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Original Article

Renal Failure Due To Obstructive Uropathy In Adults; Study Conducted In Adults At Jinnah Post Graduate Medical Center, Karachi

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ABSTRACT

Objective: To explore the picture of renal failure secondary to obstructive uropathy **Methodology:** This descriptive study was conducted in the Department of Urology, Jinnah Postgraduate Medical Centre, Karachi for a period of three years from 1st January, 2009 to 31st December, 2011. Seventy seven patients with renal failure due to obstructive uropathy were entered. Patients of both gender, age more than 15 years with unilateral or bilateral uropathy resulting in renal failure were included while those having acute kidney injury or chronic kidney diseases caused by other non-onstructive causes were excluded. **Results:** Out of 77 participants, 57 (73%) were male. Mean age was 43.9 + 18.26 years. Bilateral obstruction was reported in 47 (61%). Out of those, 28 (36%) had bilateral obstruction at supravesical region while 19 patients had infravesical obstruction commonly. Out of 77 patients, 10 (12.9%) either with unilateral or bilateral obstructive uropathy had small shrunken or poorly functioning kidneys and 4 (5%) patients had solitary obstructed kidneys, whereas 15 (19.8%; 5 right and 10 left kidneys) patients had either markedly reduced functioning (<15% function on DTPA) or non-functioning kidneys due to obstruction and hydronephrosis. Mean creatinine in cases with bilateral obstruction was 6.19 + 6.5mg/dl and in unilateral obstruction 5.7 + 5.1mg/dl. **Conclusion:** Obstruction causing renal failure at assentially any level along the urinary tract should at a minimum lead to a urologic evaluation. Special concern in all of these cases must be paid to concurrent obstruction with fever and infection because they may be an indication for immediate intervention, however early intervantion is batter than late and is highly effective on outcome

KEYWORDS: Obstructive uropathy, Renal failure, Obsructive Nephropathy

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INTRODUCTION

Renal failure along with abnormal development of kidney could be due

to obstructive uropathy [1,2]. Posterior Urethral Valve (PUV) can be considered the most common cause of non-genital lower urinary tract obstruction [1,2]. Sixteen percent of the kidney transplantations in childhood is due to obstructive uropathy [3].

Glomerular Filtration Rate (GFR) is the gold standard measure used by the clinicains to help identify patients with enal failure. It is estimated that from the age of 40 to 80 years, GFR decreases at a rate of 0.8 ml/min/1.73 cm^2 per year ont the average[4]. There are multiple causes for this. Some are functional loss and atrophy of renal tubules and gromeruli, microangiopathic changes, tubular basement membrane disintegration, vacuole changes and renal vasculature sclerosis.

The disease process could increase by comorbidities like Hypertension and Diabetes Mellitus. Decreased GFR concurrently reduces renal mass. The average being 20% to 30% which has been noted in autopsy of patients aged 30 to 90 years and 30% to 50% decrease in patients aged 30 to 70 years [5]. Renal failure is said to occur when GFR decreses to 15ml/ min/1.73m^2. In normal renal function GFR is more than 90ml/min/1.73m^2 , between 60-90 ml/min/1.73m^2 mild renal disease, between 30 and 60 moderate and between 15 and 30 ml/min/1.73m^2 severe.

Acute renal failure could be pre-renal, intrinsic and post renal. Information regarding hemodynamic status, blood pressure, exposure to nephrotic insults and systemic disease are very helpful in determining the cause of renal failure.

Tests like ultrasound kidneys, suppliments diagnosis of obstructive uropathy, hydronephrosis, hydrouretronephrosis and renal parenchymal thickness. Obstructive uropathy associated with infection constitutes urologic emergency that requires urgent urologic intervention, otherwise sepsis alone or associated with death could result.

Benign Prostatic Hyperplasia (BPH), if left untreated, could affect upper part of urinary tract as a result of outlet obstruction[6]. Urinary retention could also result, and that could cause renal failure. Diagnosis of Hydronephrosis secondary to obstructive uropathy, on the basis of autopsy findings, revealed 3% men and women younger than 60 years. In men older than 60 years the incidence was, however, 6% with 3% increase mainly due to BPH[7]

The rationale of the study was to share with others, experience of the researchers about renal failure due to obstructive uropathy.

METHODOLOGY

This retrospective descriptive study was conducted in the Department of Urology, Jinnah Postgraduate Medical Centre, Karachi for a period of three years from 1st January 2009 to 31st December 2011. Data were entered into a database. Patient's details, operative information and post-operative follow up were recorded. Patients of both gender, age more than 15 years with unilateral or bilateral uropathy resulting in renal failure were included while exclusion criteria comprised acute kidney injury or chronic kidney diseases caused by other non-onstructive causes.

