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Screening of Gastrointestinal Tract Bleeding Causes among Chronic Renal Failure Patients in Assiut University Hospitals; A Single Study Center

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Abstract

Individuals with end-stage renal disease are at an increased risk for gastrointestinal complications, such as upper and lower gastrointestinal hemorrhage. The most prevalent reason for bleeding in the upper digestive tract is peptic ulcer disease. Screening individuals at Assiut University Hospital suffering from Chronic Renal Failure (Stages I to V) according to their glomerular filtration rate (GFR) in order to identify the various causes and features of GI bleeding. This study was A cross sectional hospital-based study. Individuals were recruited from in the Nephrology Unit at Internal Medicine Department and Dialysis Units at Assiut University Hospitals. The research was conducted in the period from October 2020 and October 2021. It was found that gastro-duodenitis present in all patients with sates-I, II and IV. Patients with stage-III had either erosive esophagitis (44.4%) or gastric angiodysplasia (55.6%) while patients with stage-V had either gastric angiodysplasia (20%), colitis (48%) or colonic angiodysplasia (32%). There were significant variances among individuals with microalbuminuria & those with macroalbuminuria as regard presentation and endoscopic results. Gastrointestinal bleeding is common in chronic renal failure & it is easily documentable with endoscopy. Some findings are more common than others, such as duodenitis, duodenal ulcer, gastritis, gastric and pyloric ulcer, and this indicates the necessity for endoscopic evolution of those patients in order to detect these lesions early and to properly manage them to prevent serious and fatal complications.

Keywords: Gastrointestinal Tract Bleeding, Chronic Renal Failure, Glomerular filtration rate.

Full length article **Corresponding Author*, e-mail: ptrservices2022@gmail.com

1. Introduction

Upper gastrointestinal hemorrhage is a frequent complication in individuals with chronic kidney disease (CKD), accounting for 7.8%-12.2% of all upper gastrointestinal hemorrhage cases. Most cases of upper GI bleeding in CKD are caused by peptic ulcers, although other conditions such erosive gastritis, esophagitis, vascular ectasia, and angiodysplasia can also contribute [1]. Peptic ulcers are more common in CKD patients, as has been reported in many studies. Patients with normal renal function have been the subject of several research examining the prognosis and risk factors for bleeding from peptic ulcers. Nonetheless, there is a dearth of research on the prognosis for patients with CKD who suffer from acute hemorrhage from peptic ulcer and the variables that increase their risk of rebleeding [2]. It has been found that individuals who had CKD had a greater risk of GI bleeding due to peptic ulcer disease and angiodysplasia than the general population. Researchers observed that 52.9% of anemic individuals in stages 3-5 of CKD who did not require dialysis had GI bleeding origins on upper and lower endoscopy. Individuals with CKD stage 5 was more likely to have gastric lesions than those with CKD stages 3-4 [3]. Upper gastrointestinal bleeding (UGIB) from peptic ulcer disease is a frequent complication of CKD. A cohort-research evaluated the incidence of UGIB between 796 patients who had just begun HD and 3184 age- and sex-matched individuals without CKD who were followed for 6 years. Patients with HD had a greater incidence of UGIB (hazard ratio [HR] 1.27, 95%CI 1.03-1.57). This bleeding was most often caused by peptic ulcer disease [4].

In their study of ESRD patients, Laeeq et al., (2017) investigated the causes and features of UGIB, and they discovered that erosions (55.9%) and ulcers (30.3%) were the most prevalent results. More over half (55.9%) of the individuals required some sort of treatment intervention [5]. The purpose of the research was to screen for various reasons & features of GI bleeding in Assiut University Hospital patients with Chronic Renal Failure throughout five stages defined by glomerular filtration rate (GFR) (Stages I to V).

2. Patients and methods

2.1. Study design

Hospital-based cross-sectional research.

2.2. Study place and duration

Patients were recruited from in the Nephrology Unit at Internal Medicine Department and Dialysis Units at Assiut University Hospitals. The research was carried out in the period from October 2020 to October 2021.

