

Original research article

A Study to Determine Prevalence of Significant Upper GI Endoscopic Lesions in Patients Presenting with Chronic Kidney Disease: A Tertiary Care Centre Experience in Bundelkhand Region

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Abstract

Background: Patients with CKD exhibit upper gastrointestinal symptoms e.g. nausea, vomiting, anorexia, hiccups, haematemesis. These may vary from mild symptoms to life threatening GI bleeding; endoscopy timely diagnose most of these abnormalities to intervene accordingly. The incidence of GI symptoms can largely be attributed to the underlying conditions such as accumulation of uraemic toxins, effect of dialysis, impaired gut barrier function due to gut-dysbiosis, inflammation, immunological dysfunction and increased bleeding risk via uraemic-coagulopathy.

Aims and objective: Study the prevalence of upper GI-endoscopic lesions in CKD. Assorted lesions; their correlation with clinical, biochemical parameters and comorbidities.

Methods: Present Observational Cross-sectional study was carried out in Nephrology Unit whereas endoscopies were done at Endoscopy Room, Medicine Department, M.L.B. Medical College, Jhansi (UP). 100 patients of Bundelkhand Region were enrolled in the study during a period of March 2021 to Aug 2022 on the patients with CKD as per inclusion and exclusion criteria.

Results: Most patients in the study untreated and undiagnosed with duration <3months, had UGI-lesions, those with duration >3months under treatment and diagnosed 86.66% had lesions. ESKD is significantly related with UGI-lesions (89%). Most had inflammatory lesions (erosions, oedema, erythema) followed by haemorrhagic (bleeding ulcers) and non-haemorrhagic (clean-based ulcers, healing ulcers). Gastric lesions (74%) were most common followed by oesophageal (39%) and duodenal (18%).

Conclusion: Patients with high serum creatinine level and ESKD develop UGI-lesions; routine endoscopic evaluation may help in early diagnosis and intervention of the life threatening ones. Risk factors like diabetes, hypertension, obstructive uropathy in most CKD patients are related with UGI-lesions; restriction reduces prevalence. Anaemia perse iron deficiency due to blood loss and malabsorption is significant.

Keywords: Chronic kidney disease, upper GI endoscopic lesions, symptoms, stages

Introduction

Chronic kidney disease (CKD) is caused by progressive and permanent degradation of the nephrons, regardless of the underlying aetiology. Approximately 17.2% of the Indian population and 11 to 13% of the global population are affected by chronic kidney disease (CKD). The impaired excretory, metabolic endocrine functions of the kidney lead to the development of the Uremia Clinica Syndrome. In the study the prevalence of gastro intestinal symptoms among individuals with chronic renal disease is projected to vary between 70% and 79%. Upper gastrointestinal symptoms, such as nausea, vomiting, anorexia gastrointestinal (GI) bleeding, are one of the most common reasons for hospitalisation in patients with renal disease they greatly increase morbidity and mortality The incidence of gastrointestinal (GI) symptoms is generally attributable to the underlying diseases, such as an elevated level of uremic toxin, the influence of dialysis, a change in lifestyle, or the treatment-required drugs. GID slack clinical or

biochemical correlations is beginning to unravel putative morphometric abnormalities (e.g., duodenal eosinophilia, colonic mastocytosis) have been identified. An utmost relevance, especially given that these patients undergo haemodialysis or transplantation. This is due to the danger of bleeding from damaged mucosa as a result of heparinization during dialysis or the administration of corticosteroids or other immuno suppressive drugs. Upper GI (UGI) symptoms can range from moderate symptoms to life-threatening GI haemorrhage and endoscopy can.

Diagnose the majority of these abnormalities in a timely manner to allow for appropriate intervention. All CKD patients who exhibit GI symptoms should undergo routine endoscopic assessment. Patients with chronic kidney disease (CKD) exhibit upper gastrointestinal (GI) symptoms such as dysgeusia, anorexia, hiccups, stomatitis, nausea, vomiting gastroparesis. The coagulopathy of uremia may increase haemorrhage. Illnesses of the gastrointestinal system, such as inflammatory bowel disease (IBD) procedures, such as gastric bypass surgery, may result in renal damage. In such patients, alterations in acid-base and volume status, electrolyte imbalance kidney stone formation may cause or contribute to the development of CKD. Thus, there is a bidirectional link between the kidneys and the gastrointestinal system.

