

## Research Article

### STUDY OF CLINICAL PROFILE AND UPPER GASTROINTESTINAL ENDOSCOPIC FINDINGS IN CHRONIC KIDNEY DISEASE IN A TERTIARY CARE CENTRE

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#### ABSTRACT

**Background:** Chronic kidney disease (CKD) is a silent epidemic of the 21st century. Prevalence of GI symptoms in CKD ranges from 70% to 79%<sup>[2]</sup> CKD patients with GI symptoms have higher incidence of gastrointestinal abnormalities than those without symptoms<sup>[3]</sup> Uremic milieu is associated with upper gastrointestinal (GI) symptoms such as nausea, vomiting, anorexia, and GI bleeding responsible for hospitalization in patients with kidney impairment thereby increasing morbidity and mortality.<sup>[4]</sup> This study was done to study the upper gastrointestinal changes early in the course of CKD and assessing the need for early endoscopic therapeutic intervention and thereby decrease mortality in these patients. **Methodology:** This is a cross sectional study conducted on 80 patients with CKD Stage 3-5 admitted to the hospitals attached to BMCRI from Nov 2019 to May 2021. Detailed History with necessary investigations was collected and Upper GI endoscopy done in all and data was analyzed. **Results:** The age varied from 19 years to 67 years with majority of patients (35% being in the age group of 46 to 55 years.) Most prevalent symptoms were nausea (74%), vomiting (54%) and Anorexia (43%). Other symptoms present in patients were Pain in abdomen (19%) Heart Burn (14%), Hiccups (13%) and GI Bleeding (0.3%). As CKD stages advanced abnormal endoscopic findings increased.

**Conclusion:** Patients with gastrointestinal symptoms had higher incidence of gastrointestinal abnormalities when compared to those without symptoms. Stomach more commonly involved than Oesophageal and duodenum. Erosive disease was more common. Prevalence increases with the severity of the CKD.

**Keywords:** Chronic kidney disease, Upper GI Endoscopy, Dialysis.

#### INTRODUCTION

Chronic kidney disease encompasses a spectrum of pathophysiologic processes associated with abnormal kidney function and a progressive decline in glomerular filtration rate (GFR)<sup>[1]</sup>. Every year, over 1 lakh people in India are diagnosed with CKD necessitating a kidney transplant or continual dialysis. Prevalence of gastrointestinal (GI) symptoms in patients of CKD ranges from 70% to 79%<sup>[2]</sup> Majority of the patients of chronic renal failure (CRF) have UGI mucosal lesions on endoscopic evaluation. Patients with GI symptoms have higher incidence of gastrointestinal abnormalities when compared to those without symptoms<sup>[3]</sup> Uremic milieu associated with chronic kidney disease (CKD) is associated with upper gastrointestinal (GI) symptoms such as nausea, vomiting, anorexia, and GI bleeding. These symptoms are the most frequent indications for hospitalization in patients with kidney impairment and they significantly increase morbidity and mortality. Pathophysiology by which uraemia predisposes to gastrointestinal mucosal injury is multifactorial<sup>[4]</sup> Patients with CKD also suffer from recurrent GI bleeding episodes with superficial mucosal inflammatory lesions as the underlying cause along with effects of uremia on the GI mucosa, platelet adhesiveness and effect of heparin used in dialysis<sup>[5]</sup>. Gastroduodenal ulcers, esophagitis, vascular ectasia and gastric and duodenal erosions are among the frequently identified causative factors of UGIB in patients on maintenance hemodialysis<sup>[6]</sup> Chronic kidney disease is a worldwide health problem. Increasing evidence occurred in the past decades indicates that the adverse outcome of chronic kidney disease, such as kidney failure, cardiovascular disease, and premature death, can be prevented or delayed.

