting, nausea, anorexia, metallic taste, hiccups, abdominal discomfort, hematemesis, and other related symptoms.

2) Full examination including:

- Vital signs including: Pulse examination. Measurement of blood pressure: A mercury sphygmomanometer was used. Body Temperature. Respiratory rate and oxygen saturation
- Body mass index (BMI) "kg/m^2"

3) Laboratory Investigations:

a) Routine investigations:

All of the testing was carried out in accordance with the protocols established by the Clinical Pathology Department and the laboratories of Zagazig University Hospitals:

- Complete blood count (CBC). Liver function tests. Renal function tests. Coagulation profile: INR, Prothrombin Time (PT) and Partial Thromboplastin Time (PTT). Urine analysis, and Pelvi-abdominal ultrasound.

b) Specific investigations:

Following an overnight fast, a fiberoptic endoscopic examination of the upper gastrointestinal tract was carried out. We looked for mucosal alterations in the duodenum, stomach, and esophagus. biopsies were taken as necessary.

Ethical consideration:

This study has been approved by the Zagazig Faculty of Medicine's Medical Ethics Committee. Following receipt of all information, signed consent was provided by each participant. The Helsinki Declaration was adhered to at every stage of the investigation.

Statistical analysis

After data collection, SPSS 24.0 for Windows was used for statistical analysis. The qualitative data were shown using relative percentages and frequencies and were compared by X^2-test. The quantitative information was shown as the mean plus or minus the standard deviation and the range. $P<0.05$ was considered significant.

RESULTS

Table 1 shows the demographic data of the studied patients. Most of the patients were males (62.1%).

Table (1): Demographic data of the studied patients.

Variable	Studied patients (n=116)	
	Mean ± SD	Range
Age (years)	52.41 ± 10.73	26 - 68
BMI (kg/m^2)	28.37 ± 2.88	21.8 – 34.5
HD duration (months)	54.07 ± 41.8	2 – 192
Sex		
Male	72	62.1%
Female	44	37.9%

Table 2 shows that 65.5% of the patients were G5.

Table (2): CKD stages distribution among the studied patients.

	Studied patients (n=116)	
	N	%
G3	13	11.2%
G4	27	23.3%
G5	76	65.5%

Table 3 shows that 61.2% of the patients underwent hemodialysis.

Table (3): CKD treatment modalities distribution among the studied patients.

	Studied patients (n=116)	
	N	%
Conservative	40	34.5%
Hemodialysis	71	61.2%
Peritoneal dialysis	5	4.3%

Laboratory investigations of the studied patients are illustrated in table 4.

Table (4): Laboratory parameters distribution among the studied patients.

Variable	Studied patients (n=116)
	Mean ± SD
Hemoglobin (g/dl)	10.26 ± 1.27
TLC (x10^9/L)	5.83 ± 1.27
PLT (10^3/µL)	262.03 ± 84.46
Serum albumin (g/dl)	3.64 ± 0.247
Total protein (g/dl)	6.94 ± 0.384
ALT (U/L)	29.77 ± 7.26
AST (U/L)	29.03 ± 6.12
Serum creatinine (mg/dl)	4.54 ± 1.12
Urea (mg/dl)	58.14 ± 13.91

Table 5 shows that 43.1% of the patients presented with anorexia and 38.8% presented with vomiting.

Table (5): Symptoms distribution among the studied patients.

	Studied patients (n=116)	
	N	%
Anorexia	50	43.1%
Nausea	42	36.2%
Vomiting	45	38.8%
Heart burn	27	23.3%
Epigastric pain	24	20.7%
Hiccup	9	7.8%
GI bleeding	17	14.7%

Table 6 shows that 51.7% of the patients showed gastritis.

Table (6): Endoscopy findings distribution among the studied patients.

	Studied patients (n=116)	
	N	%
Esophagitis	46	39.7%
Gastritis	60	51.7%
Duodenitis	17	14.7%
Gastric ulcer	24	20.7%
Duodenal ulcer	4	3.4%
Hiatus hernia	9	7.8%
H. pylori	15	12.9%

There was a significant difference between the groups regarding anorexia, vomiting, esophagitis and gastritis (Table 7).

