



## **Study of prevalence of upper gastrointestinal endoscopic lesion of gastrointestinal system among patient with chronic kidney disease**

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### **Abstract**

**Background:** Chronic kidney disease (CKD) is identified as a global health problem touching about 17.2% of the Indian population and 11 to 13% globally. Gastrointestinal symptoms are common findings in patients with CKD.

**Aims and Objectives:** To evaluate the various symptoms and prevalence of upper gastrointestinal endoscopic lesion of gastrointestinal system among patient with CKD.

**Materials and Methods:** Hundred patients with CKD were studied in the Department of Medicine, Gandhi Medical College and associated Hamidia Hospital from February 2017 to January 2018. Patients were divided into different stages as Stage I to Stage V based on the GFR values. We collected age, sex, weight, detailed history of patient with special reference to gastrointestinal symptoms like nausea, vomiting, anorexia, hiccups, abdominal pain, hematemesis. All the patients had undergone upper gastrointestinal endoscopy (UGIE).

**Results:** Mean age of patients in study cohort was  $44.30 \pm 10.67$  years with male (56%) preponderance. Majority were on were on hemodialysis (53%). Out of 100 CKD patients studied, the 48 patients were in the CKD stage 5 and all were under hemodialysis. 82% patients had the lesion on UGI Endoscopy. Patients who were on HD they had more lesion on UGI Endoscopy ( $p=0.003$ ). CKD severity and stages progresses the lesion on UGI Endoscopy increases ( $p=0.02$ ). UGI Endoscopic lesion is more common in CKD with duration of disease is  $> 2$  years ( $P= 0.023$ ). Most common GI symptoms were nausea (90%) and heart burn (90%) followed abdominal pain (85%) and abdominal distension (85%). Most common UGIE lesions was pangastritis (25%) followed by duodenitis (22%) and esophagitis (16%). UGI Endoscopic lesions were more common CKD stage 5 followed by CKD stage 4. Endoscopy was more common to be found when duration of disease is more than 2 years.

**Conclusion:** Gastrointestinal symptoms are common in CKD patients and constitute an important cause of seeking medical care among these patients. Upper GI symptoms like nausea, vomiting and abdominal pain tend to worsen with increasing uremia. Patients with higher grading of CKD showed higher incidence of abnormalities of GI findings on endoscopy.

**Keywords:** gastrointestinal symptoms, endoscopy, lesions, CKD

### **1. Introduction**

The kidney is one of the extremely differentiated organs in the body. Chronic kidney disease (CKD) is identified as a global health problem touching about 17.2% of the Indian population and 11 to 13% globally [1].

Chronic kidney disease is a gradual loss in renal function; define by nephron damage and depletion that lead to prerequisite of dialysis or renal transplantation (End Stage Renal Disease) to escape death from uremia that is impairment of all the system of the organism, with laboratory and clinical irregularities.

The prevalence of gastro intestinal symptoms in patients with chronic kidney disease is about to range from 70% to 79% [2]. The prevalence of these abnormalities is generally identical in pre-dialysis patients, patients on hemodialysis, and patients on peritoneal dialysis, but a trend towards increasing symptoms with increasing duration of chronic kidney disease exists.

The most common gastrointestinal symptoms in patients with chronic kidney disease include nausea, vomiting, abdominal pain, heart burn, dysphagia, uremic

gastroenteritis, anorexia, uremic fetor, hematemesis, and abdominal distention. IBS also has a high predominance in these patients, ranging from 11% to 33%. Gastrointestinal bleeding is also a known complication of renal failure [3].

As patients advance through the stages of CKD, nutritional demands are altered and metabolism of protein, water, salt, potassium, calcium and phosphorous are impaired. These changes lead to inadequate energy generation despite adequate intake of protein and carbohydrate substrates. In more extreme manifestations, these alterations in nutrient utilization cause "uremic malnutrition," a syndrome that is specific from malnutrition caused by inadequate nutrient intake [4].

The endoscopic check out of a patient with chronic renal failure allows seeing the different pictures of gastrointestinal illness in order to treat in pre-transplant period and to prevent complication that might be a contraindication to the transplantation. In present study we tried to determine the prevalence of various upper GI lesions in patients with CKD by means of Upper GI Endoscopy and to evaluate their relationship with stage of CKD or GFR.