Aims and objectives

- To find prevalence of upper gastrointestinal lesions in patients of chronic kidney disease.
- To find out the various UGI endoscopic abnormalities in patients of CKD.
- To correlate the clinical and biochemical parameters with upper GI lesion in chronic kidney disease patients.

Materials and Methods

Observational Cross-sectional study was carried out in Nephrology Unit whereas endoscopies were done at Endoscopy Room, Medicine Department, M.L.B. Medical College, Jhansi (UP). 100 patients of Bundelkhand Region were enrolled in the study during a period of March 2021 to Aug 2022 on the patients with CKD as per inclusion and exclusion criteria.

Inclusion criteria

- Patients diagnosed CKD based on KDIGO-2012.

Exclusion criteria

- Patients on high dose of NSAID for long duration.
- Patients of chronic liver disease.
- Patient with history of chronic alcoholism.
- Known case of carcinoma, stone and esophageal varices.
- Congenital vascular malformations.

The patients diagnosed as Chronic Kidney Disease as per recommendations of National Kidney Foundation Kidney Disease Outcomes Quality Initiative (NKF KDOQI) and Kidney Disease Improving Global Outcome (KDIGO) 2012. The guideline describes CKD as either kidney damage or a decreased glomerular filtration rate (GFR) of less than 60 mL/min/1.73 m² for at least 3 months with or without albuminuria. Study cohort was divided based of staging on CKD (KDIGO Guidelines) which is based on GFR and albuminuria. Patients in all stages of Chronic Kidney Disease (CKD) with symptoms of anorexia, nausea, vomiting, hematemesis, abdominal pain, abdominal distention, hiccups and dysphagia were taken for study. Kept NPO overnight. An intravenous Buscopan and Diazepam if required. A lignocaine mouthwash was given. The records of CKD patients who underwent UGIE were collected; age, sex, weight, detailed history of patient with special reference to gastrointestinal symptoms like nausea, vomiting, anorexia, hiccups, abdominal pain, haematemesis etc. were taken followed by thorough clinical examination. The estimated creatinine clearance was calculated using the Cockcroft and Gault formula and eGFR by CKDEPI formula.

Results

Present observational cross-sectional study was carried out in Nephrology Unit of Department of Medicine, MLB Medical College, Jhansi. After taking ethical clearance and written informed consent, total 100 patients were enrolled in the study during a period of March 2021 to Aug 2022 on the patients with CKD as per inclusion and exclusion criteria.

The majority of the CKD patients were aged between 60-74 years [29(29.00%)], followed by age 15-29 years [24(24.00%)]. Statistically, a non-significant difference was observed in age-wise distribution among groups [p=0.2798]. [Table: 1, Figure: 2]

The majority of the CKD patients enrolled in the study were male i.e., [62(62.00%)] and females were [38(38.00%)]. Statistically, a non-significant difference was observed in gender-wise distribution of patients with CKD. [p=0.0874]. [Table: 1, Figure: 3]

Overall, majority of the patients had uraemic symptoms (97%) followed by fluid overload status (43%) and other somatic complains (6%). [Table: 1]

The highest number of patients 39(30.71%) had erosions, 20(15.75%) gastric ulcer, 17(13.39%) duodenal ulcer, 14(11.02%) oesophagitis, 10(7.87%) varices; observed to be statistically significant [p=0.0001].

Number of patients with inflammatory lesions were high 18(18.00%). Only 8(8.00%) had haemorrhagic lesions while 6(6.00%) had non haemorrhagic lesions. Statistically, it was non- significant [p=0.2399]

Total 48(48.00%) of patients with CKD was observed critically ill i.e., on end stage and 41(41.00%) of patients were severely ill. Statistically, it was found significant p<0.0001.

Stage IV and stage V was observed as 48(48.00%) and 41(41.00%) respectively which was found to be significant.