Table (7): Symptoms distribution among the studied patients according to CKD stages.

	G3 (n=13)	G4 (n=27)	G5 (n=76)	P-value
Anorexia	1 (7.7%)	7 (25.9%)	42 (55.3%)	**0.001**
Nausea	2 (15.4%)	8 (29.6%)	32 (42.1%)	0.129
Vomiting	0	8 (33.3%)	36 (47.4%)	**0.003**
Heart burn	0	7 (25.9%)	20 (26.3%)	0.108
Epigastric pain	0	6 (22.2%)	18 (23.7%)	0.146
Hiccup	0	1 (3.7%)	8 (10.5%)	0.283
GI bleeding	0	3 (11.1%)	14 (18.4%)	0.186
Esophagitis	1 (7.7%)	12 (44.4%)	33 (43.4%)	0.044
Gastritis	2 (15.4%)	11 (40.7%)	47 (61.8%)	0.004
Duodenitis	0	4 (14.8%)	13 (17.1%)	0.273
Gastric ulcer	0	5 (18.5%)	19 (25%)	0.115
Duodenal ulcer	0	0	5 (5.3%)	0.253
Hiatus hernia	0	0	9 (11.8%)	0.077

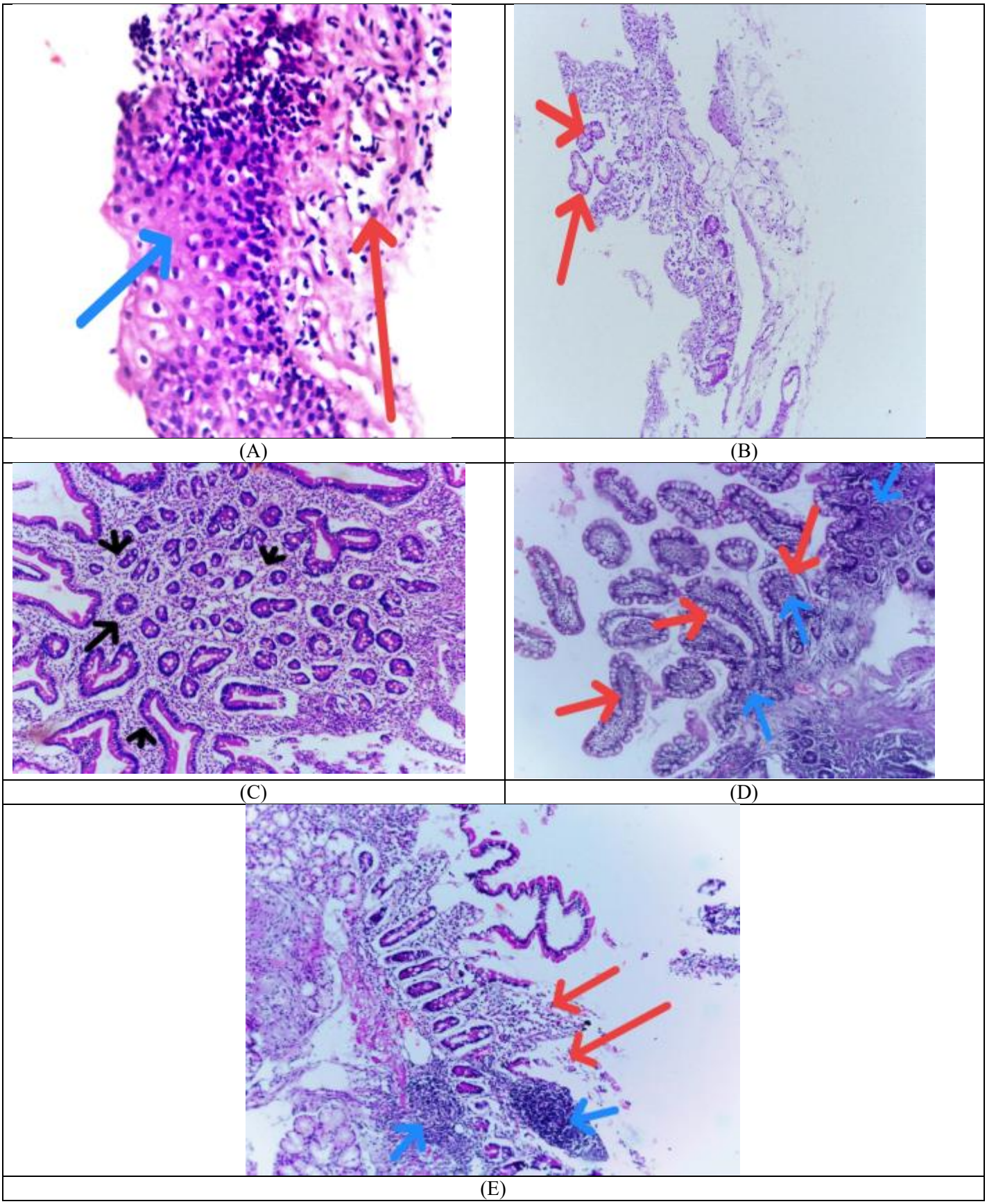

Figure 1: (A): Esophagitis in patient with CKD showing esophageal squamous epithelial lining (blue arrow) with sub-epithelial tissue showing chronic inflammatory cellular infiltrate (red arrow) (H&Ex200). (B): Gastric ulcer in patient with CKD showing loss of gastric mucosal lining with only remaining few glands (red arrows) (H&Ex200). (C): Severe chronic gastritis in patient with CKD showing dense chronic inflammatory cellular infiltrate in the lamina propria (Black arrows) (H&Ex200). (D): Chronic duodenitis in patient with CKD showing duodenal villous glands (red arrows) with chronic inflammatory cellular infiltrate in the lamina propria (blue arrows) (H&Ex200). (E): Duodenal ulcer in patient with CKD showing loss of mucosal lining (red arrows) with dense chronic inflammatory infiltrate in the lamina propria and submucosa (blue arrows) (H&E x200).

DISCUSSION

No matter what causes it, CKD is characterized by the gradual and permanent degradation of the nephrons. Clinical syndrome of uremia develops when the effective functioning of renal tissue diminishes, impairing the kidney's excretory, metabolic, and endocrine functions. Patients with kidney impairment are more likely to require hospitalization for gastrointestinal (GI) issues, which greatly raise the risk of morbidity and mortality. These symptoms include anorexia, nausea, vomiting, and gastrointestinal (GI) bleeding [9].

