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A Prospective Study on Upper Gastrointestinal Endoscopic Lesions in Chronic Kidney Disease

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Abstract

Introduction: Chronic Kidney disease (CKD) is a slow and progressive loss of kidney function over time regardless of cause. CKD virtually affect the functions of all organ system in our human body. Gastrointestinal symptoms and complications are more common in chronic kidney disease. Upper gastrointestinal (UGI) symptoms may vary from mild symptoms to life-threatening gastrointestinal bleeding and endoscopy may timely diagnose the most of these abnormalities to intervene accordingly. The present study was designed with an objective to study the prevalence of various UGI symptoms and UGI endoscopic abnormalities in patients of CKD.

Materials & Methods: The present study was conducted at RNT Medical College Udaipur. This study was done over a period of six month after getting written and informed consent from patients. In this study a total number of 100 patients diagnosed as CKD Stage (3-5) admitted in medicine ward and nephrology unit were selected for study. All patients underwent a detailed History, Clinical examination, Renal Function tests, Ultrasound Abdomen and upper GI Endoscopy.

Results: 100 patients of CKD stage 3-5 were included in study, of which 71 were males and 29 were females. Ages of patient ranged from 18- 70 years while maximum age group was from Fifth decade. Majority of patients were in CKD stage 5.The predominant symptoms were nausea, vomiting and anorexia. Endoscopically, 65% of patients had one or more upper GI mucosal lesions. Lesions were more frequent in the stomach. Inflammatory lesions were the most common upper GI lesion seen.

Conclusion: Gastrointestinal symptoms are common in CKD patients. Majority of the patients have upper GI mucosal lesions in endoscopy. Recognition of these lesions and prompt management can significantly reduce the morbidity and mortality in CKD patients.

Keywords: Chronic kidney disease, Endoscopy, Mucosal lesions, Symptoms, stages.

Introduction

Chronic kidney disease (CKD) results from progressive and irreversible deterioration of the nephrons irrespective of cause. The diminished effective functioning of kidney tissue causes impairment of excretory, metabolic, and endocrine function of kidney, leading to the development of clinical syndrome of uremia.[1,2] Upper gastrointestinal symptoms such as nausea, vomiting, anorexia, and gastrointestinal (gastrointestinal) bleeding are one of the most frequent indications of hospitalization in patients with kidney impairment and they significantly increase morbidity and mortality.[3] Pathophysiology by which uremia predisposes to gastrointestinal tract mucosal injury is multifactorial. Upper gastrointestinal (UGI) symptoms may vary from mild symptoms to life-threatening gastrointestinal bleeding and endoscopy may timely diagnose the most of these abnormalities to intervene accordingly.[4,5] The incidence of gastrointestinal symptoms can largely be accredited to the causal conditions such as increase level of uremic toxin, the effect of dialysis, lifestyle changes, or the drugs used for its treatment. Hence, routinely endoscopic evaluation should be done in all CKD patients having gastrointestinal symptoms. 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. Earlier stages of chronic kidney disease can be detected through laboratory testing and treatment of earlier stages of chronic kidney disease is effective in slowing the progression toward kidney failure.[6] It was way back in 1934 when Jaffe2 and Laing reported the gastrointestinal (gastrointestinal) finding in 136 autopsy cases who had uremia.[7] 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.[8-10]The patients on maintenance hemodialysis may bleed from the mucosal lesions with the use of heparin in the dialysis program. Even in asymptomatic patients of CRF on maintenance hemodialysis, investigators have shown that the gastrointestinal blood loss is much more than in controls. Hence, a proper gastrointestinal assessment is of paramount importance either for a prospective renal transplantation candidate or those patients having even minor gastrointestinal symptoms when they are on maintenance hemodialysis or conservative management of CRF. In a patient who is being offered renal transplantation, the upper gastrointestinal (UGI) involvement in the CRF syndrome assumes overwhelming importance, because the uremic gastropathy worsens in the post-transplant period with the use of steroids and immunosuppressive drugs, which are used for an indefinite period in the posttransplant case. A proper diagnosis of peptic ulcer is both important and difficult in a patient of CRF, because of the risk of gastrointestinal hemorrhage in the post-transplant period. Radiological studies of gastrointestinal tract can be difficult to interpret because large nodular folds are often present in duodenal bulb can be confused with acute ulcer crater. Furthermore, mucosal lesions can be missed by radiography of the UGI, which employs only single contrast. Fiber-optic endoscopes which revolutionized the examination of gastrointestinal tract shows a wide range of pathological lesions in CKD. Many studies are