Operational Definition:

Diagnosis of aucte or chronic renal failure due to obstructive uropathy was made with help of history, relevant physical examination, lab. Investigation shwoing raised blood urea nitrogen, creatinine and radiological investigation i.e. ultrasound KUB, C.T KUB for diagnosis of obstructive uropathy.

Ethical Consideration:

Permission was taken from the concerned authority to conduct the study. Informed consent was taken from the patients. Their autonomy, anonymity and confidentiality were strictly maintained. They were told that refusal to take part in the study would, in no way, affect their due care in the hospital.

Data Analysis:

The data were analysed using statistical packages for social sciences (SPSS) version 18.0. Frequencies and percentages were calculated for categorical variable like gender. Mean and standard deviation were computed for quantitative variables like age, hemoglobin, blood urea nitrogen, serum creatinine of patients.

RESULTS

Out of 77 patients, 57 (73%) were male (Figure no1).

Mean age was 43.9 + 18.26 years. Mean systolic BP was 132 ± 18 mmHg. Urinary tract infection was present in 50.30% of the patients (see Table no 1). Forty seven (61%). had bilateral obstruction. Amongst those, 28 (36%) had bilateral obstruction at supravesical region i.e. kidneys, pelvis, U.V junction or ureter most commonly due to stone while 19 patients had infravesical obstruction (see Table no 2) commonly either due to benign prostatic hyperplasia or carcinoma of urinary bladder. Out of 77 patients, 10 (12.9%) either with unilateral or bilateral obstructive uropathy had small shrunken or poorly functioning kidneys and 4 (5%) patients had solitary obstructed kidneys, whereas 15 (19.8%), 5 right and 10 left kidneys) patients had either markedly reduced functioning (<15% function on DTPA) or non-functioning kidneys due to obstruction and hydronephrosis. Mean creatinine in cases with bilateral obstruction was 6.19 + 6.5mg/ dl while in unilateral obstruction it was 5.7 + 5.1mg/

FIGURE - 1
Distribution of Gender
n=77

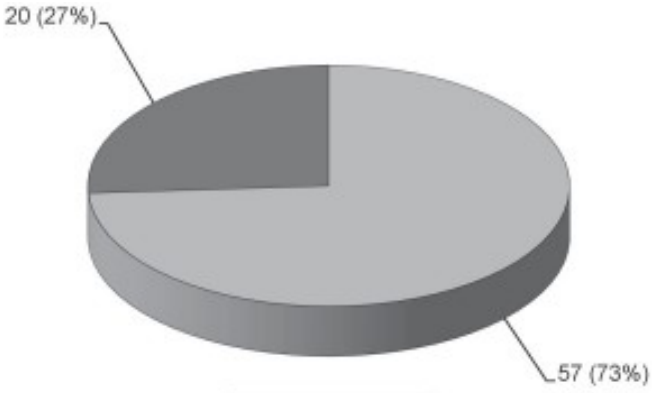


Figure no1
Distribution of Gender
n=77

TABLE NO 1
Demographic and Clinical parameters
n=77

Demographic / clinical parameter	Mean / SD
• Age	43.9 + 18.6
• Systolic BP mmHg	132 + 18
• Diastolic BP mmHg	90 + 16
• Hemoglobin mg/dl	9.45 + 2.01
• Total leucocyte count	11686 + 6.02
• Preprocedure creatinine mg/dl	5.6 ± 2.7
• Post procedure creatinine mg/dl	4.8 + 2.6
• Urinary tract infection	50.30%

TABLE NO 2
Unilateral and Bilateral Obstructive Uropathy
n=77

Site	No. of patients	Percentage
Bilateral obstructive	47	61%
i) Supra vesical	28	60%
ii) Infravesical	19	40%
Uniltral obstructive	30	39%

TABLE NO 3
Causes of Obstructive Uropathy
n=77

Cause	No. of patients	Percentage
Bilateral renal stone	11	14%
Bilateral ureter stone	5	6%
Bilateral renal stone with ureter stone	2	2.58%
Unilateral ureteric stone	5	6%
Unilateral with contralateral ureter stone	4	5.19%
Unilateral renal stone	9	12%
Renal stone with pyonephrosis	9	12%
Small kidney with renal or ureter stone	8	10.38%
Solitary kidney with renal or ureter stone	4	5%
Benign prostatic hyperplasia	6	7.70%
Benign prostatic hyperplasia renal stone	2	2.58%
Carcinoma prostate	2	2.58%
Carcinoma urinary bladder	5	6%
Urethral stricture	1	1.29%
Vesicoureteral reflux	1	1.29%
Fbroid uterus	1	1.29%
Carcinoma cervix	1	1.29%
Pelviureteric junction stricture	1	1.29%

TABLE NO 4
Causes of Obstructive Nephropathy
n=77

Cause	Number	percentage
Obstructing stone	36	47%
Stone with pyonephrosis	9	12%
Stone with small non functioning kidney	8	10%
Stone obstructing solitory kidneys	4	5%
BPH	8	10%
Urological malignancies	8	10%
Others	5	6%

dl. Renal function of only 10 patients touched base line while that of 63 patients never got normal.Four patients ultimately developed end stage renal disease.