As a result of its complex pathophysiology, uremia increases the risk of mucosal injury to the gastrointestinal system. Endoscopy can quickly identify the majority of problems affecting the upper gastrointestinal tract (UGI), allowing for appropriate intervention in cases ranging from minor symptoms to potentially fatal gastrointestinal bleeding. Causing factors, such as elevated uremic toxin levels, dialysis side effects, lifestyle modifications, or medication used to treat it, are mostly responsible for the occurrence of gastrointestinal symptoms. Therefore, all CKD patients experiencing gastrointestinal symptoms should undergo routine endoscopic assessment [10].

The current research set out to determine how common certain UGI symptoms are, as well as any abnormalities detected during endoscopic examinations, among CKD patients.

In this study, the age of patients ranged from 26 to 68 years and most of the patients were males by 62.1%. Meanwhile, 61.2% were on hemodialysis with HD duration ranged from 2 – 192 months.

In a study by **Shabka *et al.*** [11] they documented that out of 30 patients, 16 (53.3%) were men, 14 (46.75%) were women, their age ranged from 15 to 84 years with a mean age of 56.93±14.59 years. Twenty-three patients previously underwent dialysis, duration ranged from 0.17 to 13.0 years with a mean of 2.98±3.42 years. Meanwhile, in a study by **Mouhamed *et al.*** [12], they included 70 patients (48 male, 22 females) and 62.9% of the patients were on dialysis.

Regarding CKD stages, we found that 65.5% of the patients were G5, 23.3% were G4, and 11.2% were G3. In a study by **Goyal *et al.*** [13], stage 5 CKD was detected in 76% of patients, while stage 4 was detected in 22%. Stage 3 was reached by just two patients. Moreover, **Elango and Shankar** [14] reported that 45 percent of individuals were in stage 5 CKD. Twenty-two percent of the patients were in stage 3 CKD, and thirty-five percent were in stage 4.