present in literature giving an insight into prevalence of gastrointestinal symptoms, endoscopic findings and documentation of different data and experiences. The present study was designed with an objective to study the prevalence of various UGI symptoms and UGI endoscopic abnormalities in patients of CKD.

Materials & Methods

The present study was conducted at RNT Medical College Udaipur. This study was done over a period of six month after getting written and informed consent from patients. In this study a total number of 100 patients diagnosed as CKD Stage (3-5) admitted in medicine ward and nephrology unit were selected for study. All patients underwent a detailed History, Clinical examination, Renal Function tests, Ultrasound Abdomen and upper GI Endoscopy. Upper gastrointestinal endoscopy was performed using fibreoptic endoscope after an overnight fasting. The oesophagus, stomach and duodenum were studied for mucosal changes.

Inclusion Criteria

The patients of either sex aged between 18 and 70 years were enrolled in the study after being diagnosed as chronic kidney disease based on clinical, biochemical and radiological profile

A. Patients with serum creatinine above 3 mg % with

1. Abnormal findings on renal ultrasound – asymmetric kidney size, small kidney (<8 cm) or large polycystic kidney/increased echogenicity.

AND/OR

2. Increased serum creatinine with no improvement for >3 months.

AND/OR

3. Uremic symptoms over 3 months with increase serum creatinine.

4. Both male and female patients.

5. Patients on conservative treatment / Hemodialysis (HD) / Peritoneal dialysis.

6. Patients undergone Renal transplant

Exclusion Criteria

Patients of CRF with:

1. Chronic analgesic intake, i.e., nonsteroidal antiinflammatory drugs
2. Patients in uremic encephalopathy.
3. Patients having History of previous acid peptic disease,
4. Patients is on steroids
5. Corrosive poisoning
6. Chronic alcoholic, Chronic smoker
7. Patients who refused to give consent

Results

Table 1: Age wise distribution

Age (years)	No.	%
≤20	8	8
21-30	9	9
31-40	14	14
41-50	23	23
>50	46	46
Total	100	100

The table is showing that among study population maximum no. of patients were within age group > 50 year.

Table 2: Sex wise distribution

Sex	No.	%
Male	71	71%
Female	29	29%
Total	100	100

In this table it is evident that 71% of population were males & 29% were females.

Table 3: Table showing patient presented with various symptoms

Symptoms	No.	%
Nausea	72	72
Vomiting	69	69
Anorexia	22	22
Pain abdomen	22	22
Hiccups	20	20
gastrointestinal bleeding	5	5

The presenting Symptoms in all cases included nausea (72%), Vomiting (69%), Anorexia (22%), Pain abdomen (22%), Hiccups (20%), and gastrointestinal bleeding (5%) were seen.

Table 4: Showing of no. of patients of various stages of CKD

CKD stages	No.	%
3	9	9
4	21	21
5	70	70
Total	100	100

The table is showing that among study population maximum no. of patients were in CKD stage 5 (70%) i.e. end stage renal disease.

Table 5: UGI endoscopic findings

	Normal	Abnormal
No. of patients (%)	35 (35%)	65 (65%)

Table showing that among 100 patient of CKD out of this 35(35%) was found to be normal UGI endoscopy finding and 65 (65%) patients had abnormal UGI endoscopic finding.