The percentage of patients with endoscopic lesions with duration < 3 months (untreated and undiagnosed) is 100% i.e. 55 out of 100 patients. The percentage of patients with endoscopic lesions with duration > 3 months (under treatment and diagnosed) is 86.66% i.e. 39 out of 100 patients. 6 patients who were diagnosed and were under treatment were found to have no endoscopic lesions. The mean ± SD time duration of disease was [96.76 ± 84.23].

43 out of 100 patients with significant value of serum creatinine so as to produce eGFR less than 15ml/min/1.73m² rendering them towards the later stages of renal diseases. The mean creatinine clearance of CKD patients was 18.07±13.33 the mean estimated glomerular filtration rate of CKD patients was 17.63±14.58. 83 out of 100 patients were found to be anaemic. Thus, mean ±SD level of haemoglobin was observed as 8.39±2.55. On examining the CKD patients, [72(48.00%)] were found pale. Mean ± SD of FBS was 108.32±20.98. HbA1c was found [5.18±1.37]. The mean ± SD of 24 hr urine protein in patients with CKD was found to be 2.11±1.09. The indicators related with diabetes. The mean SBP was [135.90 ± 27.13] and DBP was [84.84 ± 15.29]. Hypertension was observed in the study [44(44.00%)]. On fundus examination normal signs were detected in 79(79.00%) of participants. Over all total hypertensive changes was observed in total 21 patients. The mean pulse rate was [93.28 ± 17.30]. Most patients from the above study had ECGs with LV volume overload changes, left axis deviation, LVH related changes, low voltage complexes in some etc. Most had dyslipidaemia. Thus, most CKD patients are at risk for serious cardiovascular events despite of these gastrointestinal ones. Obstructive uropathy i.e., [23(23.00%)]. Quite lesser history of polycystic kidney disease [2(2.00%)] was found while least history of biopsy diagnosed disease was there [2(2.00%)].

Table 1: Demographic data of patients with CKD

| Age Distribution (Years) | N | % | P-Value |
|--|-------|---------|----------------------|
| 15-29 | 24 | 24.00% | X=5.074 p=0.2798 |
| 30-44 | 20 | 20.00% | |
| 45-59 | 16 | 16.00% | |
| 60-74 | 29 | 29.00% | |
| 75-90 | 11 | 11.00% | |
| Total | 100 | 100.00% | |
| Gender | N | % | |
| Female | 38 | 38.00% | X=2.922 |
| Male | 62 | 62.00% | p=0.0874 |
| Total | 100 | 100.00% | |
| Presenting Complains | N | % | |
| Complains Suggestive of Fluid Overload Status [43%] Abdominal Pain, Body Swelling, Breathlessness, Abdominal Distension, Anasarca | 77 | 77.00 | |
| URAEMIC SYMPTOMS [97%] Anorexia, Nausea Vomiting, Hiccups, Anuria | 97 | 97.00 | |
| Other Somatic Complains [6%] Cough, Chest Pain, Hematemesis | 8 | &00 | |
| Duration of Disease | Mean | SD | |
| | 96.76 | 84.23 | |
| Creatinine | Mean | SD | |
| | 18.07 | 13.33 | |
| Severity | N | % | |
| Mild To Moderate | 9 | 9.00% | X=38.25 p<0.0001* |
| Moderate To Severe | 2 | 2.00% | |
| Severe | 41 | 41.00% | |
| End Stage | 48 | 48.00% | |
| Total | 100 | 100.00% | |
| STAGE | N | % | P-Value |
| II | 3 | 3.00% | X=53.59 p<0.0001* |
| IIIA | 6 | 6.00% | |
| IIIB | 2 | 2.00% | |

| | | | |
|---------------------------------|----------|----------|----------------------|
| IV | 41 | 41.00% | |
| V | 48 | 48.00% | |
| Total | 100 | 100.00% | |
| Endoscopic Lesions | N | % | P-Value |
| Normal | 6 | 4.72% | X=33.39 p=0.0001* |
| Both Gastric and Duodenal Ulcer | 2 | 1.57% | |
| Gastric Ulcer | 20 | 15.75% | |
| Gastric Haemorrhage | 6 | 4.72% | |
| Oesophagitis | 14 | 11.02% | |
| Erosions | 39 | 30.71% | |
| Erythema | 5 | 3.94% | |
| Oesophageal Varices | 10 | 7.87% | |
| Duodenal Ulcer | 17 | 13.39% | |
| Haemorrhagic Erosions | 8 | 6.30% | |
| Total | 127 | 100.00% | |
| Remarks | N | % | P-Value |
| Haemorrhagic Lesions | 8 | 8.00% | X=4.208 p=0.2399 |
| Non-haemorrhagic Lesions | 6 | 6.00% | |
| Inflammatory Lesions | 18 | 18.00% | |
| Normal | 6 | 6.00% | |