It was way back in 1934 when Jaffe<sup>2</sup> and Laing reported the gastrointestinal finding in 136 autopsy cases who had uremia<sup>[7]</sup>. At that time, the relevance of such a study was more of academic one. However, recently more and more number of patients of chronic renal failure (CRF) are being submitted for renal transplantation or are being maintained by long-term maintenance hemodialysis or by judicious conservative management<sup>[8-10]</sup> Fiber-optic endoscopes which revolutionized the examination of gastrointestinal tract shows a wide range of pathological lesions in CKD. There are only a few studies addressing these aspects in Indian patients. Hence this study is being done to know the importance of detecting upper gastrointestinal changes early in the course of CKD and assessing the need for early endoscopic therapeutic intervention and thereby decrease mortality in these patients.

#### MATERIALS AND METHODS

This was a Cross sectional Study design performed after obtaining institutional ethics committee clearance and written informed consent, the patients fulfilling the inclusion and exclusion criteria, were taken up for the study. 80 patients with chronic kidney disease on haemodialysis for more than three months were included in this study after ruling out Chronic liver disease, malignancy and HIV. Detailed history was taken and patients were subjected to upper GI endoscopy. Findings were recorded in a pre-formed proforma. Relevant Blood investigations were done. Data collected was entered, edited in Microsoft excel Spread sheet. Statistical Analysis was done in SPSS (Statistical Package for Social Sciences) version 20. [IBM SPASS statistics (IBMcorp. Armonk, NY, USA released 2011)] The descriptive statistics like mean, median, standard deviation and inter-quartile range were calculated. The frequency and percentages were displayed through frequency distribution tables.

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The association between numerical variables was checked through correlation while for categorical variables Chi square test was used. The level of significance was set at 5%. So significant value was considered if  $p < 0.05$ .

## RESULTS

There were 36(45%) female patients and 44(55%) male patients in the study population. Out of 80 patients, 37(46.3%) and 58(72.5%) patients had diabetes (Table 3) and hypertension (Table 4) respectively. CKD staging of the patients revealed that 12(15.0%), 19(23.8%) and 49(61.3%) patients belonged to stages 3, 4 and 5 accordingly. It was found that 66(82.5%) patients out of 80 patients had upper GI symptoms whereas, 14(17.5%) patients did not have any symptoms. Majority of patients had nausea 59(73.8%) followed by Vomiting 43(53.8%), Anorexia 34(42.5%), Pain abdomen 15(18.8%) Heart Burn 11(13.8%), Hiccups 10(12.5%) and GI Bleeding 5(6.3%). 25(31.3%), 53(66.3%), and 2(2.5%) patients accordingly had conservative, hemodialysis, Peritoneal dialysis as a modality of treatment Total of 66 (82.5%) patients exhibited abnormal UGI findings whereas 14(17.5%) patients normal upper GI endoscopy. Esophagus was involved in 36(45%) patients, stomach in 64(80%) and duodenum in 15(18.7%) (Table 10). Stomach was the most common site of involvement. It was found that out of 12 patients who were in stage 3 CKD, 7(58.3%) showed abnormal findings and 5(41.7%) normal. Among 19 patients of CKD stage 4 15(78.9%) showed abnormal findings and 4(21.1%) normal. In the stage 5 CKD patients, out of 49 patients, 44(8.8%) patients had abnormal findings and 5(10.2%) patients had normal findings.

## DISCUSSION

Chronic kidney disease (CKD) is characterised by nephron destruction and depletion, as well as a progressive loss of renal function (Elango and Shankar, 2018)<sup>[11]</sup>. CKD is linked to a number of diseases as a result of multifactorial damage that causes a loss of function in the system of body (Sandilands *et al.*, 2013)<sup>[17]</sup>. CKD is linked to a number of gastrointestinal disorders affecting all segments of the gastrointestinal system (Grant *et al.*, 2017)<sup>[18]</sup>. There is a definite underreporting of the disease, which leads to a lack of understanding of the mechanisms that cause a wide range of symptoms.