Table 6: Shows according to etiology of CKD normal and abnormal endoscopic findings

Etiology of CKD	Normal UGI Endoscopy	Abnormal UGI Endoscopy
DM (N=18)	6	12
HTN (N=12)	5	7
DM+HTN (N=59)	19	40
Other cause (N=11)	5	6

Table shows that total 100 patient of CKD only 18 patients were diabetic and among diabetic patients 12 UGI endoscopy were abnormal. 12 patients only hypertensive among them 7 had abnormal finding. Most of patients had both DM, HTN 59 patients and among them 40 patients had abnormal findings. Other cause of CKD was in only 11 patients among them 6 had abnormal findings. Rest was normal findings.

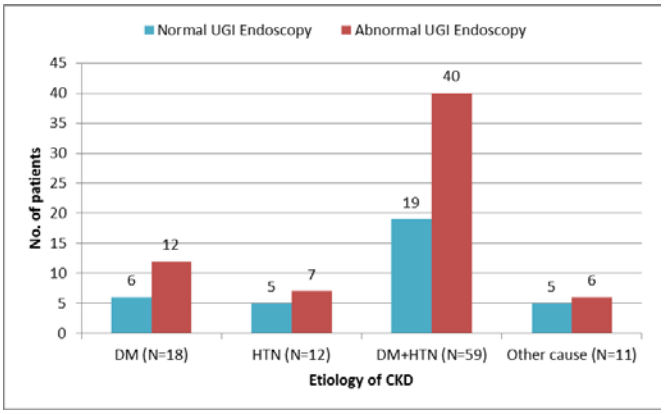

Table 7: Showing distribution site of lesions in CKD patients

Lesions	No.	%
Esophagus	8	8
Stomach	35	35
Duodenum	0	0
Mixed lesion (Esophagus+Stomach+Duodenum)	22	22

Table showing that maximum no. of lesion found in CKD patients were in Stomach. Large number of patients had involvement of more than one site.

Table 8: Lesion in UGI endoscoppy

UGI Findings	Type of lesion	N (%)
Esophagus	Esophagitis	11
	Esophageal candidiasis	6
	Hitus hernia	13
Stomach	Antral gastropathy	33
	Fundal erosion (Gastric erosion)	18
	Gastric ulcers	5
	Antral talengectasia	7
Duodenum	Duodenitis	7
	Duodenal ulcer	2

Table shows that among various lesions in endoscopic findings of CKD patient maximum patients had Antral gastropathy 33%, 18% patient had Fundal erosions(Gastric erosion),13% hiatus hernia, 11% Esophagitis 7% duodenitis, 7% Antral talengectasia, 6% Esophageal Candidiasis, 5% gastric ulcer, least findings is Duodenal ulcer only 2%.

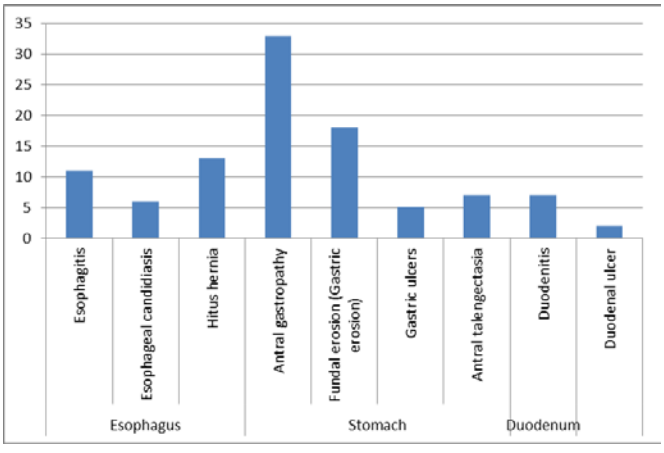

Table 9: Endoscopic findings and CKD stages

CKD stages	Abnormal Endoscopic finding (no.)	%
3 (n=9)	4	44.44%
4 (n=21)	11	52.38%
5 (n=70)	50	71.42%

Table shows that among study population in CKD stage 3, 9 patients were found and abnormal UGI endoscopy only in 4 patients (44.44%), in CKD stage 4, 21 patients were found and abnormal finding occur in 11 patients (52.38%). In CKD stage 5, 70 patients and abnormal UGI endoscopy in 50 patients (71.42%).