Table 2: Endoscopic lesions of CKD

| Endoscopic Lesions | Number | Percentage | p-Value |
|---------------------------------|--------|------------|----------------------|
| Normal | 6 | 4.72% | X=33.39 p=0.0001* |
| Both Gastric and Duodenal Ulcer | 2 | 1.57% | |
| Gastric Ulcer | 20 | 15.75% | |
| Gastric Haemorrhage | 6 | 4.72% | |
| Oesophagitis | 14 | 11.02% | |
| Erosions | 39 | 30.71% | |
| Erythema | 5 | 3.94% | |
| Oesophageal Varices | 10 | 7.87% | |
| Duodenal Ulcer | 17 | 13.39% | |
| Haemorrhagic Erosions | 8 | 6.30% | |
| Total | 127 | 100.00% | |

| Prognosis of CKD by GFR and Albuminuria Categories: KDIGO 2012 | | | | Persistent albuminuria categories | | |
|--|-----|----------------------------------|-------|-----------------------------------|-----------------------------|--------------------------|
| | | | | Description and range | | |
| | | | | A1 | A2 | A3 |
| | | | | Normal to mildly increased | Moderately increased | Severely increased |
| | | | | <30 mg/g <3 mg/mmol | 30-300 mg/g 3-30 mg/mmol | >300 mg/g >30 mg/mmol |
| GFR categories (ml/min/ 1.73 m ²) Description and range | G1 | Normal or high | ≥90 | | | |
| | G2 | Mildly decreased | 60-89 | | | |
| | G3a | Mildly to moderately decreased | 45-59 | | | |
| | G3b | Moderately to severely decreased | 30-44 | | | |
| | G4 | Severely decreased | 15-29 | | | |
| | G5 | Kidney failure | <15 | | | |

Fig 1: Staging of CKD (KDIGO Guidelines)