2.3. Inclusion criteria

A total of one hundred patients who were diagnosed as CKD as assessed by EPI estimation present with upper gastrointestinal bleeding. The CKD-EPI equation, expressed as a single equation, is GFR = 141 × min(Scr/κ, 1)α × max(Scr/κ, 1)-1.209 × 0.993Age × 1.018 [if woman] _ 1.159 [if black], where Scr is serum creatinine, κ is 0.7 for women & 0.9 for men, α is -0.329 for women & -0.411 for men, min demonstrates the minimum of Scr/κor 1, & max demonstrates the maximum of Scr/κ or 1 [6].

2.4. Exclusion criteria

Patients with different gastrointestinal tumors, piles or anal fissure, Mallory Weiss syndrome, diverticular disease, colonic polyp, infectious diseases, chronic liver disease other than HCV and/ or HBV, platelets dysfunction, hematological disorders, malignancyand patients on anticoagulants or NSAIDs and/or gastroesophageal varices.

2.5. Methods

Each patient was subjected to full history taking & thorough clinical evaluation with special attention to; GIT symptoms of abdominal pain, heart burn, anorexia, nausea, vomiting, regurgitation, dyspepsia, hematemesis and melena and stigmata of chronic liver diseases.

2.5.1. Clinical examination

2.5.1.1. General examination

General examination including state of awareness, general appearance (skin, face, eye, oedema), vital signs (BP, Pulse, respiratory rate, temperature) & body mass index (weight (kg) / [height (m)]^2) [7].

2.5.1.2. Laboratory investigations

Complete blood count, Liver function testes including direct and indirect bilirubin, total protein, AST, ALT, serum Albumin, Urine analysis, Blood urea and serum creatinine and eGFR by The CKD-EPI equation, expressed as a single equation, is GFR = 141 × min(Scr/κ, 1)α × max(Scr/κ, 1)-1.209 × 0.993Age × 1.018 [if woman] _ 1.159 [if black], where Scr is serum creatinine, κ is 0.7 for women & 0.9 for men, α is -0.329 for women & -0.411 for men, min demonstrates the minimum of Scr/κor 1, & max demonstrates the maximum of Scr/κ or 1 [6]. Serum calcium & phosphorus, Lipid profile, International randomized ratio, prothrombin time, prothrombin concentration & Serology: HCV Abs

2.5.1.3. Imaging study

Imaging study including abdominal ultrasonography with liver assessment to exclude the presence of liver cirrhosis.

2.6. Subgroupings of the patients

The studied patients were subdivided based on Stages of CKD based on EPI equation. According to state of HCV ab (positive and negative), According to albuminuria either macroalbuminuria or macroalbuminuria, Duration of CKD (< 10 years and >10 years), Dialysis and non-dialysis group

2.7. Procedure and technique of Upper endoscopy

Upper endoscopy is usually done in 30-60 minutes and does not require hospitalization. The physicians gave me sedatives before the surgery so I wouldn't feel anything and could rest easy. An anesthetic spray is sometimes used by doctors to numb the throat before inserting the endoscope. A mouth guard can be used to help maintain an open mouth position. Endoscopy is a painless process, but you may feel a little pressure in your throat while the tube is inserted into your upper gastrointestinal tract. The gastroenterologist may ask you to drink some liquids for testing purposes. Your upper digestive tract as seen through the endoscope, which was connected to a computer. The doctor was utilizing it to look into any unusual signs and determine their origin. During an endoscopy, a gastroenterologist may choose to inflate your digestive tract slightly so that they have more room to work.

2.8. Procedure of colonoscopy

During colonoscopy, the patient is typically positioned in the left lateral decubitus position, as is the case with esophagogastroduodenoscopy (EGD). It is also crucial that the examiner (endoscopist) adopt the ideal position when doing the colonoscopy, much as correct posture is necessary for an athlete to achieve greater performance and to prevent injuries.

2.9. Ethical consideration

The research was confirmed by the ethical committee of faculty of Medicine, Assiut University. All patients gave their informed permission either orally or in writing.

2.10. Statistical analysis

SPSS (Statistical Package for the Social Science, version 20, IBM, & Armonk, New York) was utelized to collect & analyze data. The quantitative data were presented as mean± standard deviation (SD), range, & contrasted using the student t-test. The nominal data are expressed as a number (n) & a proportion (%). The Chi2 test was applied to these data.

ROC curves were used to determine the accuracy of several factors in predicting GIT bleeding, while logistic regression was used to identify GIT bleeding predictors in

patients with CKD. The level of confidence was maintained at 95 percent, and P values< 0.05 were considered significant.