**2. Materials and Methods**

We performed an observational cross-sectional study on 100 patients with CKD attending MOPD, Nephrology OPD and those admitted in the Department of Medicine, Gandhi Medical College and associated Hamidia Hospital, Bhopal from February 2017 to January 2018.

Patients diagnosed to have CKD based on KDIGO-2012 with eGFR <60ml/min/m<sup>2</sup> (stage 3-5), age > 20 years and CKD patients with presence of gastrointestinal symptoms were included. Patients in stage 1 and stage 2 CKD, Patients in uremic encephalopathy presenting with symptoms/sign like seizures, muscular irritability or altered sensorium in which it is difficult to perform endoscopy (Vitaly unstable patients), patients on high dose of NSAID for long duration, patients of cirrhosis with esophageal varices, patients with hemoglobin level < 7 gm/dl and with history of chronic alcoholism/ smoking/ tobacco chewing were excluded from the present study.

Institutional Ethics Committee clearance was obtained before start of work. All the patients were taken informed consent in Hindi/English and evaluated according to clinical proforma.

The patients were 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 m<sup>2</sup> for at least 3 months.

Study cohort was divided based of staging of CKD (KDIGO Guidelines) which is based on GFR as Stage I (kidney damage with GFR ≥ 90 ml/min/1.73m<sup>2</sup>), Stage II (kidney damage with GFR of 60-89 ml/min/1.73m<sup>2</sup>), Stage III (kidney damage with GFR of 30-59 ml/min/1.73m<sup>2</sup>), Stage IV (kidney damage with GFR of 15-29 ml/min/1.73m<sup>2</sup>) and Stage V (GFR of < 15 ml/min/1.73m<sup>2</sup>)

All subjects were subjected to routine (hemoglobin, FBS, Serum urea, Serum creatinine. S. calcium, urine R/M, Abdominal ultrasonogram, ECG, lipid profile) and special investigation to detect various CKD stages according to eGFR.

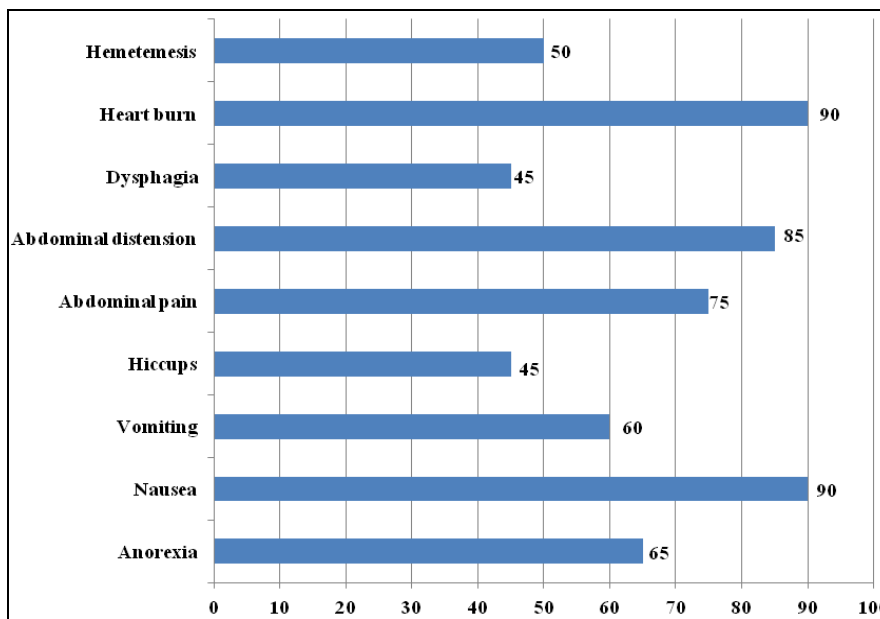
Patients in Stage 3 to Stage 5 Chronic Kidney Disease (CKD) with symptoms of anorexia, nausea, vomiting, hemetemesis, abdominal pain, abdominal distention, hiccups and dysphagia and who are clinically stable (Hb>7gm/dl) taken for study. An intravenous catheter set was inserted for the administration of Buscopan and Diazepam if required. A lignocaine mouthwash was given. Endoscopy was performed in all patients using Olympus 170 series light source and Olympus 150 series video gastroscope.

