IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 19, Issue 9 Ser.1 (September. 2020), PP 10-14
www.iosrjournals.org

CKD-A risk factor for cholelithiasis: An observational study at a tertiary teaching hospital in Jharkhand

Dr.Shiv Shankar Munda[1], Dr.Sanjay Singh[2], Dr.Sita Paikra[3*] , Dr.RishiTuhin Guria[4]

[1]*Junior resident, Department of Medicine, Rajendra Institute of Medical Sciences,Ranchi,,Jharkhand*
[2]*Professor, Department of Medicine, Rajendra Institute of Medical Sciences,Ranchi,Jharkhand*
[3]*Junior resident, Department of Medicine, Rajendra Institute of Medical Sciences,Ranchi,,Jharkhand*
[4]*Associate Professor, Department of Medicine, Rajendra Institute of Medical Sciences,Ranchi,Jharkhand*
**Corresponding author-Dr.Sita Paikra*

Abstract
Objective*- The study was done to see the prevalence of cholelithiasis in chronic kidney disease(CKD) patients and establish CKD as a risk factor for cholelithiasis.*
Materials and method*- Medical, demographic and clinical data of all the patients were recorded between age of 18-70 years with diagnosis of CKD as per NFK/KDOQI criteria regardless of its primary cause.The serum creatinine and blood urea was estimated at the time of admission and eGFR was calculated. USG abdomen was done during hospital stay.*
Results*- Overall prevalence of cholelithiasis in CKD patients was 18.9%. Prevalence rate of cholelithiasis was increasing with age and body mass index(BMI), much higher in female, dyslipidemic, diabetic and patients with secondary hyperparathyroidism.*
Conclusion*- CKD should be considered a risk factor for cholelithiasis. Identified modifiable risk factors like BMI, diabetes, dyslipidemia and secondary hyperparathyroidism warrant proper treatment to prevent the occurrence and progression of cholelithiasis.*
Keywords*- CKD, Cholelithiasis, BMI, eGFR.*

Date of Submission: 20-08-2020 Date of Acceptance: 06-09-2020

I. Introduction

Chronic Kidney Disease encompasses a spectrum of different pathophysiologic process associated with abnormal kidney function and a progressive decline in glomerular filtration rate (GFR)which is irreversible.[1] At least 6% of adult population in United States have CKD stage 1and 2, additional 4.5% is estimated to have stage 3 and 4 CKD[1].SEEK (Screening and Early Evaluation of Kidney Disease) study in India revealed a prevalence rate of 17.2% CKD patients out of which 6% has CKD stage 3 or worse[2].

Cholelithiasis is the formation of stone in gall bladder. NHANES III survey in United States has revealed an overall prevalence of 7.9% in men and 16.6% in women.[1]Patients with CKD may have a more complex disorder of gastrointestinal motility that contributes to gallbladder stasis, which is an important factor in gallbladder stone formation. Gallbladder motility is controlled by a complex process involving neural and hormonal factors[3,4]. Autonomic nervous system may become dysfunctional in the uremic state which controls gastrointestinal motility[5,6].Serum level of cholecystokinin, gastrin, glucagon and some other hormonal factors involved in gastrointestinal motility are significantly higher in renal insufficiency.[7,8,9]The disproportionate increases of hormonal factors with antagonistic effects on gastrointestinal motility may alter gastrointestinal function. The aim of our study is study the prevalence of cholelithiasis in CKD patients and establish CKD as one of the risk factor for cholelithiasis.

II. Materials And Method

It was a hospital based prospective and observational study.Medical, demographic and clinical data of all the chronic kidney disease patients were recorded between age group of 18-70 years with diagnosis of CKD as per NFK/KDOQI criteria[10] regardless of its primary cause from 1st September 2017 to 31st August 2018.The serum creatinine and blood urea was estimated and eGFR was calculated.USG abdomen and other relevant blood investigations were done subsequently during hospital stay.