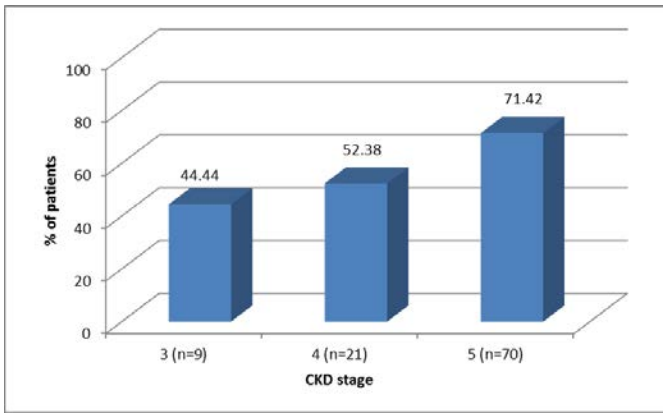

Table 10: RPD grade v/s abnormal and normal endoscopic finding

RPD grade	Normal UGI findings	Abnormal UGI findings
Grade I (n=9)	5 (55.55%)	4 (44.44%)
Grade II (n=26)	11 (42.30%)	15 (57.69%)
Grade III (n=65)	19 (29.23%)	46 (70.76%)

Table shows that RPD Grade 1 had only 9 patients abnormal UGI findings were in 4 patients (44.44%). RPD grade 2 had 26 patients abnormal findings were in 15 patients (57.69%). and most of patients were in RPD grade 3 had 65 patients most of abnormal UGI endoscopic findings occur in this group 46 patients (70.76%).

Table 11: Mucosal pattern in CKD patients

CKD stages	Pallor mucosa	Mosaic pattern of mucosa	Normal mucosa
3 (n=9)	6 (66.7%)	3 (33.3%)	0
4 (n=21)	14 (66.7%)	5 (23.8%)	2
5 (n=70)	41 (58.6%)	22 (31.4%)	7

Table shows that maximum no. of patients had pallor mucosa (due to Anaemia) but "Mosaic pattern" of mucosa was also seen. Rest were normal mucosa.

Table 12: Modality of treatment

Modality		No.	%
Conservative		29	29
Dialysis	Hemodialysis	59	59
	Peritoneal dialysis	12	12

Table shows that 59% patients were on hemodialysis. 29% patients were on conservative treatment and only 12% patients were on peritoneal dialysis.

Table 13: UGI findings in relation to type of management in CKD patients

Type of treatment		Positive UGI findings	Normal UGI findings
Conservative (n=29)		15 (51.72%)	14 (48.27%)
Dialysis	Hemodialysis (n=59)	43 (72.88%)	16 (27.11%)
	Peritoneal dialysis (n=12)	7 (58.33%)	5 (41.66%)

Table shows that on the basis of type of treatment endoscopy findings. On Hemodialysis (59) patients positive findings were found in 43 patients (72.88%). On conservative treatment 29 patients positive findings were found in 15 patients (51.72%) . and rest 12 patients was on peritoneal dialysis positive findings were found in 7 patients (58.33%).

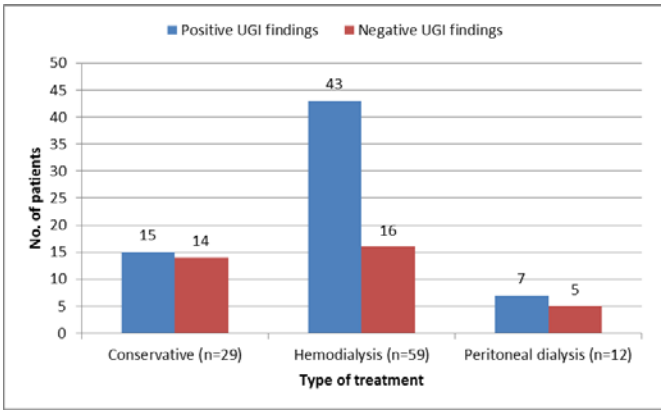

Table 14: Patient outcome

Death	Discharge
2 (2%)	98 (98%)

Table shows that among 100 patients 98% patients were discharged and only 2% Death.

