

Prevalence Of Gall Stones In Chronic Renal Failure

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ABSTRACT

Background: Chronic renal failure has a multisystemic effect leading to high morbidity and mortality. Uremia is syndrome resulted from the renal failure. We have two types of renal dialysis which are peritoneal and Hemodialysis. We have two types of gallstones which are cholesterol and pigmented stones. **Objective:** In this case-control study, we sought to determine whether the prevalence of gallbladder stones (GBS) was increased in chronic renal failure (CRF) patients on a hemodialysis (HD) program, and an intermittent peritoneal dialysis and study the effect of factors that might have some influence on the development of GBS and to compare the results with health control. **Methods:** This case control study enrolled 78 patients with chronic renal failure of them 40 on HD, 38 on intermittent PD, 41 healthy control populations. All cases were taken from Al-yarmouk teaching hospital during the period between January 2006 to the end of December 2006. All cases had been sent for renal function test, fasting abdominal ultrasound, fasting lipid profile, Serum Ca, Serum k, serum PO₄, RBS and Hb. Statistical analysis had been done using chi square and p value. P value of less than 0.05 had been selected as the level of Statistical significance. **Results:** The age of both patients and control had ranged between 16-69 years old (mean of age 43.63 years old). The prevalence of gallstone in CRF is 7.69% (which is not significant) (P value > 0.05) which is similar to that in healthy control. There is no effect of age on prevalence of gallstone in CRF. There was no association between sex and prevalence of gallstone in CRF (P value > 0.05). There is no effect of type of dialysis on prevalence of gallstone in CRF (P value > 0.05). The duration of HD have no effect on the prevalence of gallstone in CRF. Hypertension and DM both had no effect on the prevalence of gallstone in CRF (P value > 0.05). **Conclusion:** The prevalence of gallstone in CRF is similar to that of general control healthy population whether treated on HD or intermittent PD.

Introduction:

Chronic renal failure is a clinical state in which there has been an irreversible loss of endogenous renal function, of a degree sufficient to render the patient permanently dependent on replacement therapy (dialysis or transplantation) in order to avoid life threatening uremia⁽¹⁾. Uremia is a clinical syndrome associated with fluid, electrolyte and hormone imbalance and metabolic abnormalities, which develop in parallel with deterioration of renal function.⁽¹⁾ Diabetes is primary cause of ESRD in the United States and accounts for 40% of new dialysis patients, followed by hypertension 25.2%, glomerular nephritis 11.3%, interstitial disease 3.8%, cystitis 2.8%, and neoplasms 1.7%.^(2,3) Patients with uremia must have dialysis initiated as soon as symptoms are present regardless of GFR.⁽⁴⁾ For a symptomatic patients, dialysis is generally initiated when their creatinine clearance is 10 ml / min (creatinine level of 8-10 mg / dl) or less, or for diabetic patients, when their creatinine clearance is 15 ml/min (creatinine level of 6 mg/ dl), early referral to nephrologists for preparation for dialysis or transplantation.⁽⁵⁾ Patients may be decided on

peritoneal dialysis or Hemodialysis, a decision is dependent on presence of contraindications to each procedure, peritoneal dialysis is preferred for patients who are highly motivated, need flexibility in their dialysis schedule, and who may have underlying cardiovascular disease. Gall stone disease is one of the most common and costly of all digestive diseases. The third national health and nutritional examination survey estimated that 6.3 million men and 14.2 million women aged 20 to 70 in the United States had gallbladder disease.⁽⁶⁾ There appear to be either higher rates of cholelithiasis in western Caucasian and Native American populations and lower rates in eastern European and Japanese populations.⁽⁷⁻⁹⁾ There are two principal types of gallstones diseases: Bile pigment gallstones either black or pigmented and Cholesterol stones either pure or mixed. The formation of gallstones is dependent upon three factors: cholesterol supersaturation of bile, crystallization-promoting factors within bile, Motility of gallbladder itself. The major components of pigment stones is calcium bilirubinate with less than 50% cholesterol content.⁽¹⁰⁾

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Patients and methods

The study enrolled 78 patients with chronic renal failure, of them 38 treated with intermittent peritoneal dialysis, other 40 treated with chronic Hemodialysis and other 41 normal healthy taken as control. Of chronic renal failure 35 of them male and other 43 female, 16 patients of PD were male and other 22 patients were female. 19 patients of Hemodialysis were male and other 21 were female. Also the healthy control: 21 patients were male and other 20 patients were female. The main age ranging from 16-69 years for both chronic renal and for healthy control. All the patients were taken from our department of internal medicine and kidney diseases control. All the healthy control subjects were taken also in our AL-Yarmouk teaching hospital outpatient clinic.