Inclusion Criteria:-
1. All the patients of CKD admitted in Department of Medicine R.I.M.S. Ranchi with estimated glomerular filtration rate less than 70 mL/min per 1.73 m2 as calculated by the Modification of Diet in Renal Disease formula.
2. Age 18-70 year of age

Exclusion Criteria:-
1. Age < 20years or >70 years
2. BMI >40
3. Chronic Liver Disease
4. Chronic hemolytic Anemia (Sickle cell anemia, thalassemia etc.)
5. History of medications like oral contraceptives and octreotide
6. Chronic inflammatory bowel disease
7. Prior history of gastrointestinal surgery specially cholecystectomy

Data was tabulated using MS Excel, Word and was analysed using SPSS 23.0 software.Association was considered significant if $p<0.05$.

III. Results

Table no.1 shows the prevalence of cholelithiasis in CKD .The overall prevalence of cholelithiasis in CKD patients was 18.9% which was much higher than those in general population**.**

		Frequency	Percentage
	CHOLELITHIASIS PRESENT	20	18.9%
	CHOLELITHIASIS ABSENT	86	81.1%
	Total	106	100%

Table no.2 shows sex wise prevalence of cholelithiasis in CKD.Theprevalence of cholelithiasis in CKD was much higher in female patients 29.3% as compared to males 12.3%

			GBS		Total
			CHOLELITHIASIS PRESENT	CHOLELITHIASIS ABSENT	
SEX	MALE	Count	8	57	65
		%	12.3%	87.7%	100.%
	FEMALE	Count	12	29	41
		%	29.3%	70.7%	100.%
Total		Count	20	86	106
		%	18.9%	81.1%	100.%

*p value- 0.030

Table no. 3 shows the prevalence of cholelithiasis in CKD according to BMI. CKD patients who had BMI>25 were considered to be obese and the observed prevalence of cholelithiasis was 25% as compared to 5.9% prevalence in those BMI<25.

			GBS		Total
			CHOLELITHIASIS PRESENT	CHOLELITHIASIS ABSENT	
BMI	>25	Count	18	54	72
		%	25.0%	75.0%	100.%
	<25	Count	2	32	34
		%	5.9%	94.1%	100.%
Total		Count	20	86	106
		%	18.9%	81.1%	100.%

*p value -0.019

Table no.4 shows the prevalence of cholelithiasis in CKD with diabetes mellitus. 31.3% of CKD patients with diabetes developed cholelithiasis which was much higher than non-diabetic CKD patients(13.5%)

			GBS		Total
			CHOLELITHIASIS PRESENT	CHOLELITHIASIS ABSENT	
DM	DIABETIC	Count	10	22	32
		%	31.3%	68.8%	100.%
	NON DIABETIC	Count	10	64	74
		%	13.5%	86.5%	100.%
Total		Count	20	86	106
		%	18.9%	81.1%	100.%

*p value- 0.032

Table no.5 shows the prevalence of cholelithiasis in dyslipidemic and non dyslipidemic CKD patients.It was higher in dyslipidemic CKD patients 25.4% as compared to non dyslipidemic CKD patients 5.7%.

			GBS		Total
			CHOLELITHIASIS PRESENT	CHOLELITHIASIS ABSENT	
DYSLIPIDEMIA	DYSLIPIDEMIC	Count	18	53	71
		%	25.4%	74.6%	100.%
	NON DYSLIPIDEMIC	Count	2	33	35
		%	5.7%	94.3%	100.%

Total	Count	20	86	106
	%	18.9%	81.1%	100.%

*p value-0.01

Table no.6 shows the prevalence of cholelithiasis in CKD with secondary hyperparathyroidism. It was higher 22.9% in patients with secondary hyperthyroidism as compared to 4.3 % prevalence in those with normal serum PTH level.