Discussion

UGI symptoms in uremic patients usually consequence of disequilibrium of liquid and electrolyte imbalance, adverse effect of toxins and metabolite accumulated in the body as a result of decreased kidney excretion. From the study, it was evident that there is always a high prevalence of UGI symptoms. All patients were having one or more dyspeptic symptoms.

In this study, a total number of 100 patients with CKD Stages 3-5 (CRF) admitted in M.B Govt. Hospital are taken, and they are evaluated for UGI manifestations with reference to UGI endoscopy taking into consideration, the age, sex, duration of illness, presence or absence of UGI symptoms, degree of azotemia, cause of CKD, and treatment modality that is being used in these cases.

Based on Age

Study	Most common affected age group
Current study	>50
G. Elango et al., (2018)[28]	11-80 year Most common age group affected (30-60year)

In the current study, age group included was (18-70 year). The number of patients in the age group below and equal 20 is 8. 9 patients were in age group 21-30. 14 patients were in age group 31-40. 23 patients were in age group 41-50. 46 patients were in age group more than 50. The highest number of patients were from age group more than >50.It was similar to study done by Varma et al., (1996)[38] age group included was (17-70) year and most common affected age was 40-70 year another study done by G. Elango et al., (2018)[28] age group involved (11-80 year) and most common affected age group was (30-60) year.

Based on Gender

Study	Sex of patients
Current study	Male=71 Female=29
Madavaram Sreelantha et al., (2017)[31]	Male=40 Female=10
G.Elango et al., (2018)[28]	Male=58 Female=22

In the current study it was found that 71 patients was male and 29 was female. On the other hand according to the study of Madavaram Sreelantha et al. (2017) it was found that 40 patients was male and 10 patients was female Similarly, according to the study of G. Elango et al., (2018) there were 58 male patients and 22 female patients. The no of male patients was far more than the Female patients. it shows that CKD is more common in male patients.

Based on symptoms

Study	Symptoms
Current study	Nausea=72 Vomiting=69 Anorexia=22 Pain abdomen=22 Hiccups=20 gastrointestinal bleeding=5
G. Elango et al. (2018)[28]	Nausea=61 Vomiting=51 Anorexia=67 Pain abdomen=22 Hiccups=16 gastrointestinal bleeding=6

Result obtained from this study was in concordance with the previous study done in 2003 by Agarwal et al.,[39]he found prevalence of gastrointestinal symptoms ranging from 46.6% to as high as 90%, in another study done in 1996 by 77% by Farshakh et al[40]The percentage of gastrointestinal symptoms ranged to 77%. A study done in 1998 by Hammer et al[41].The presence of gastrointestinal symptoms was 79%

In the current study, majority of the patients had nausea, vomiting and anorexia were the most common symptoms. Similarly according to the study of G. Elango et al[28] (2018).Similar observations was reported by Farasakh et al[40] and Sivinovic et al[42]. Study done by Kochar R[43] and Goenka M, anorexia, nausea and vomting were the predominant symptoms.

Based on CKD Stages

Study	No. of patients in various stages of CKD
Current study	Stage 3 =9 Stage 4=21 stage 5=70

Madavaram Sreelantha et al., (2017)[31]	Stage 3 =5 stage 4=8 stage 5=21
G. Elango et al., (2018)[28]	Stage 3 =18 stage 4=26 stage 5=36

In the current study it was found that 9 patients was in CKD stage 3, 21 patients was in CKD stage 4, and 70 patients was in CKD stage 5. On the other hand according to the study of Madavaram Sreelantha et al., (2017)it was found that CKD stage 3, 5 patients, CKD stage 4, 8 patients and CKD stage 5, 21 patients. Similarly, according to the study of G. Elango et al., (2018) there was 18 patients in CKD stage 3, 26 patients in CKD stage 4, and 36 patients in CKD stage 5.The majority of the patients was belong to stage 5 CKD.