3. Results and discussion

Advanced chronic renal failure is correlated with a raised risk of gastrointestinal bleeding, which accounts for 3-7% of deaths. Uremia-related platelet dysfunction, a high incidence of arteriovenous malformations (AVMs), and the presence of other risk factors such as cardiovascular disease, diabetes, liver cirrhosis & advanced age have been cited as contributors to the raised risk of UGIB in ESRD cases [8]. Red blood cells and platelets in interacting with the injury site, hence it's thought that anemia raises the chance of bleeding. Erythropoietin and blood transfusions have been shown to reduce bleeding time in uremic patients, lending more support to this notion. The risk of UGIB in the ESRD population is further raised by the use of medicines that interfere with the clotting cascade. These include anticoagulants, anti-platelets &non-steroidal anti-inflammatory drugs (NSAIDS) [9]. A total of one hundred patients who were diagnosed as CKD as assessed by EPI estimation present with upper gastrointestinal bleeding. Majority of patients predominantly from the rural area were elderly males. In line with our results. Nopp et al., (2022) stated that the majority of their patients were male [10]. Moreover, Shabka et al., (2017) reported that People over the age of 80 have a 1% higher risk of being admitted to the hospital due to a gastrointestinal bleed even they were not taking anti-platelet medication indicating that aging itself is considered as a risk factor for GIB independent of other predisposing variables [11]. As regarding etiology of CKD; the most frequent etiologies were DM followed by HTN and Obstructive uropathy and lupus nephritis. Consistent with our findings, Melo et al., (2019) illustrated that systemic arterial hypertension associated with or without diabetes mellitus were the most common and most cases were undergoing dialysis for at least 3 years [12]. In the current study, most of patients presented mainly with hematemesis and melena, while hematochezia occurred less frequent in agreement with Huang et al., (2023) [1]. In contrast to our findings, Nand et al., (2014) showed that the main GI symptom in CKD patients was nausea, followed by vomiting, while hematemesis was presented less frequent. These differences in presentation of patients could be explained by the severity of lesions, availability of health services, and early seeking of medical advice from patients [13]. Also, we found that based on the endoscopic findings; most of our patients had gastroduodenitis and gastric angiodysplasia, respectively. Other lesions as erosive esophagitis, colitis and colonic angiodysplasia were found in small number. However, Shabka et al., (2017) found that reflux esophagitis, esophageal erosion, esophageal ulcer, pyloric ulcer and antral gastritis were less frequently while gastric ulcer, duodenitis and duodenal ulcer were frequently detected [11]. In the present study, accidentally, we noticed that patients with macroalbuminuria presented mostly with melena and / or hematochezia with erosive esophagitis, gastroduodenitis and gastric angiodysplasia commonly on endoscopic evaluation. Regarding CKD stages, it was found that gastroduodenitis present in all patients with stages I, II and IV. Only half of patients with stage III had both erosive esophagitis and gastric angiodysplasia on endoscopic study, while colitis and colonic angiodysplasia were present in twenty present of stage V (patients with CKD). Our study in consistent with Pursnani et al., showed that among people with CKD, the majority of stage 5 patients had experienced at least one UGI symptom predominantly in non-dialysis group [14]. Nevertheless, some limitations of the present research were noticed as relatively small sample size, being conducted in a single center and no long term follow up for those cases. Yet, the main strength of this study was being the first research that discussed such issue in our locality. Mean age of the studied cases was 45.87 ± 12.56 (years). Out of the studied cases; 81 (81%) cases were men & 19 (19%) cases were women. Mean body mass index 26.78 ± 3.45 (kg/m^2). Seventy-five (75%) patients came from rural areas and 25 (25%) patients came from urban areas. As regarding aetiology of the chronic kidney disease (CKD); the most frequent aetiologies were DM (67%) and HTN (23%). Obstructive uropathy was present in 13 (13%) patients and another 7 (7%) patients had lupus nephritis. Duration of the CKD was 7.98 ± 3.45 (years) while duration of the dialysis was 4.33 ± 2.01 (years) (Table 1). Table 2 showed baseline data of enrolled cases. It was noticed that 45 (45%) cases had microalbuminuria while 55 (55%) patients had macroalbuminuria. Echogenic kidney grade-I, II and III were found in 35 (35%), 55 (55%) and 10 (10%) patients, respectively. Based on the endoscopic findings; 48 (48%) and 20 (20%) patients had gastroduodenitis and gastric angiodysplasia, respectively. Other lesions as erosive esophagitis, colitis and colonic angiodysplasia were found in 12 (12%), 12 (12%) and 8 (8%) patients; respectively (Table 3). Different stages of CKD had insignificant difference as regard different presentation (p= 0.93). Meanwhile, there was significant variance among different stages as regard endoscopic findings. It was found that gastroduodenitis present in all patients with sates-I, II and IV. Patients with stage-III had either erosive esophagitis (44.4%) or gastric angiodysplasia (55.6%) while patients with stage-V had either gastric angiodysplasia (20%), colitis (48%) or colonic angiodysplasia (32%) (Table 4). There were significant variances among patients with microalbuminuria and those with macroalbuminuria as regard presentation and endoscopic findings. All patients with microalbuminuria presented with hematemesis and their endoscopy revealed erosive esophagitis (11.1%), gastroduodenitis (40%), gastric angiodysplasia (24.4%), colitis (6.7%) and colonic angiodysplasia (17.8%). Patients with macroalbuminuria presented either with melena (63.6%) or haematochezia (36.4%) and their endoscopy revealed erosive esophagitis (12.7%), gastrodueinitis (54.5%), gastric angiodysplasia (16.4%) and colitis (16.4%) (Table 5).