In this study, 80 patients with CKD Stages III-V from hospitals affiliated to Bangalore Medical College & Research Institute, Bangalore, were examined for UGI manifestations using UGI endoscopy, taking into account their age, sex, comorbidities, and the presence or absence of UGI symptoms. We had studied the clinical profile and upper gastrointestinal findings in patients with chronic kidney disease using Upper gastrointestinal endoscopy. Then findings were evaluated to check the association with staging of Chronic Kidney disease. This study was conducted to know the importance of detecting upper gastrointestinal changes early in the course of CKD and assessing the need for early endoscopic therapeutic intervention and thereby decrease mortality in these patients. In the current study, mean age with standard deviation of the study population was  $43.78 \pm 12.48$  years. The age varied from 19 years to 67 years with majority of patients (35% being in the age group of 46 to 55 years. Reports indicate that prevalence of CKD is as high as 35% above 40 years of age (Raman *et al.*, 2014; Anjana *et al.*, 2011)<sup>[19,20]</sup>. It was also reported that subjects  $\geq 45$  years are susceptible to CKD due to age-related glomerulosclerosis and kidney function deterioration (Rai *et al.*, 2019)<sup>[21]</sup>. Renal blood flow and mass reduction, as well as increasing glomerulosclerosis, are all part of the

natural ageing process, with eGFR declining by 0.75 mL/min/1.73 m<sup>2</sup> every year after the age of 40 (Lindeman *et al.*, 1985)<sup>[22]</sup>.

Age is one of the factors strongly associated with CKD (Rai *et al.*, 2019)<sup>[81]</sup>. Poorly controlled diabetes and hypertension are the most common causes of CKD. In the present study, majority of study patients (73%) had hypertension and diabetes (46%) as comorbidities. Many studies have reported higher prevalence of hypertension than diabetes in CKD (Verma *et al.*, 2010)<sup>[23]</sup>. Out of 80 patients, highest percentage of patients (61%) belonged to CKD stage 5 followed by stage 4(24%) and stage 3(15%).

In our study 80% patients had symptoms of upper GI which corresponds to the reported prevalence of GI symptoms in patients of CKD as in the range of 70% to 80% (Bhagath *et al.*, 2018; Cano *et al.*, 2007)<sup>[24,25]</sup>. Most prevalent symptoms were nausea (74%), vomiting(54%) and Anorexia (43%). Other symptoms present in patients were Pain in abdomen (19%) Heart Burn (14%), Hiccups (13%) and GI Bleeding (0.3%). Similar reports of nausea, vomiting and anorexia as predominant symptoms in CKD patients are made by different researchers individually (Pursnani *et al.*, 2019; Elango and Shankar, 2018)<sup>[4,11]</sup>. In comparison, hematemesis and melena were discovered in 53% the individuals investigated by Huang *et al.*, (2012). In contrast, Sotoudehmanesh *et al.*, (2003) discovered that the most common GI symptom was nausea in 13% of patients, followed by heart burn in 9%, and no symptoms in the majority of cases (74%)<sup>[26]</sup>. The severity of lesions, availability of health services, and patients' early seeking of medical care could all explain differences in patient presentation among studies (Shabka *et al.*, 2017). In the current study maximum patients (66%) had hemodialysis as modality of treatment.

As majority of CKD patients had GI symptoms, maximum of 83% of patients exhibited abnormal UGI findings. The increased rate of abnormalities in this study can be explained by the fact that patients with GI symptoms have a higher rate of gastrointestinal abnormalities than those without symptoms (Sreelatha *et al.*, 2017)<sup>[3]</sup>. It was found that in 80% patients, stomach was involved. Upper GI endoscopy findings revealed that stomach being the major site of involvement, Pangastritis was predominant in 45% patients out of 64 patients. Other findings included had esophagitis (29% of 39), hiatus hernia(11% of 39) and GERD (9% of 39), Erosive gastritis (15% of 64), Pale mucosa (11% of 64), Gastric ulcer (5% of 64), Antral telangiectasia(4% of 64) Duodenitis (16% of 15) and Duodenal ulcer (3% of 15) . There are discrepancies found in abnormal endoscopic findings in CKD patients in different investigation(AI-Mueilo, 2004; Emir *et al.*, 2000; Kang *et al.*, 1998; Hwang *et al.*, 1992; ) and this could be attributable to disparities in diagnostic techniques, diets, and the most common underlying disorders, among other things (Pakfetrat *et al.*, 2020)<sup>[27]</sup>. Comparison of patients based on the presence or absence of GI symptoms with respect to diabetes shown that in patients with DM, presence of upper GI symptoms were found to be significantly higher (95%) than in patients without DM(72%) (p value- 0.008). Comparison of patients based on the findings of GI endoscopy with respect to CKD stages presented that in all the stages, abnormal findings were more than normal findings. It was observed that, as the CKD stages advanced abnormal endoscopic findings increased. Abnormal findings present in CKD stage 5 (90%) was significantly higher than stage 4 (80%) and 3 (58%). The difference among the groups was statistically significant with p-value of 0.033. In the current study, there was no significant difference between patients who had UGF finding in relation with presence or absence of DM. In both the group of patients with and without DM, presence of abnormal findings was high. It was 79% without DM, and 86% with DM. Though we found significance with respect to GI symptoms, there was no significance with respect to endoscopy