Regarding CKD treatment modalities, we documented that 34.5% of the patients treated conservatively, 61.2% underwent hemodialysis, and 4.3% underwent peritoneal dialysis. **Elango and Shankar** [14] reported that twenty percent of patients required dialysis, while eighty percent opted for conservative therapy. Thirteen patients underwent hemodialysis and three underwent peritoneal dialysis as part of their treatment regimen of sixteen patients undergoing dialysis.

Various GI symptoms were noted in the patients under study. We found that prevalence of GI symptoms in CKD was 67.2%. **Zuvela *et al.*** [6] found that 72% of patients with CKD also experienced gastrointestinal problems, which is in line with our findings. Meanwhile, **Elango and Shankar** [14] reported gastrointestinal symptoms were present in 85% of patients studied and **Goyal *et al.*** [13] reported that 80% of the total patients had one or the other GI symptoms.

In our study, we found that 43.1% of the patients presented with anorexia, 36.2% presented with nausea, 38.8% presented with vomiting, 23.3% presented with heart burn, 20.7% presented with epigastric pain, 7.8% presented with hiccup, and 14.7% presented with GI bleeding.

In a study by **Goyal *et al.*** [13], they found that 38% of patients vomited, 34% experienced anorexia, 26% felt sick to their stomach, 16% experienced epigastric pain, and 6% hiccupped. To be clear, no patients experienced bleeding in the upper gastrointestinal tract.

Moreover, **Elango and Shankar** [14] reported that the majority of symptoms, 83%, were associated with anorexia. In decreasing order of frequency, the following symptoms were reported: nausea (76%), vomiting (64%), heart burning (38%), abdomen pain (28%), and hiccups (20%). Six patients, or 8% of the total, experienced gastrointestinal hemorrhage as their presentation.

However, a study **Shabka *et al.*** [11] showed that the main GI symptoms detected in patients studied were upper GI bleeding in 24 (80%) patients, epigastric pain in four (13.3%) patients, vomiting in one (3.3%) patient, and both epigastric pain and vomiting in one (3.3%) patient. On the other hand, **Sotoudehmanesh *et al.*** [15] found that the main GI symptom detected was nausea in 12.6% of patients followed by heart burn in 8.7%. Also, **Nand *et al.*** [16] showed that the main GI symptom in CKD patients under study was nausea in 96% of cases, followed by vomiting in 80%, with hematemesis detected only in 4% of patients. The difference in presentation of patients in different studies could be explained by the severity of lesions, availability of health services, and early seeking of medical advice from patients.

Sixty percent of endoscopic abnormalities were identified in our investigation. Endoscopic abnormalities were found in 86% of cases, according to research by **Elango and Shankar** [14]**. Nardone *et al.*** [17] **and Khedmat *et al.*** [18] found that 74% and 79% of upper gastrointestinal lesions on endoscopy, respectively, in their respective investigations. In a related study, **Agarwal and Srivastava** [19] found that 85.7% of patients with CRF had UGI involvement when evaluated endoscopically.

In our analysis, the most common types of upper gastrointestinal lesions were gastric lesions. Most lesions in the stomach (68.7%) were the most common

in the study by **Serme *et al.* [20].**

Regarding endoscopic findings, we found that 39.7% of the patients showed esophagitis, 51.7% showed gastritis, 14.7% showed duodenitis, 20.7% showed gastric ulcer, 3.7% showed duodenal ulcer, and 7.8% showed hiatus hernia.

Ragab *et al.* [21] findings were compatible with our results, they reported that gastritis was found in 60%, gastric ulcer was found in 12.1%, duodenal ulcer was found in 6.1%. Also, **Goyal *et al.* [13]** revealed that gastritis affected 68% of patients, esophagitis 42%, gastric ulcer 22%, duodenitis 8%, hiatus hernia 6%, and duodenal ulcer 2%. Gastric erosions were seen in 56% of CKD patients in research by **Nardone *et al.* [17],** which is consistent with our results.

Of the various types of lesions seen, inflammatory changes were the most common. **Elango and Shankar [14]** found that gastritis (60%), esophagitis (32%), and duodenitis (19%) were the most prevalent lesions. Gastritis accounted for 60.8% of the lesions in the study by **Esfahani *et al.* [22],** with duodenitis and gastro duodenitis making up 13% and 7.2% of the lesions, respectively. Because of specific causes of gastritis, patients with uremia have an enhanced ability to release acid.