The diagnosis of CRF was defined as a serum creatinine level consistently $> 1.2 \text{ mg/dl}$ and creatinine clearance $< 70 \text{ ml/min/1.73m}^2$, calculated using the Cockcroft and Gault formula. Creatinine clearance had been calculated according to the following formula: Creatinine clearance = $\{(140 - \text{age (year)}) \times \text{body weight (kg)}\} / \text{plasma creatinine} \times 72$ in male. Creatinine clearance in female patients had been calculated by multiplying the results estimated from the above formula by 0.82. In all patients, we recorded age, sex, serum values of urea, creatinine, fasting serum cholesterol, fasting s. triglyceride, HDL, presence diabetes mellitus, as well as parity and past or present and other medications. Use of oral contraceptive in the women moreover we recorded serum concentrations of calcium, phosphorus and potassium.

Results:

Table (1): The age distribution of patients with CRF & healthy control

Age	Renal failure				Control			
	Gallstone detected		Gallstone undetected		Gallstone detected		Gallstone undetected	
11 – 20	0	0	6	7.69	0	0	8	18.51
21 – 30	0	0	9	11.53	0	0	5	12.19
31 – 40	0	0	21	26.92	0	0	5	12.19
41 – 50	0	0	19	24.35	1	2.43	4	9.75
51 – 60	3	3.84	10	12.82	0	0	11	26.82
61 – 70	3	3.84	7	8.97	2	4.87	4	9.75
71 – 80	0	0	0	0	0	0	1	2.43

In Table -1 the prevalence of gall stone according to age. We note the increase prevalence of stone in patient with CRF in age 50-60 year while in healthy control from 40-70 year there is one case and two cases from 61-70 year. So the prevalence of gall stone is increase after 40 year. There is increase prevalence of stone in patient with CRF in age 50-60 year while in healthy control from 40-70 year there is one case and two cases from 61-70 year. So the prevalence of gall stone is increase after 40 year. The prevalence of gall stone according to

sex; Male and female are equal in prevalence. The effect of type of dialysis on prevalence of gall stone in CRF; the prevalence of gall stone in patient on PD is double time of that on HD. The prevalence of gall stone according to duration of renal failure, we find that four cases in those equal or less than one year while two cases in those more than one year. In CRF there are six patients of 78 have gallstones (7.69%), in healthy control there are three patients of 41 have gallstones (7.31 %); so there is no effect of CRF on prevalence of gallstone

Table (2): The prevalence of gallstones according to the level of LDL cholesterol

Serum LDL cholesterol (mg/dl)	No	%
<120	4	3.36
121 – 150	0	0
151 – 180	2	1.68
181 – 210	1	0.84
211 – 240	2	1.68

Four patients with gall stone with L.D.L level bet. 91-120 mg / dl, two patients with gall stone with L.D.L level bet. 151 - 180 mg /dl, one patient with gallstone with L.D.L level bet. 181 - 210 mg /dl and two patients with gallstone with L.D.L level bet. 211 - 240 mg /dl.

Table (3): Distribution of patients and disease characteristics according to gallstone presence

Variables	Gallstone detected		Gallstone detected		P value
	No	%	No	%	
Gender					
Male	3	8.57	32	91.43	0.79 [NS]
Female	3	6.98	40	93.02	
Type of dialysis					
HD	2	5	38	95	0.36 [NS]
PD	4	10.5	34	89.5	
Duration of CRF (years)					
= 1	4	10.5	34	89.5	0.36 [NS]
> 1	2	5	38	95	
Hypertension					
HT	3	6.5	43	93.5	0.64 [NS]
No HT	3	9.4	29	90.6	
DM					
DM	1	10	9	90	0.78 [NS]
No DM	5	7.35	63	92.65	
Chronic renal failure					
CRF	6	7.7	72	92.3	0.94 [NS]
Control	3	7.3	38	92.7	

Table (4): The effect of the duration of the dialysis (HD) on the prevalence of gallstones

Duration of dialysis (years)	No	%	Delectable stones
<1	22	55	1
1 – 2	6	15	
2 – 3	3	7.5	
3 – 4	1	2.5	1
4 – 5	1	2.5	
5 – 6	2	5	
6 – 7	2	5	
7 – 8	1	2.5	
8 – 9	0	0	
9 – 10	0	0	
10 – 11	1	2.5	
11 – 12	0	0	
>12	1	2.5	

We had one patient with gallstone with duration of H.D less than one year. We had one patient with gallstone with duration of H.D more than one year (3-4 years).