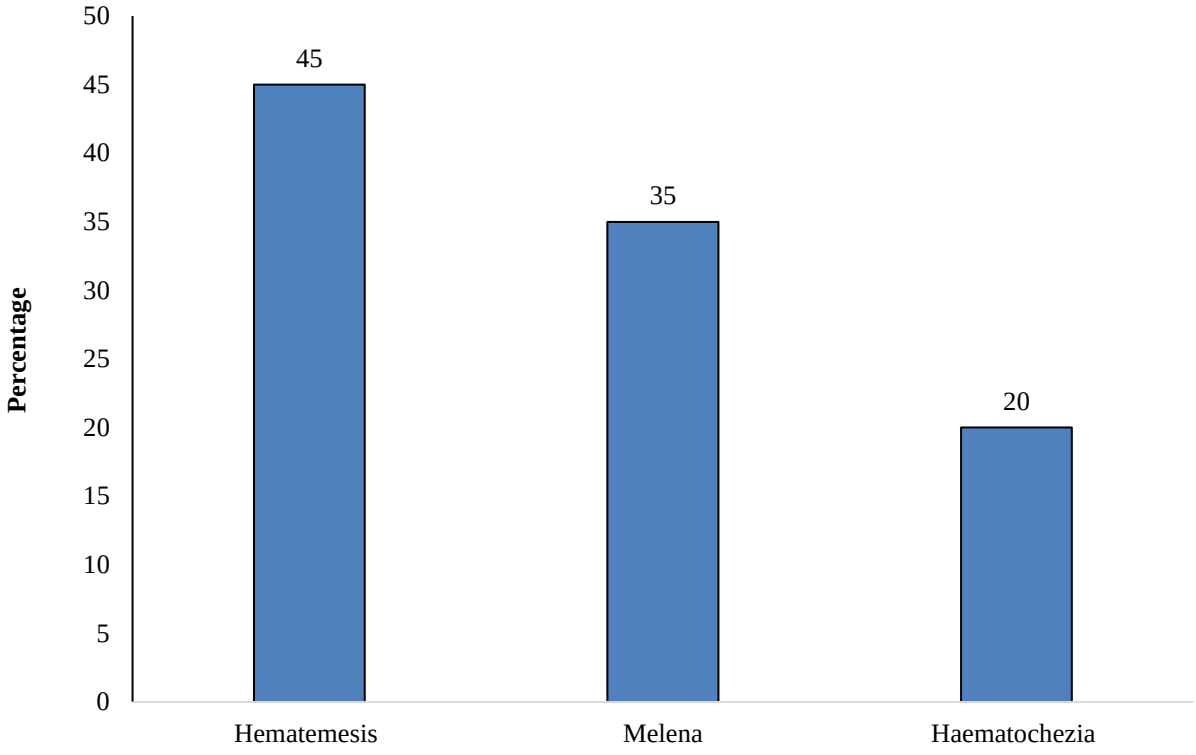

Figure 1: Clinical presentation between the studied group.