The records of CKD patients who underwent UGIE were collected. We collected age, sex, weight, detailed history of patient with special reference to gastrointestinal symptoms like nausea, vomiting, anorexia, hiccups, abdominal pain, hemetemesis etc. will be taken followed by thorough clinical examination. The estimated creatinine clearance was calculated by using the Cockcroft and Gault formula.

All the statistical analysis was done using IBM SPSS ver. 20 software. Frequency distribution and cross tabulation was used to prepare the tables. Microsoft word 2010 was used to prepare the graphs. Quantitative data is expressed as mean ± SD whereas categorical data was expressed as percentage. Student t test was used to compare the means whereas categorical data was compared using chi square test. Level of significance was assessed at <0.05.

**3. Results**

Mean age of patients in study cohort was 44.30±10.67 years. Most of the patients were in the age group of 31-40 years (35%) followed by 41-50 years (34%). Majorities were male (56%).



\*One or more than one symptoms could present in one patient.

**Fig 1:** Presenting complaints of the 100 patients with chronic kidney diseases\*

Out of 100 patients the most common Co-morbidities in present study was hypertension (48%) followed by diabetes (21%). Mean duration of hypertension and diabetes was

4.45±3.22 and 4.89±3.14 respectively. 17% patients had both hypertension and diabetes. Out of 100 CKD patients studied, 48% patients were in CKD stage 5, 28% patients

were in CKD stage 4, and 24% patients were in CKD stage 3.

Majority were on were on hemodialysis (53%). Mean duration of CKD was 2.80±0.60The patients who were on hemodialysis the mean duration was 2.30±0.80. The patients who were not on hemodialysis the mean duration was 1.80±0.40 years.

Out of 100 CKD patients studied, the 48 patients were in the CKD stage 5 and all were under hemodialysis. 28 patients were in CKD stage 4 in which only 5 patients were under hemodialysis and 23 patients were not on hemodialysis. Out

of 24 patients who were in stage 3 none of them were under hemodialysis.

Most of the patients had hemoglobin between 7-10g/dl (54%) (mean 8.8±0.64). Most of the patients (49%) had serum calcium between 7-9mg/dl (mean 8.30±0.60) followed by 37% patients who had serum calcium of <7mg/dl (mean 6.20±0.46).

Out of 100 CKD patients studied, 82% patients had the lesion on UGI Endoscopy and 18% patients had the normal UGI Endoscopic findings.

**Table 1:** Comparing UGIE findings with CKD duration

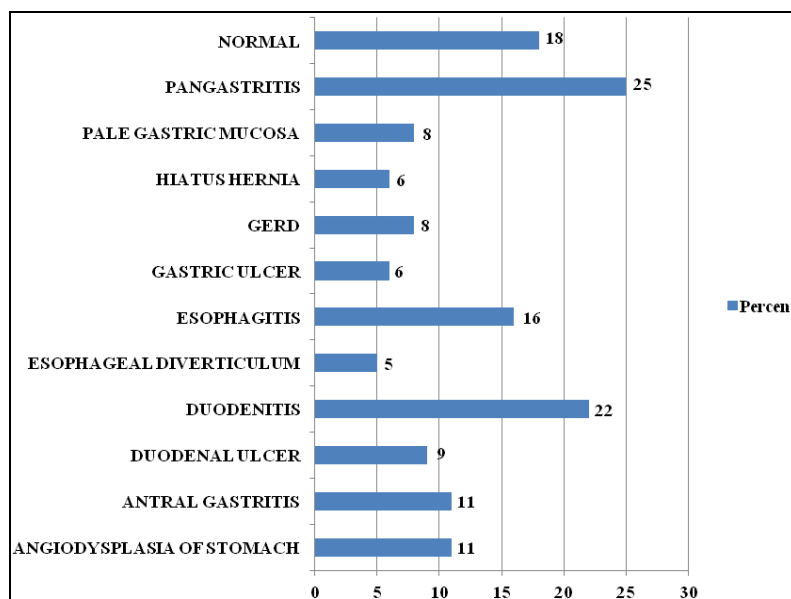
UGIE findings	CKD duration					
	≤2	%	2-4	%	>4	%
Angiodysplasia of stomach (11)	2	18	4	36	5	46
Antral Gastritis (11)	2	18	4	36	5	46
Duodenal Ulcer (9)	2	22	3	33	4	45
Duodenitis (22)	4	18	8	36	10	46
Esophageal Diverticulum (5)	1	20	2	40	2	40
Esophagitis (16)	2	12	6	38	8	50
Gastric Ulcer (6)	1	16	2	32	3	52
GERD (8)	1	13	3	38	4	49
Hiatus Hernia (6)	1	17	2	33	3	50
Pale Gastric Mucosa (8)	1	13	3	38	4	49
Pangastritis (25)	5	20	7	28	13	52
Normal (18)	12	66	5	28	1	6