Based on percentage of Abnormal UGI Findings in CKD Patients

Study	% of Abnormal UGI Findings
Current study (Total patients=100)	Abnormal=65%
G. Elango et al., (2018)[28] (Total patients=80)	Abnormal=86%
Nardone[44]	Abnormal=74%
Khedmat[45]	Abnormal=79%
Agrawal[39]et al.,	Abnormal=85.7%

In the current study the prevalence of endoscopic abnormalities was 65% out of 100 patients .In study conducted by G. Elango et al., (2018)[28] upper gastrointestinal lesion was observed in 86% patients. In Nardone[44] and Khedmat[45] it was observed upper gastrointestinal lesion on endoscopy was 74% and 79% respectively. In study of UGI endoscopic evaluation in CRF by Agrawal[39] et al., 85.7% patients showed UGI involvement.

Based on etiology of CKD and UGI Endoscopic findings

In the current study when look into the etiology (cause) of CKD major cause was both Hypertension and diabetes mellitus occur simultaneously in 59 % patients. Of which 67% (40) patients had UGI endoscopic lesion.

Based on distribution site of lesion

Study	Distribution site of lesion
Current study	Stomach=35 Mixed lesion=22% Esophagus=8%
G. Elango et al. (2018)[28]	Stomach=80%
Serme et al.[46]	Stomach=68.7%

The upper gastrointestinal lesion in our study had a predominant localization in stomach. Next predominant lesion were mixed lesion (22%) and least involvement was esophagus alone (8%). Compare to study done by G. Elango et al., (2018)[28] predominant lesion was in stomach 80%. In study done by Serme et al.[46] gastric lesion (68.7%) were at the forefront followed by duodenal lesion (32%).

Based on Various lesion in UGI endoscopy

In our study among the isolated lesion erosive gastritis (either Antral gastropathy or Fundal erosion) constitutes a major part of (33% and 18%) respectively. Gastric involvement in various form (Antral gastropathy, gastric erosion, Antral talengectasia 7%, gastric ulcer 5%) constitutes the majority of UGI findings. In this study when compared to esophagus and duodenum.

Lesion included esophagitis 11%, Esophageal candidiasis 6%, Hitus hernia 13%, Duodenitis 7%, Duodenal ulcer 2%. This result was Similar to the

findings of study conducted by Madavaram Sreelantha et al., (2017)[31].

As compare to study conducted by Varma et al.[38] gastritis was the major lesion 27%. Other lesions duodenitis 14 %, gastroduodenitis 20%, telangictasia in 4.3%, and peptic ulcer 6.5 %.

In the study by Esfahani[47] gastritis was the predominant one accounting for 60.8% other lesions - duodenitis 13%,gastroduodenitis 7.2%, peptic ulcer and esophago gastritis each 4.3%, esophagitis 3%. In another study by Agrawal et al.[39] UGI endoscopic involvement was seen in 95.7% patients. Uremic gastropathy was found in 91.4% patients (mucosal edema 60% and erosions 43%), esophageal involvement - 63%, and duodenal involvement - 49%.

In our study gastric ulcer (5%) and duodenal ulcer (2%) incidence was low. It was similar to Sunder et al[48] study who also reported low incidence of peptic ulcer and Nardone[44] in his study noticed duodenal ulcer in 6% patients.

According to Andriulli[49], et al, Patients with chronic renal failure are not at a risk of developing chronic peptic ulcer. In an Indian study by Prakash et al[50] also noted that risk of developing peptic ulcer is not high in patients with chronic renal failure.