In their study, **Elango and Shankar [14]** found a low incidence of stomach ulcers (5%), duodenal ulcers (4%), while **Nardone *et al.* [17]** found duodenal ulcers in 6% of patients. Chronic peptic ulcers do not occur in patients with chronic renal insufficiency.

However, in a study by **Shabka *et al.* [11],** where upper endoscopic evaluation of their patients showed the following lesions; there were five cases of reflux esophagitis (16.7% of the total), two cases of esophageal erosions (6.7% of the total), three cases of esophageal ulcers (10%), five cases of pyloric ulcer (16.7% of the total), eleven cases of antral gastritis (36.7%), seven cases of gastric ulcer (23.3%), thirteen cases of duodenitis (43.3%), and eleven cases of duodenal ulcer (36.7%). The study found that 43.3% of lesions were duodenitis. Duodenitis was identified in 32.8% of instances by **Bacci *et al.* [23],** but not at all by **Nand *et al.* [16],** therefore this did not align with their findings. Both investigations found that erosive gastritis was the most prevalent lesion.

Gastrointestinal hemorrhage affected 14.7% of the participants in this research. It has been recognized that CKD patients can experience gastrointestinal bleeding. It has been found that bleeding occurs often in uremic patients due to gastritis; nevertheless, the primary cause of this bleeding was previously thought to be angiodysplastic lesions [14].

Elango and Shankar [14] reported that in 6 individuals (8%), hemorrhage from the gastrointestinal tract was detected. Five patients with UGI bleeds exhibited erosive gastritis and one had angiodysplasia, according to the endoscopic evaluation.

The study indicated that 7.88% of individuals had a hiatus hernia. Our study was consistent with study done by **Elango and Shankar [14] and Khedmat *et al.* [18],** who noticed hiatus hernia in 8 and 9%, respectively.

We found that hiatus hernia was more frequent in hemodialysis patients. But in **Elango and Shankar [14]** study, hiatus hernia was more in conservative management patients.

Patients on G5 hemodialysis were more likely to have anorexia and vomiting, according to our findings. Additional side effects experienced by G5 hemodialysis participants included nausea and epigastric pain at higher rates.

Elango and Shankar [14] found that the most common symptoms in both dialyzed and non-dialyzed CKD patients were nausea, vomiting, and anorexia. This is in line with what **Sibinović *et al.* [24].** Anorexia, vomiting, and nausea were the most common symptoms in a study conducted by **Goyal *et al.* [13]** on the CKD subject, they found two patients with GFRs ranging from 30 to 60 ml/min/m^2, and both of them suffered from nausea and anorexia. Results showed that 45% of patients with stage 4 CKD (defined as a GFR between 15-30 ml/min/m^2) experienced anorexia, 18% nausea, 36% vomiting, 18% epigastric discomfort, and 18% no gastrointestinal symptoms at all. Anorexia affected 26% of patients, nausea 26%, vomiting 37%, hiccups 8%, epigastric pain 13%, and no gastrointestinal symptoms at all in 21% of patients with a GFR below 15 ml/min/m^2. This is known as stage 5 CKD [13].

In our study, we noted that gastritis, duodenitis, gastric ulcer, and duodenal ulcer were more prevalent among G5 patients on hemodialysis compared to stage G4 and G3 patients.

In a study by **Goyal *et al.* [13]**, both patients in stage 3 of CKD did not have an endoscopic gastrointestinal lesion. In stage 4 CKD patients with a GFR of 15-30 ml/min/m^2, 27% had esophagitis, 36% gastritis, 9% duodenitis, and 45% no GI lesion at all. Esophagitis was present in 47% of stage 5 CKD patients, gastritis in 79%, duodenitis in 8%, gastric ulcers in 29%, duodenal ulcers in 3%, and hiatus hernias in 8%.

Our research shows that the likelihood of developing upper gastrointestinal lesions increases with the severity of renal failure.

CONCLUSION

Endoscopy on patients with ESRD can help in early detection of commonly occurring GI lesions and proper management for prevention of serious complications.

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