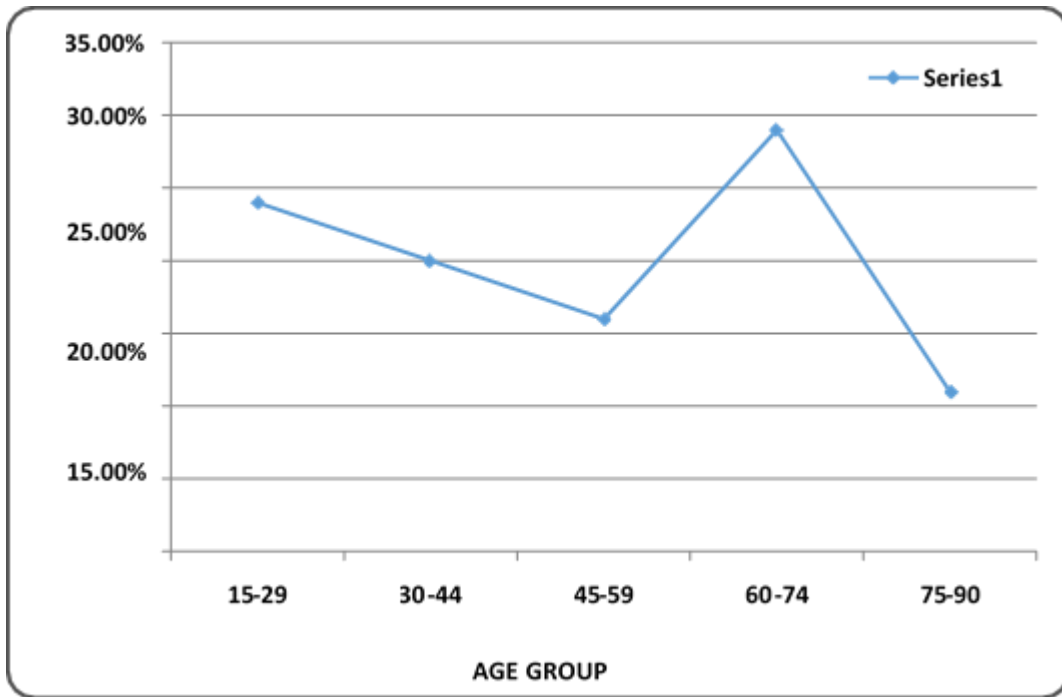


Fig 2: Age distribution (years) of patient

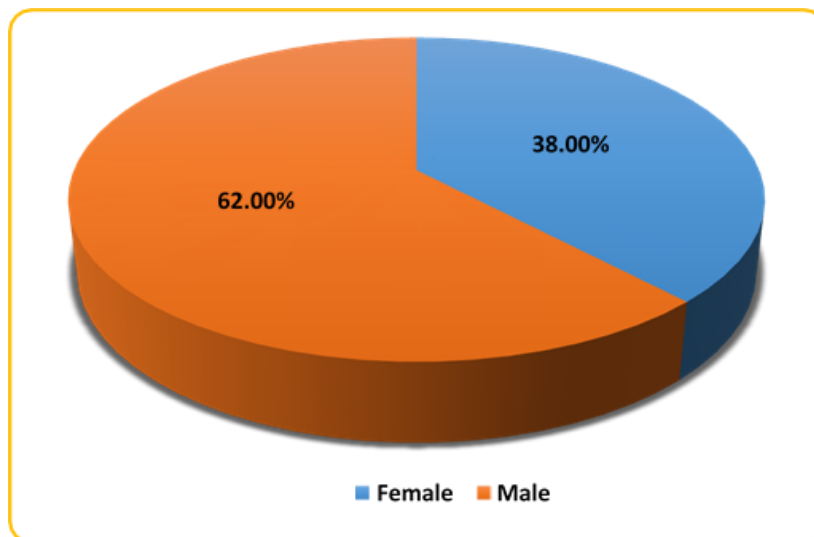


Fig 3: Sex wise distribution of patients

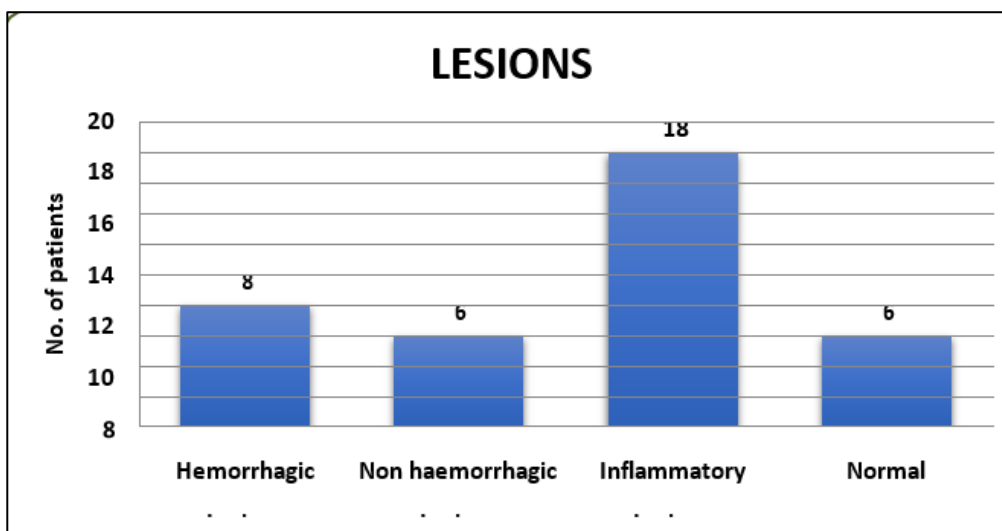


Fig 4: Graphical representation of various lesions seen in CKD patients

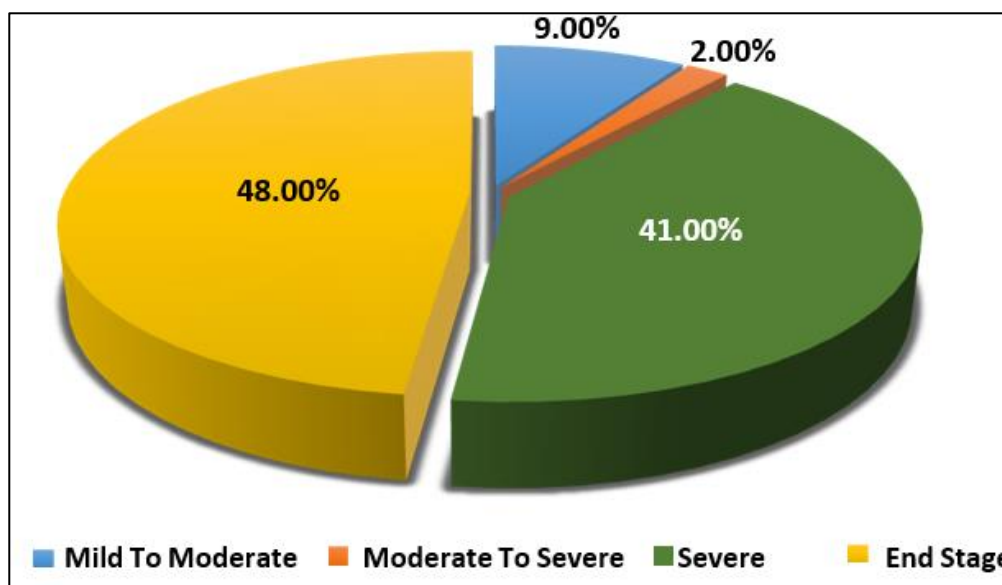


Fig 5: Severity level of CKD patients

Discussion

The majority of the CKD patients were aged between 60-74 years [29(29.00%)], followed by age 15-29 years [24(24.00%)]. The majority of the CKD patients enrolled in the study were male i.e., [62(62.00%)]. Sreelatha M *et al.*, (2017) [42] conducted a study on 50 chronic kidney disease (CKD) patients were selected in this study. The majority of patients are between the ages of 21 and 30 and ten of them are male. There are eleven patients in the 31-40 year-old age bracket, with significantly more men than women. Pursnani N *et al.*, (2019) [47] designed with an objective to study the prevalence of various UGI symptoms and UGI endoscopic abnormalities in patients of CKD. For the study, 54 patients were discovered and chosen. It includes 30 males and 24 females with CKD with UGI symptoms. The average age of the study group was 36.6±6.3 years.

Majority of the patients had uraemic symptoms (97%) followed by fluid overload status (43%) and other somatic complains (6%). [Table: 1]

The highest number of patients 39(30.71%) had erosions. Number of patients with inflammatory lesions were high 18(18.00%). Only 8(8.00%) had haemorrhagic lesions while 6(6.00%) had non haemorrhagic lesions. Habas E *et al.