Out of 100 CKD patients studied, the 53 patients who were on hemodialysis 51 patients had lesion in UGI Endoscopy (96%) and 2 patients had normal UGI Endoscopy. The 47 patients who were not on hemodialysis 31 patients had lesion in UGI Endoscopy (66%) and remaining 16 patients had normal UGI Endoscopy. It signifies that the patients who were on HD they had more lesion on UGI Endoscopy (p=0.003).

Out of 24 patients who were in CKD stage 3, 10 patients had lesion on UGI Endoscopy (42%). Out of 28 patients who were in CKD stage 4, 25 patients had lesion on UGI Endoscopy (89%). And out of 48 patients who were in CKD

stage 5, 47 patients had lesion on UGI Endoscopy (98%). It means as CKD severity and stages progresses the lesion on UGI Endoscopy increases. In this study P value is 0.02, which is statistically significant.

Out of 100 CKD patients studied, the 18 patients who had Duration of disease >4 years, 94% had lesion on UGI Endoscopy and out of 52 patients who had duration of disease 2-4 years, 90% had lesion on UGI Endoscopy And the patients who had duration of disease < 2years they had 60% lesion in UGI Endoscopy. It signifies that UGI Endoscopic lesion is more common in CKD with duration of disease is > 2years (P= 0.023).



**Fig 2:** Number and Percentage of various UGIE findings in CKD patients

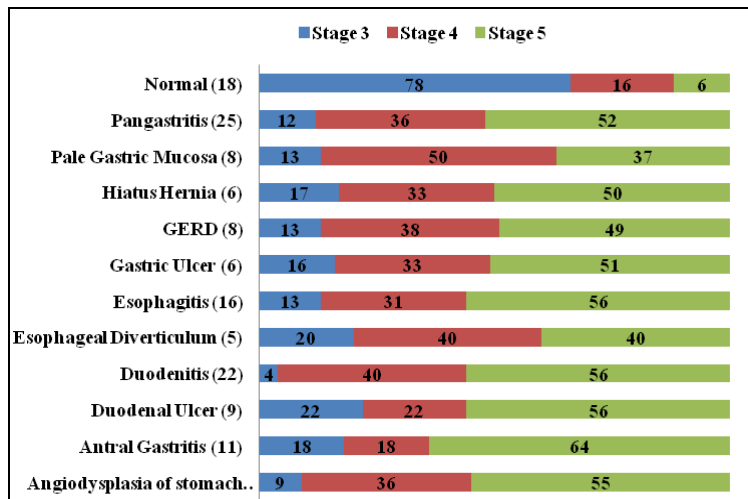


Fig 3: Comparing UGIE findings with CKD stages

**4. Discussion**

Chronic renal failure is associated with several diseases, due to a multifactorial damage that leads to a loss in function of all systems of the organism. Gastrointestinal alterations are very common in these patients, and it is confirmed by endoscopy that shows a large range of pathological pictures. In literature there are many cases of endoscopic findings, and every author has different experiences and data.