Discussion:

The chronic renal failure is associated with high morbidity and mortality; and uremia has multi systemic effects. One of these effects is on gastrointestinal system, so in our study we want to know the effect of CRF on prevalence of biliary gallstones and its risk factors. In our study we found that the prevalence of gallstones in CRF is 7.69% (six of 78 patients three males, three females) with P value > 0.05 which statically non-significant. Mean age = 43.63 year and mean duration of hemodialysis = 23, 62 months. The same finding of prevalence of gallstones in CRF can be observed by reviewing the results of department of nephrology cerraah pasa medical faculty, university of Istanbul, Turkey in which the prevalence of gallstones in CRF is (3.85% of 182 patients' five males, two female).⁽¹¹⁾

In Croatia, a similar study was done, the paper presents the survey on the prevalence of gallstones in a relatively big group of hemodialysis patients (number = 114 patients) of them (49 females, 65 males) gallstones have been found in 24 of 114 patients on hemodialysis (21, 05 %) with P value > 0.05. The final results of this study of gallstones in hemodialysis patients showed same frequency as in general population and probably results from the same pathophysiology mechanisms. So this result is similar to our results.⁽¹²⁾ Interestingly other study conducted in Israel, Department of Nephrology and Hypertension, Meir General Hospital, Kfar Saba, which is corresponded to our finding. The gallstones were found in 12 of 93 (12.9%) patients, seven HD and five CAPD. In this study there were 54 HD (28 males, 26 females, mean age 52.4 years) and 39 CAPD (22 males, 17 females, and mean age 59.1 years), in healthy control group gallstones where found in eight of 134 (6%) with P value > 0.05.

⁽¹³⁾ The study of department of Gastroenterology, faculty of medicine, Mayis University, Samsun, Turkey, was found that CRF and renal replacement therapy (HD and CAPD) did not affect gallbladder functions.⁽¹⁴⁾ In Slovenia, Department of Nephrology and Hemodialysis, Teaching Hospital of Maribor, a study of prevalence of gallstones was done, revealed 16% of gallstones in patients with end-stage renal disease treated with HD which is similar to the prevalence in non-uremic control group. The prevalence of gallstones in patients with end-stage renal disease is similar to that of normal population.⁽¹⁵⁾ In Sicilian population another study was performed in which they found that non-dialyzed CRF patients had a chollithiasis prevalence of 22%, which was higher than in the local general population but lower than in a group of local HD patients, p-value < 0.0001.⁽¹⁶⁾ This finding suggests that disease related alterations in bile compositions, which begin in early phases of CRF,

may produce strong effects that mask the influence of the risk factors more classically associated with chollithiasis, one such effect could be the use of low-protein diets, which are started at very early stages in CRF and which may be applied more strictly by physicians and patients than the clinical situation actually demands. In fact, a low protein intake could be responsible for increased bile lithogenicity⁽¹⁷⁾, or for a decrease in antinucleating proteins factors of the bile that may facilitate the early face of protein precipitation and subsequent stone formation.⁽¹⁸⁾

Because our patients were all on normoproteinic or hypoproteinic diet, confirmed by close follow up of the families of patients or by monthly check up with dieticians, this may have influenced lithogenesis, our patients followed a diet with a balanced diet contents. If we review an Italian study which was done in division of nephrology and dialysis, we found that it is different from our study. The prevalence of gallstone in this study is higher than that of our study. In Italian study the prevalence of gallstone is 28% of 119 patients on regular dialysis treatment.⁽¹⁹⁾ In Korean study the prevalence of gallstones is higher than that of our study; the prevalence in Korean study is 18.2% in patients with end-stage renal disease treated with HD, and higher than in non uremic population.⁽²⁰⁾

So the prevalence of gallstones in Iraq, Turkey, Slovenia, Croatia and Israel are similar which were located in same geographical region. While our study differ from that in Italy, Sicilian population and Korea. The prevalence of gallstones is lower in our study. So geographical area may be the cause of this variation in prevalence of gallstone disease. Regarding the effect of type of dialysis on the prevalence of gallstones in our study there was no association p-value > 0.05 which is not significant (p value = 0.35). This result goes with study done in department of nephrology and Hypertension, Israel.⁽¹³⁾ The duration of HD had no relation with prevalence of gallstones and this is similar to study of department of nephrology and Hemodialysis, teaching hospital of Maribor, Slovenia.⁽¹⁵⁾

And for interest that laparoscopic cholecystectomy has proven to be safe and effective treatment for symptomatic gallstone disease. Several patients may not be candidates for laparoscopic approach, including patients with morbid obesity, acute cholecystitis and previous abdominal surgery due to peritoneal thickening and abdominal adhesions secondary to peritoneal dialysis. But laparoscopic surgery is advocated in peritoneal dialysis requiring cholecystectomy in a study conducted in the department of surgery, Johns Hopkins Bayview medical center, Baltimore, MD 21224, USA.⁽²¹⁾

Conclusions:

The prevalence of gallstones in CRF patients is not associated with age, sex, hypertension, DM, level of serum creatinine and LDL cholesterol.

The Prevalence of gallstone is doubled in patients on intermittent PD as compared with that patient on continuous HD; this variation may be related to regular time and fixed time in HD.

The duration of dialysis had no effect on the prevalence of gallstones. The prevalence of gallstone in CRF is same as healthy control.

Recommendations:

We still recommend doing an abdominal ultrasound for patients with CRF on regular time such as annually for detection of gallstones.

Both males and females must do an abdominal ultrasound for detection of gallstones and females are not having more risk than males for developing of gallstones in CRF

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