*, (2017) [36] investigated the necessity of upper GI endoscopy in CKD and end-stage renal disease (ESRD) on regular hemodialysis patients presented to emergency department (ED) with upper GI symptoms. Vomiting and hematemesis were the most common symptoms. Endoscopy at presentation in Group A revealed erosive gastritis in 19 patients (60.3%), erosive oesophagitis in 3 patients (10%), superficial oesophagitis in 7 patients (23.3%) duodenal ulcer in 1 patient (3.3%) Sreelatha M *et al.*, (2017) [42] Endoscopic examination reveals UGI mucosal lesions in the majority of CRF patients. Patients with GI symptoms are more likely to have GI abnormalities than those without symptoms. In CRF, erosive mucosal illness is the most prevalent form of GI pathology. Homse Netto JP *et al.*, (2018) [43] aimed to describe the alterations seen on the upper endoscopies of 96 kidney-transplant candidates. Males made up 54.17 percent of the 96 patients involved in the study. The median age and duration of dialysis treatment were each 50 months. The most common finding on an upper endoscopy was exanthematous pangastritis (57.30%), followed by erosive oesophagitis (30.20%). Pakfetrat M *et al.*, (2020) [51] conducted this study to assess the endoscopies results for ESRD patients who were on hemodialysis (HD) Longer dialysis duration and older patients were associated with an increase in upper GI abnormalities (P = 0.032, <0.001). As long as more than 50% of patients have at least one upper GI involvement, they recommended that patients without symptoms who have risk factors for ulcers undergo endoscopy as a pretransplantation examination.