findings in case of patients with and without DM. This is most likely related to DM's effect on GI motility (Ko *et al.*, 1999)<sup>[28]</sup>.

Comparison of patients based on the findings of GI endoscopy with respect to modality of treatment revealed that there was considerable difference in the presence of abnormalities with respect to the treatment followed. With maximum patients getting hemodialysis showed maximum abnormalities of 89%. The difference in the distribution was not found statistically significant (p value=0.065). Distribution of patients with respect to the lesions present with CKD stages of patients revealed that majority of lesions was Pangastritis with 4(33.33%), 9(47.37%) and 23(46.94%) patients in CKD 3, 4 and stages respectively and followed by esophagitis with 4 (33.33%), 4(21.05%) and 15(30.61%) patients in CKD 3, 4 and stages respectively. GI symptoms and endoscopic findings were distributed differently in different studies. Patients' early seeking of medical care, the severity of lesions, and the availability of health services could all explain disparities in various studies.

**TABLE 1: DISTRIBUTION OF THE SUBJECTS BASED ON AGE**

Age groups	Frequency	Percent
19 to 25 yrs	10	12.5
26 to 35 yrs	14	17.5
36 to 45 yrs	15	18.8
46 to 55 yrs	28	35.0
> 55 yrs	13	16.3
<b>Total</b>	<b>80</b>	<b>100.0</b>

**TABLE 2: DISTRIBUTION OF THE SUBJECTS BASED ON GENDER**

Gender	Frequency	Percent
Females	36	45.0
Males	44	55.0
<b>Total</b>	<b>80</b>	<b>100.0</b>

**TABLE 3: DISTRIBUTION OF THE SUBJECTS BASED ON DIABETES**

DM	Frequency	Percent
Present	37	46.3
Absent	43	53.8
<b>Total</b>	<b>80</b>	<b>100.0</b>

**TABLE 4: DISTRIBUTION OF THE SUBJECTS BASED ON HYPERTENSION**

HTN	Frequency	Percent
Present	58	72.5
Absent	22	27.5
<b>Total</b>	<b>80</b>	<b>100.0</b>

**TABLE 5: DISTRIBUTION OF THE SUBJECTS BASED ON CKD STAGING**

CKD STAGES	Frequency	Percent
3	12	15.0
4	19	23.8
5	49	61.3
<b>Total</b>	<b>80</b>	<b>100.0</b>

**DISTRIBUTION OF THE SUBJECTS BASED ON VARIOUS UPPER GI SYMPTOMS**

Upper GI symptoms		Frequency	Percent
Nausea	NO	21	26.3
	YES	59	73.8
Vomiting	NO	37	46.3
	YES	43	53.8
Anorexia	NO	46	57.5
	YES	34	42.5
Pain abdomen	NO	65	81.3
	YES	15	18.8
Heart Burn	NO	69	86.3
	YES	11	13.8
Hiccups	NO	70	87.5
	YES	10	12.5
GI Bleeding	NO	75	93.8
	YES	5	6.3