			GBS		Total
			CHOLELITHIASIS PRESENT	CHOLELITHIASIS ABSENT	
PTH	INCREASED PTH	Count	19	64	83
		%	22.9%	77.1%	100.%
	NORMAL PTH	Count	1	22	23
		%	4.3%	95.7%	100.%
Total		Count	20	86	106
		%	18.9%	81.1%	100.%

*p value-0.04

IV. Discussion

Prevalence of cholelithiasis was 9.1% in patient aged 18-40 years, 16.4% in those aged 41-60 years and 31% in patient aged >60 years.The prevalence increased with increasing age.In CKD patients, increasing age is the Seyrek at el[12] where the highest prevalence was 12.1% in patients aged >65 years (p value< 0.001) and in the age group 50-60 years respectively.

In the study,no.of male and female were 65 and 41respectively. 8 and 12 cholelithiasis cases were observed in males and females accounting for 12.3% and 23.3% respectively (p value<0.05) Sex is a also a traditional risk factor for cholelithiasis as also evidenced by Unisha and Jagannathet al[13]showing cholelithiasis prevalence of 5.59% and 1.99% in females and males in general population respectively. Khuroo et al[14]also observed a prevalence of 9.6% and 3.07%, 28.5% and 14.5% in females and males respectively by Vecchi and Soresi et al[15] and by Lai et al[11].

Overall 72 and 34 CKD patients in study population had BMI>25 and <25 respectively. Cholelithiasis was observed in 18 patients with BMI>25 and 2 patients with BMI <25 accounting for 25% and 5.9% prevalence respectively($p<0.05$). BMI is also a traditional risk factor for cholelithiasis as quoted in several of standard medical textbook. This finding was in accordance with Lai et al[11] who reported that patients with body mass index >27 kg/m2 were more likely to have gallbladder stones ($p < 0.05$).

Among total 106 cases 32 cases were diabetic out of which cholelithiasis was present in 10 cases accounting for 31.3% as compared to 13.5% prevalence in non-diabetic.($p<0.05$)Similar results were reported by Li Vecchi and Cesare et al[15] and Lai et al[11]who concluded diabetes to be one of the major risk factors for cholelithiasis in CKD.

A total of 71 CKD patients had dyslipidemia out of which 18 patients had cholelithiasis accounting for 25.4% prevalence. Cholelithiasis was present in 2 cases who were not dyslipidemic accounting for 5.7 % prevalence rate.($p<0.05$) This observation was re comparable to study done by Altiparmak et al[16] and Hung and Liao et al[17] where dyslipidemia was associated with increased cholelithiasis prevalence in CKD patients.

Inthe study population 83 patients had increased serum PTH levels and 23 patients had normal serum PTH levels.Cholelithiasis was present in 19 CKD cases with secondary hyperparathyroidism accounting for 22.9% prevalence as compared to only 1 case of cholelithiasis present in CKD patients without hyperparathyroidism accounting for 4.3%. ($p<0.05$).This observation was comparable to Barut and Tarhanet al[18] who reported an almost ten times higher incidence (25% vs 2.6%) of cholelithiasis in CRF patients with secondary hyperparathyroidism undergoing PD ($p = 0.007$).

V. Conclusion

This study shows that there was clearly an increased prevalence of cholelithiasis in CKD patient. Increasing age, female gender, obesity(BMI>25) ,diabetes, dyslipidemia and secondary hyperparathyroidism emerged as a risk factor in CKD patients for increased prevalence of cholelithiasis. Therefore, CKD should be considered a risk factor for cholelithiasis and proper screening and follow-up of all CKD patients should be done for the same. Identified modifiable risk factors in this study warrant proper treatment for these to prevent the occurrence and progression of cholelithiasis.