This study examined the most common upper GI lesions that occur in patients with CKD using upper GI endoscopy. Prevalence of GI symptoms in patients with CKD is thought to range from 70 to 79%. The prevalence of these disorders is generally similar in predialysis patients, patients on hemodialysis, and patients on peritoneal dialysis [5], but a trend towards increasing symptoms with increasing duration and severity of CKD exists.

CKD patients receiving hemodialysis treatment abide of more than 1.1 million people in the world, and the size of this population is expanding at a rate of 7% per year according to the progress in medical and dialysis machine technique [6].

Mean age of patients was 44.30±10.67 years. Male preponderance was reported in present study. Low number of female patients is may be due to the admission pattern in hospital and social pattern in our society where female are decreased to household activities and socialize less compared to males. In a similar study by Omnia *et al.*, [7]. out on 30 patients of which 53.3% of were men and their age ranging from 15 to 84 years with a mean age of 56.93±14.59 years. Krishnan *et al.* [8]. reported that there were 197 males and 90 females. The Mean age was 36.7 years (range 13 to 54 years).

Most common GI symptoms at presentation were nausea and heart burn followed abdominal pain and abdominal distension. Findings of Omnia *et al.* [7] revealed that the associated symptoms were upper GI bleeding in 80% patients, epigastric pain in 13.3% patients, vomiting in 3.3% patient, epigastric pain and vomiting in 3.3% patient. This goes hand in hand with Huang *et al.* [9]. who found that hematemesis and melena were detected in 52.9% of the patients studied.

These are the result of uremic syndrome. 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.

In a study of Krishnan *et al.* [8]. gastric biopsy findings were compared to findings in 100 consecutive patients with normal kidney function undergoing endoscopy for assessment of dyspepsia and author found that symptoms of GI disturbance were found in 28.6% of the 287 patients. The prevalence of various GI symptoms was nausea 12.6%, heartburn 3.9%, regurgitation in 9.4% and abdominal pain 7.3% patients.

The present study shows that out of 100 CKD patients most of the patients had the CKD stage of 5 (48%) followed by stage 4 (28%) and stage 3 (24%). Mohit Goyal *et al.* 76% of these patients were found to be in Stage 5 of CKD and 22% were in Stage 4 of CKD. Only 2 patients were in Stage 3 [10]. Mean duration of CKD in present study was 2.80±0.60 years. Most of the CKD patients were on hemodialysis (53%) and 47% were not on hemodialysis. Omnia *et al.* [7] reported that 23 previously underwent dialysis, duration ranged from 0.17 to 13.0 years with a mean of 2.98±3.42 years. Krishnan *et al.* [8]. reported that duration of HD treatment prior to endoscopy was 17 ± 12.3 months with a range of 3-32 months. Among the patients who were in the CKD stage 5, all were under hemodialysis (48%), patients with CKD stage 4, maximum were not under hemodialysis (23%), none of the patients of CKD stage 3 (24%) were on the hemodialysis.

Most of the patients had hemoglobin between 7-10g/dl (54%) (Mean 8.8±0.64). A total 39% of the patients had hemoglobin between 10-12g/dl (mean 10.7±0.86). Anemia might begin to develop in the early stages of CKD, when someone has 20 to 50 percent of normal kidney function. Anemia tends to worsen as CKD progresses. When kidneys are diseased or damaged, they do not make enough EPO. As a result, the bone marrow makes fewer red blood cells, causing anemia. When blood has fewer red blood cells, it deprives the body of the oxygen it needs. These nutrients are necessary for red blood cells to make hemoglobin, the main oxygen-carrying protein in the red blood cells.

Uremia and dialysis have been found to have increased the risk of lesions in the GI tract. Among the patients who were not on hemodialysis, 31 patients had positive UGIE findings whereas out of 53 patients who were on hemodialysis, 51 had positive Positive UGIE findings.

As the severity of disease progresses, the multifactorial factors like uremia, hypergastrinemia, and anemia lead to the lesion on UGI Endoscopy. Sreelatha *et al.* the majority of

the patients, 30 out of 50, belong to Stage V CKD, of whom 21 (70%) showed UGI lesions. 14 patients belong to Stage IV CKD of whom eight patients (57%) have positive UGI findings. Rest of the patients is in Stage III CKD [11].