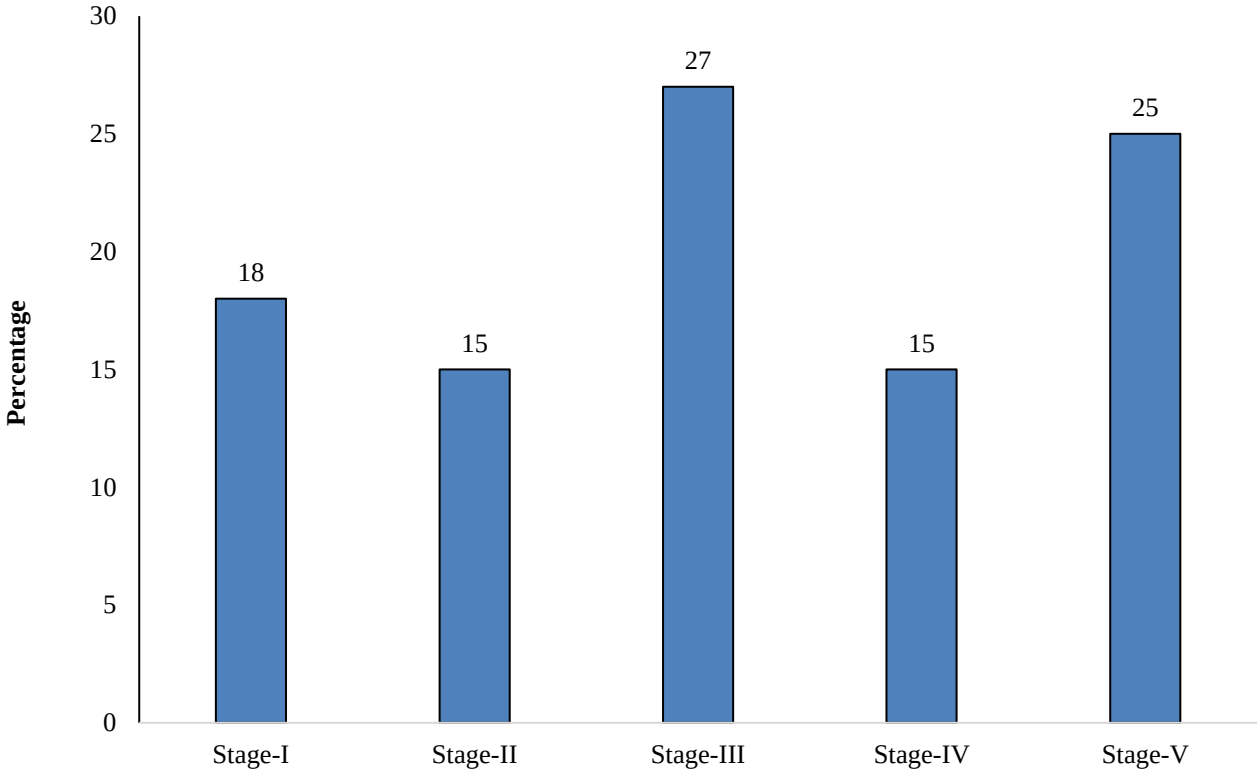

Figure 2: Stages of chronic kidney disease among the studied group.