References

[1]. J.Larry Jameson et al,2016;Harrison's Principles of Internal medicine19:1811-1825
[2]. Singh A, Farag Y, Mittal B, Karai Subramanian K, Reddy SRK, Acharya VN.et al,2003; Epidemiology and risk factors of chronic kidney disease in India-result from the SEEK (Screening and Early Evaluation of Kidney Disease) study. BMC Nephrology 14:114-23
[3]. Tierney S,Pitt HA, Lillemoe KD,1993; Physiology and pathophysiology of gallbladder motility. SurgClin North Am. 73:1267y1290.
[4]. Patankar R, Ozmen MM, Bailey IS, Johnson CD,1995; Gallbladder motility, gallstones, and the surgeon. Dig Dis Sci. 40:2323Y2335.
[5]. Campese VM, Romoff MS, Levitan D, Lane K, Massry SG,1981;Mechanisms of autonomic nervous system dysfunction in uremia. Kidney Int. 20:246Y253
[6]. Mendez-Sanchez N, Chavez-Tapia NC, Motola-KubaD,Sanchez-Lara K, Ponciano-RodriguezG,Baptista H, RamosMH,Uribe M,2005;Metabolic syndrome as a risk factor for gallstone disease. World J Gastroenterol. 11:1653Y1657.
[7]. Owyang C, Miller LJ, DiMango EP, Brennan LA Jr, Go VL,1979; Gastrointestinal hormone profile in renal insufficiency. Mayo Clin Proc. 54:769Y773
[8]. Ravelli AM,1995; Gastrointestinal function in chronic renal failure. PediatrNephrol. 9:756Y762
[9]. Pauletzki J, Althanus R, Holl J, Sackmann M, Paumgartner G,1996; Gallbladder emptying and gallstone formation: a prospective study on gallstone recurrence. Gastroenterology 111:765Y771
[10]. National Kidney Foundation,2002: Kidney Disease outcomes Quality initiative: IV NFK-K/DOQI. Update Am J Kidney Dis 37:S182-238
[11]. Lai SW, Liao KF, Lai HC, Chou CY, Cheng KC, Lai YM,2009; The prevalence of gallbladder stones is higher among patients with chronic kidney disease in Taiwan. Medicine (Baltimore) 88(1):46-51. doi: 10.1097/MD.0b013e318194183f. PubMed PMID: 19352299.
[12]. Paydas S, Seyrek N, Gorkel Y, Sagliker Y,1996; Prevalence of cholelithiasis in patients with end-stage renal disease. Nephron 72:115–116.
[13]. Unisa S, Jagannath P, Dhir V, Khandelwal C, Sarangi L, Roy TK,2011; Population-based study to estimate prevalence and determine risk factors of gallbladder diseases in the rural Gangetic basin of North India. *HPB (Oxford)*13(2):117-25.
[14]. Khuroo MS, Mahajan R, Zargar SA, Javid G, Sapru S,1989; Prevalence of biliary tract disease in India: a sonographic study in adult population in Kashmir 30(2):201-5. PubMed PMID: 2649414; PubMed Central PMCID: PMC1378302.
[15]. Li Vecchi M, Cesare S, Soresi M, et al,2001; Prevalence of biliary lithiasis in a Sicilian population of hemodialysis patients. ClinNephrol 55:127–132.
[16]. Altiparmak MR, Pamuk ON, Pamuk GE, Celik AF, Apaydin S, Cebi D, Mihmanli I, Erek E,2003; Incidence of gallstones in chronic renal failure patients undergoing hemodialysis: experience of a centre in Turkey. Am J Gastroenterol 98:813Y820.
[17]. Hung SC, Liao KF, Lai SW, Li CI, Chen WC,2011; Risk factors associated with symptomatic cholelithiasis in Taiwan: a population-based study. *BMC Gastroenterol*. 11:111. Published 2011 Oct 17. doi:10.1186/1471-230X-11-111
[18]. Barut I, Tarhan OR, Baykal B, et al,2007; Higher incidence of cholelithiasis in chronic renal failure patients with secondary hyperparathyroidism undergoing peritoneal dialysis. Ren Fail 29:453–457

Dr.Sita Paikra, et. al. "CKD-A risk factor for cholelithiasis: An observational study at a tertiary teaching hospital in Jharkhand.*" IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 19(9), 2020, pp. 10-14.