Based on percentage of abnormal UGI findings in relation with CKD Stages

Study	% of Abnormal UGI Findings in various CKD stages
Current study	Stage 3=44.44% Stage 4=52.38% Stage 5=71.42%
Omnia **et al**[32]	Stage 1 =23.9% Stage 2 & 3=32.8% Stage 4 & 5=42.6%

In our study it was found that in CKD stage 3, (44.44%) patients had abnormal UGI endoscopic findings .In stage 4 it was (52.38%) and in stage 5 it was (71.42%). Compare to another study done by Omnia et al[32] Clinically relevant lesions were found in 23.9% of patients with CKD stage 1, in 32.8% of patients with CKD stages 2 and 3, and 42.6% of patients with CKD stages 4 and 5. The gastrointestinal lesions increased with the degree of renal failure

Based on percentage of abnormal UGI findings in relation with RPD Grades

In our study, the prevalence of endoscopic abnormalities was increases with Increases RPD grades. In RPD grade I it was 44.44%. In RPD grade II it was 57.69%. In RPD grade III it was 70.76% respectively.

Based on mucosal pattern

In our study most of the patient had pallor of mucosa .because in all CKD patients anaemia was predominantly present. As compare to study done by G. Elango et al., (2018)[28].where pale mucosa contribute only (15 %). In our study other type of mucosa were also seen its known as “Mosaic pattern” of mucosa. This type of mucosa never seen in various studies done in past. This was found in CKD stage 3, 4, 5 was 33.3%, 23.8%, 31.4% respectively.

Based on modality of treatment

In our study most of the patient belong to stage 5 CKD(70%) The majority of patients (59%) in the study were on hemodialysis as the treatment modality. It was similar to study done by Madavaram Sreelantha et al. (2017)[31].

In our study only (29 %) patients was on conservative treatment. As compare to another study done by G. Elango et al. (2018)[28]. Majority of the patients (80%)

were on conservative treatment. Only (12%) patients was on peritoneal dialysis.

Based on modality of treatment with positive UGI Findings

Most of the patients, in our study belong to Stage 5 CKD (70%) of which 50 patients (71.42%) had UGI involvement. The majority of the patients in this study 59% (59 out of 100) were offered hemodialysis as the treatment modality. out of them 43 patients (72.88%) had positive UGI Findings. which could be due to either uremia per se or due to usage of heparin in hemodialysis. It was similar to study done by **Madavaram Sreelantha et al. (2017)[31].**

As compare to another the study done by Es Fahani et al (2017)[47].it was quoted that duration of dialysis did not have any influence on prevalence of gastrointestinal symptoms or lesion. Margolis et al[51] and Andrivilli et al[49] also found no relationship between duration of dialysis with the presence or absence of gastrointestinal lesion. According to our study, the more is the stages of renal impairment, the more is thechance of getting upper gastro-intestinal lesion.

In this study, only 12% (12 patients) was treated with Peritoneal dialysis and out of them only 7 patients (58.33%) had UGI involvement .out of 29 patients who was on conservative management in this study 15 patients (51.72%) had positive endoscopic findings. As compare to study done by Madavaram Sreelantha et al. (2017)[31] where only 12% (6 patients) was treated with peritoneal dialysis and all these patients had UGI involvement. 18 patients who was on conservative management 11 patients have positive endoscopic findings.

Based on patient outcome

In our study among 100 patients mortality was in only (2%) patients rest were discharged (98%).

Summary and Conclusion

It has been documented since a long time that gastrointestinal complications is more common in CKD as compared to the general population. This study was also proved to be in accordance with the same phenomenon. All the patients with CKD showed a high prevalence of various upper gastrointestinal symptoms. Different stages of CKD were prevalent to have different gastrointestinal symptoms and the prevalence indeed increases with the severity of the CKD. In dialyzed and undialysed 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. Patients with gastrointestinal symptoms had higher incidence of gastrointestinal abnormalities when compared to those without symptoms. Erosive mucosal disease was the most common form of gastrointestinal pathology in CKD. Erosive gastritis as well as multiple sites of involvement of upper gastrointestinal tract was the most common lesions. Esophageal 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. Patients with stage 5 CKD showed predominant upper gastrointestinal involvement. UGI findings are frequently observed in CKD patients on dialysis. No correlation could be made with age, sex, degree of dialysis, and duration of azotemia to the presence or absence or the pattern of gastrointestinal involvement in CKD.

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