43 out of 100 patients with significant value of serum creatinine so as to produce eGFR less than 15ml/min/1.73m² rendering them towards the later stages of renal diseases. Total 48(48.00%) of patients with CKD was observed critically ill i.e., on end stage and 41(41.00%) of patients were severely ill. Stage IV and stage V observed in 48(48.00%) and 41(41.00%) respectively Pakfetrat M *et al.*, (2020) [51] conducted this study to assess the endoscopies results for ESRD patients who were on hemodialysis (HD) and to find out the most common disease that involves upper GI tract of them. 50.6% of patients reported abnormal endoscopic results. Mild gastritis (35.6%) and gastro oesophageal reflux disease (16.4%) were the two most prevalent abnormalities. 11% of patients were observed to have GI ulcers. The duodenal ulcer was the most prevalent ulcer, affecting 6.8% of patients.

The percentage of patients with endoscopic lesions with duration < 3 months (untreated and undiagnosed) is 100% i.e. 55 out of 100 patients. The percentage of patients with endoscopic lesions with

duration > 3 months (under treatment and diagnosed) is 86.66% García Agudo R *et al.*, (2018) [46] conducted a cross-sectional, analytical, observational study to determine the prevalence of endoscopic gastrointestinal lesions and associated risk factors in asymptomatic patients with chronic kidney disease. The endoscopic examination revealed 255 lesions, with at least one lesion in 68.2% of patients. Karahan D *et al.*, (2022) [60] aimed to evaluate the frequency of gastro-intestinal symptoms and findings and compare between renal replacement therapies. Frequent gastrointestinal problems among patients included gastritis (62%) and gastro-oesophageal reflux (39%) The ratio was significantly greater in the pre-dialysis group ($p = 0.016$).

83 out of 100 patients were found to be anaemic. Sharma D *et al.*, (2018) [48] estimated the pattern of anaemia in the elderly patients and the underlying etiology of anaemia. The average haemoglobin level of 105 elderly anaemia patients was $8.8 \pm 2.3\%$ g/dl. The etiological distribution of anaemia was iron deficiency in 26 patients (24.8%), chronic disease in 24 patients (22.9%), haematological disorders in 21 (20%), chronic kidney disease in 13 (12.4%). Iron-deficient patients exhibited upper gastrointestinal lesions at a rate of 57.6%, with 30.7% having a nutritional origin. Thus, a complete study, including gastrointestinal endoscopy is required.

Hypertension was observed in the study [44(44.00%)]. Most patients from the above study had ECGs with LV volume overload changes, left axis deviation, LVH related changes, low voltage complexes in some etc. Thus, most CKD patients are at risk for serious cardiovascular events despite of these gastrointestinal ones.

Limitations of the study: This was a single-centered study. Still other Prospective Researches are required to provide additional light on this topic.

Conclusion

From our study of CKD patients it is derived that CKD patients with high serum creatinine level are prone to develop Upper GI system and most of them shows erosive gastritis, ulcerative oesophagitis and duodenitis on Upper GI endoscopy. It is thus established that routine endoscopic evaluation may help in early diagnosis of UGI abnormalities. An early intervention can be done if life threatening. Level of creatinine affects GI mucosa while producing various uraemic toxins. Thus early decision for Renal Replacement Therapy through frequent dialysis or transplantation while decreasing creatinine may help in decreasing UGI abnormalities. Proteinuria, estimated GFR, stages and severity of CKD, is significantly related to early diagnosis of UGI endoscopic abnormalities. Risk factors like diabetes, hypertension, obstructive uropathy are significantly related with UGI abnormalities controlling them may help reduce prevalence. Anaemia perse iron deficiency due to blood loss and also due to malabsorption is significantly related with UGI abnormalities. Thus Iron supplementation is utmost in CKD patients. An early diagnosis may help in deciding the route of administration i.e. intravenous if refractory.

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