In present study out of 18 patients who had Duration of disease >4 years, 94% had positive UGIE findings whereas out of 52 patients of Duration of disease 2-4 years, 90% had positive UGIE findings. Positive UGIE finding were more common in patients with duration of disease more than 2 years. Sreelatha *et al.* 26 patients (56%) presented with only 1 year duration of illness, out of which 14 males and three females showed positive UGI findings [11]. In a study of Thomas *et al.* who reported that in a spans over a 5 year period, 38 patients with CKD in which 30 had significant findings on upper endoscopy and were biopsied [6]. Predominant biopsy findings included erosive gastritis, ulcerative esophagitis, esophageal candidiasis, and duodenitis /duodenal ulcerations. None of these patients were documented to be on any gastric irritant drugs.

The present study shows that out of 100 CKD patients the most common lesions in CKD patients was pangastritis (25%) followed by duodenitis (22%) and esophagitis (16%). Omnia *et al.* [7] studied upper endoscopic findings in patients with chronic kidney disease on 30 patients and reported that reflux esophagitis was detected in five (16.7%) patients, esophageal erosion in two (6.7%) patients, esophageal ulcer in three (10%) patients, pyloric ulcer in five (16.7%) patients, antral gastritis in 11 (36.7%) patients, gastric ulcer in seven (23.3%) patients, duodenitis in 13 (43.3%) patients, and duodenal ulcer in 11 (36.7%) patients. This was not compatible with Bacci *et al.* [12] and Nand *et al.* [13] where duodenitis was detected in 32.8% of cases by Bacci *et al.* [12] and not detected by Nand *et al.* [13] In both studies erosive gastritis was detected as the most common lesion. Sotoudehmaneshi *et al.* detected duodenal erosion as the most common lesion in 32% of studied patients [14]

The etiologies of GI complications in CKD are likely to be multifactorial. Urea causing increase the back diffusion of hydrogen ions across the mucosal barrier and elevated gastrin levels partly due to the decreased renal clearance of gastrin and partly due to the enhanced gastrin synthesis, which in turn act as an important stimulus for acid secretion are some of the factors linked to gastric mucosal injuries in renal failure.

Antral gastritis was a common lesion in this study detected in 11% of 100 enrolled CKD patients. However Bacci *et al.* [12] (77%), Nand *et al.* [13] (32%), Kawaguchi *et al.* [15] (27%), Bang *et al.* [16] (31%) found higher prevalence of Antral gastritis in their study. Duodenal ulcer was also a common lesion in this study detected in 9% of patients as well as gastric ulcer in 6%. Huang *et al.* (Huang S 2012) detected duodenal ulcer and gastric ulcer are the important source of bleeding (22.5 and 37%, respectively). Also it was compatible with the findings of Khedmat *et al.* [17] and Chacaltana *et al.* [18], who showed peptic ulcer as a common source of bleeding detected in 16.1 and 24.1% of patients, respectively. Moriyama *et al.* [19] detected erosive gastritis as the most common source of GI bleeding detected in 58% of patients.

## 5. Conclusion

We found that gastrointestinal symptoms are common in CKD patients and constitute an important cause of seeking medical care among these patients. Upper GI symptoms like

nausea, vomiting and abdominal pain tend to worsen with increasing uremia. Majority of the patients with CKD have UGI mucosal lesions on endoscopic evaluation. Hence it can be predicted that Patients with higher grading of CKD Shows higher incidence of abnormalities of GI findings on endoscopy. GI diseases are common in chronic renal failure, and it is easily documentable with endoscopy. Some findings are more common than others, such as pangastritis, duodenitis and esophagitis, duodenal ulcer, antral gastritis, gastric ulcer, angiodysplasia and hiatus hernia were also observed in significant number of patients. The upper GI lesions are more common in stage 5 CKD patients than in stage 4 CKD patients. This indicates the necessity for endoscopic evaluation of patients in order to detect these lesions early and proper management before hand to prevent its further progression. It will aid in to improve general health of the patient and minimize the co-morbidity associated with gastrointestinal lesion and thus combating future complications.

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