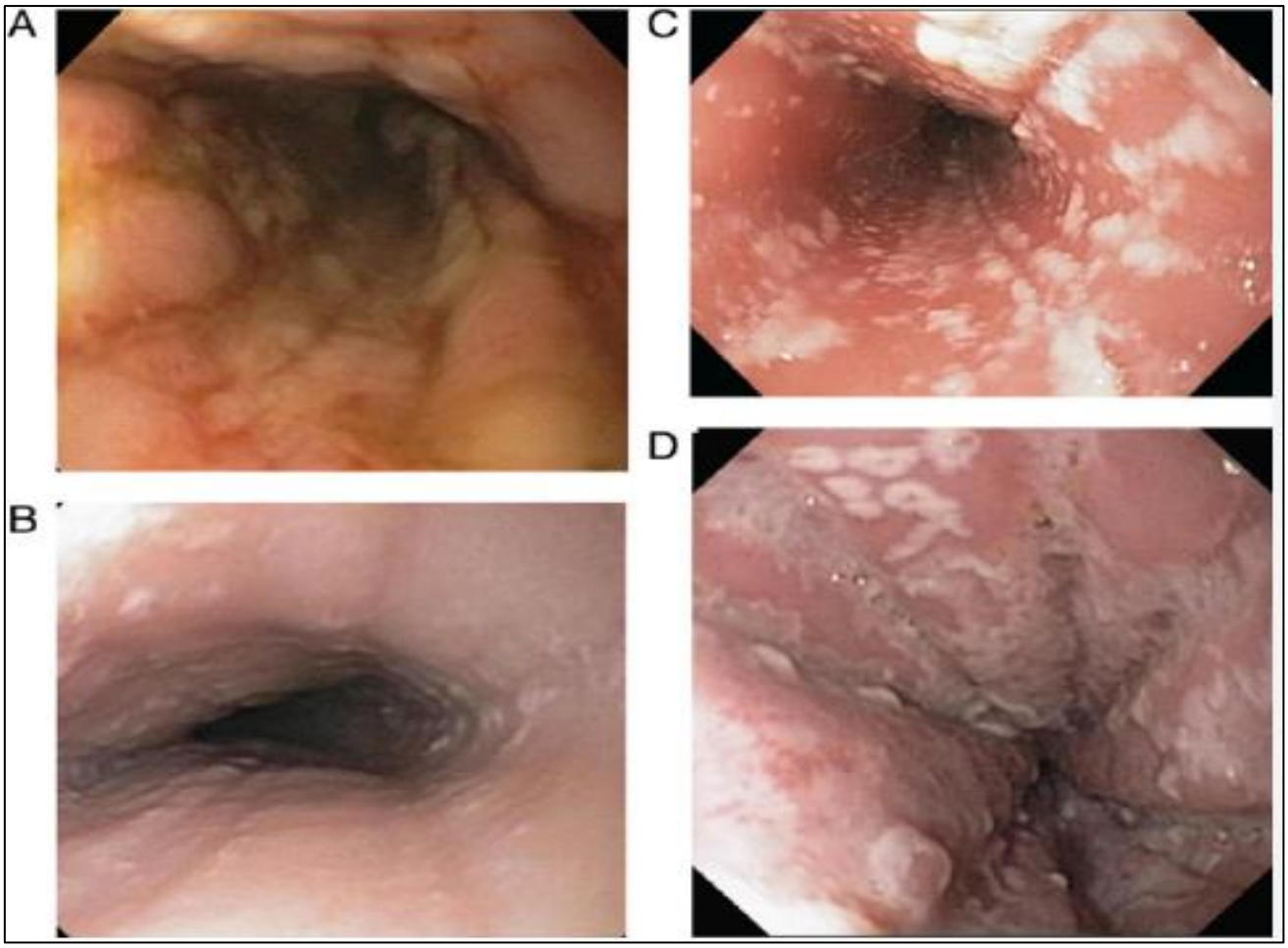

Figure 3: illustrated case No-1. Female patient 56 years old with CKD of 5 years duration presented with melena. Upper endoscopy revealed severe erosive gastritis.

Table 1: Baseline data of the studied group.

	N= 100
Age (years)	45.87 ± 12.56
Sex Male Female	 81 (81%) 19 (19%)
Body mass index (kg/m^2)	26.78 ± 3.45
Residence Rural Urban	 75 (75%) 25 (25%)
Etiology of CKD Diabetes mellitus Hypertension Obstructive uropathy Lupus nephritis	 57 (67%) 23 (23%) 13 (13%) 7 (7%)
Duration of CKD (years)	7.98 ± 3.45
Duration of dialysis (years)	4.33 ± 2.01
Systolic blood pressure (mmHg)	134.56 ± 22.87
Diastolic blood pressure (mmHg)	87.78 ± 9.09

Data expressed as mean (SD), frequency (percentage).

Table 2: Baseline laboratory data between the studied group.