**UPPER GI ENDOSCOPY WITH CKD STAGES**

Upper GI endoscopy		CKD STAGE			Total
		Stage 3	Stage 4	Stage 5	
Abnormal	Count	7	15	44	66
	%	58.3%	78.9%	89.8%	82.5%
Normal	Count	5	4	5	14
	%	41.7%	21.1%	10.2%	17.5%
Total	Count	12	19	49	80
	%	100.0%	100.0%	100.0%	100.0%

Chi-square value-6.82  
p value-0.033\*

\*significant

## GI SYMPTOMS WITH DIABETES MELLITUS

GI symptoms		DM		Total
		Absent	Present	
No	Count	12	2	14
	%	27.9%	5.4%	17.5%
Yes	Count	31	35	66
	%	72.1%	94.6%	82.5%
Total	Count	43	37	80
	%	100.0%	100.0%	100.0%

Chi-square value-6.97  
p value-0.008\*

\*significant

## UPPER GI ENDOSCOPY FINDINGS WITH MODALITY OF TREATMENT

Upper GI endoscopy (Impression)		MODALITY OF TREATMENT			Total
		CONSERVATIVE	HEMODIALYSIS	PERITONEAL DIALYSIS	
Abnormal	Count	17	47	2	66
	%	68.0%	88.7%	100.0%	82.5%
Normal	Count	8	6	0	14
	%	32.0%	11.3%	0.0%	17.5%
Total	Count	25	53	2	80
	%	100.0%	100.0%	100.0%	100.0%

Chi-square value- 5.46  
P value-0.065

## UPPER GI ENDOSCOPY FINDINGS WITH DIABETES MELLITUS

Impression		DM		Total
		Absent	Present	
Abnormal	Count	34	32	66
	%	79.1%	86.5%	82.5%
Normal	Count	9	5	14
	%	20.9%	13.5%	17.5%
Total	Count	43	37	80
	%	100.0%	100.0%	100.0%

Chi-square value- 0.75  
p value-0.38

## DISTRIBUTION OF VARIOUS ENDOSCOPIC LESIONS BASED ON CKD STAGES

Type of lesion	CKD Stage 3(n=12)		CKD Stage 4 (n=19)		CKD Stage 5 (n=49)		Total (n=80)	
	N	%	N	%	N	%	N	%
Normal	4	33.33	3	15.79	7	14.29	14	63.41
Esophagitis	4	33.33	4	21.05	15	30.61	23	85
Hiatus hernia	2	16.67	1	5.26	6	12.24	9	34.17
GERD	0	0	4	21.05	3	6.12	7	27.18
Eosophageal varices	0	0	0	0	1	2.04	1	2.04
Pangastritis	4	33.33	9	47.37	23	46.94	36	127.64
Erosive gastritis	0	0	2	10.53	10	20.41	12	30.93
Pale mucosa	0	0	1	5.26	8	16.33	9	21.59
Gastric ulcer	0	0	1	5.26	3	6.12	4	11.39
Antral telangiectasia	0	0	1	5.26	2	4.08	3	9.34
Duodenitis	0	0	3	15.79	10	20.41	13	36.2
Duodenal ulcer	0	0	0	0	2	4.08	2	4.08

## CONCLUSION

All the patients with CKD showed a high prevalence of various upper gastrointestinal symptoms. Prevalence indeed increases with the severity of the CKD. Both dialyzed and undialyzed group of patients of Stage 5 does not have a significant difference in the prevalence of gastrointestinal symptoms, which proves that it cannot be considerable fact while differentiating the clinical aspects of patients of these two classes while the prevalence among other stages of CKD was statistically different. Majority of the patients of CKD had upper gastrointestinal mucosal lesions on endoscopic evaluation. Erosive mucosal disease was the most common form of gastrointestinal pathology in CKD. Oesophageal and duodenal involvement is less common than the gastric lesions. No correlation could be made with gastrointestinal symptoms to the patterns of gastrointestinal findings on endoscopy. No correlation could be made with age, sex, degree of dialysis, and duration of azotaemia to the presence or absence or the pattern of gastrointestinal involvement in CKD.

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