	N= 100
Complete blood count	
WBCs (10^3/ul)	8.98 ± 2.33
Hemoglobin (gm/dl)	9.33 ± 2.21
MCV (fl)	75.87 ± 12.09
MCH (g/dl)	23.34 ± 8.87
Platelets (10^3/ul)	281.8 ± 110.40
Kidney function tests	
Urea (mg/dl)	18.95 ± 7.56
Creatinine (µmol/l)	566.1 ± 183.11
ACR	234.56 ± 147.29
Albuminuria Microalbuminuria Macroalbuminuria	 45 (45%) 55 (55%)
Liver function tests	
AST (u/L)	28.98 ± 12.65
ALT (u/L)	25.22 ± 9.65
ALP (u/l)	105.78 ± 12.10
Albumin (mg/dl)	31.22 ± 2.19
Protein (mg/dl)	75.80 ± 10.10
Bilirubin (mmol/l)	4.11 ± 0.30
Direct bilirubin (mmol/l)	1.34 ± 0.90
Coagulation profile	
INR	1.21 ± 0.06
PT (s)	12.76 ± 2.35
PC (%)	77.09 ± 19.31
Random blood sugar	121.90 ± 34.98
Lipid profile	
Triglyceride (mg/dl)	134.11 ± 30.18
HDL (gm/dl)	49.65 ± 12.90
LDL (10^3/ul)	77.89 ± 10.17
Cholesterol (mg/dl)	180.90 ± 42.11
VLDL (mg/dl)	28.90 ± 8.65

WBCs: white blood cells; MCV: mean corpuscular volume; MCH: mean corpuscular hemoglobin; ALT: alanine transaminase; AST: aspartate transaminase; ALP: alkaline phosphatase; INR: international randomized ratio; ACR: albumin/creatinine ratio; INR: international randomized ratio; PC: prothrombin concentration; TGs: triglycerides; LDL: low density lipoproteins; HDL: high density lipoproteins; VLDL: very low-density lipoproteins.

Table 3: Radiological and endoscopic findings among studied patients.

	N= 100
Kidney echogenicity	
Grade-I	35 (35%)
Grade-II	55 (55%)
Grade-III	10 (10%)
Endoscopic findings	
Erosive esophagitis	12 (12%)
Gastroduodenitis	48 (48%)
Gastric angiodysplasia	20 (20%)
Colitis	12 (12%)
Colonic angiodysplasia	8 (8%)

Data expressed as frequency (percentage).

Table 4: Association between stages of CKD with the presentation and endoscopic findings.

	Stages of chronic kidney disease					*P* value
	Stage-I (n= 18)	Stage-II (n=15)	Stage-III (n=27)	Stage-IV (n=15)	Stage-V (n=25)	
Presentation						
Hematemesis	6 (33.3%)	7 (46.7%)	14 (51.9%)	5 (33.3%)	13 (52%)	0.93
Melena	8 (44.4%)	5 (33.3%)	8 (29.6%)	6 (40%)	8 (32%)	
Haematochezia	4 (22.2%)	3 (20%)	5 (18.5%)	4 (26.7%)	4 (16%)	
Endoscopic findings						
Erosive esophagitis	0	0	12 (44.4%)	0	0	**<0.001**
Gastroduodenitis	18 (100%)	15 (100%)	0	15 (100%)	0	
Gastric angiodysplasia	0	0	15 (55.6%)	0	5 (20%)	
Colitis	0	0	0	0	12 (48%)	
Colonic angiodysplasia	0	0	0	0	8 (32%)	

P value was significant if < 0.05. CKD: chronic kidney diseases.

Table 5: Association between albuminuria with the presentation and endoscopic findings.

	Albuminuria		***P* value**
	Microalbuminuria (n= 45)	**Macroalbuminuria (n= 55)**	
Presentation			**< 0.001**
Hematemesis	45 (100%)	0	
Melena	0	35 (63.6%)	
Haematochezia	0	20 (36.4%)	
Endoscopic findings			**< 0.001**
Erosive esophagitis	5 (11.1%)	7 (12.7%)	
Gastroduodenitis	18 (40%)	30 (54.5%)	
Gastric angiodysplasia	11 (24.4%)	9 (16.4%)	
Colitis	3 (6.7%)	9 (16.4%)	
Colonic angiodysplasia	8 (17.8%)	0	

4. Conclusions

Gastrointestinal bleeding is common in chronic renal failure, and it is easily documentable with endoscopy. Some findings are more common than others, such as duodenitis, duodenal ulcer, gastritis, gastric and pyloric ulcer, and this indicates the necessity for endoscopic evolution of those patients in order to detect these lesions early and to properly manage them to prevent serious and fatal complications.

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