In the sample, 22 patients required hemodialysis post-operatively, nine with unilateral where as 13 with bilateral obstruction. Ten patients required more than

TABLE NO 5
Procedure done in Obstructive Nephropathy
n=77

Procedure done	No. Of patients	Percentage
URS	21	27%
Percutaneous nephrostomy	19	25%
Pylolithotomy	12	16%
Percutaneous nephrolithotomy	11	14%
Nephrectomy	4	5%
TURP	5	6%
CRG	9	12%
Lithopexy	1	1%
Ureterolithotomy	3	4%
TURBT	1	1%

five sessions of dialysis while four were put on maintenance dialysis. In seven (9%) of the patients carcinoma of the prostate and urinary bladder caused obstructive uropathy. Two cases (2.5%) of carcinoma of cervix and fibroid uterus came out as cause of obstructive uropathy (see Table no 3). Six (8%) of BPH cases caused obstructive uropathy (see Table no 3) while in obstructive nephropathy the number was 8 (10%) (see Table no 4). Obstructing stones were the main cause of obstructive nephropathy (n=36,47%) (Table no 4). Most common surgical intervention in obstructive nephropathy was URS (n=21, 27%) while TURP was done in 5 (6%) (see Table no 5).

DISCUSSION

Renal failure secondary to obstructive uropathy is difficult to diagnose and this type of disease always need emergency intervention. Unfortunately, in our country, there is lack of facilitates and experienced hands in remote areas. Therefore most of the patients present in late stages with multiple complication[1].

In obstructive uropathy due to stone disease or bladder outlet obstruction (BOO), early intervention is strongly recommended. There is lot of difference between unilateral and bilateral obstruction; unilateral obstruction takes time for complete process and bilateral obstruction happens all of a sudden so unilateral may be diagnosed on outpatient department (OPD) basis and electively but bilateral need hospitalization and need early intervention.[8,10]

Untreated BPH can lead to retention of urine that develops back pressure due to increase intra vesicle pressure and leads to renal failure [6]. Study in hand can be divided into two categories i.e. supra vesicle and infra vesicle. Supravesicle comprises kidney and ureter while Infra vesicle contains prostate, urethra and bladder itself.

This study shows 61% of patients had bilateral obstruction among which 60% had supra vesicle while 40% had infra vesicle obstruction. Thirty nine % of the patient had unilateral obstruction. This study showed that 14% of patient had obstruction due to bilateral renal stones, 12% due to unilateral renal stones and renal stones with pyonephrosis, 10.38% due to small kidney with ureteric stone, 7.70% due to BPH,6% due to carcinoma of urinary bladder and unilateral uretic stone, 5.19% obstruction due to unilateral with contralateral uretic stone and solitary kidney with renal or ureteric stone, 2.58 % the blockage due to carcinoma of prostate and 2% BPH with renal stone and bilateral renal stone with ureteric stone. There are many other factor that may lead to obstruction

One of the study .conducted by khalaf et al included

91 adolescent with unilateral obstructive uropathy shows same kind of result when patient get treatment for obstruction as shown in our study[11].

All patients came to us with deranged GFR due to obstruction and were treated for it by different procedures. Majority of the patients needed Hemodialysis (HD) pre intervention because patients presented in late stage with Uremia so intervention was done accordingly and obstruction was relieved. Renal function of only 10 patients touched base line while that of 63 never got normal. Four patients developed end stage renal disease. Twenty two patients required hemodylasis post-operatively, nine with unilateral where as 13 with bilateral obstruction. Ten patients required more than five sessions of dialysis while four were put on maintenance dialysis. Arterio-venous fistula (AVF) were made on all 22 patients for HD future and present, four of the patients progressed to End Stage Renal Disease (ESRD) after reliving there obstruction they were shifted to Nephrology OPD for HD and future pre transplant workup; rest of the patients maintaining their createnine with in limit of 4-6mg/dl and were being treated on OPD bases. One of the study that took place in Iran which included 29 adults of unilateral obstructive uropathy shows same kinds of result but the recovery of patient is much more batter and rapid than as shown in our study.[12]

In a review article done by Hamad et al, they have taken several studies on uretral obstruction which shows same kind of results and recovery of patient is far batter and less complicated than as shown in our study [13]. Similar kind of study that took place on Sudanese patient in 2005, renal function are completely recovered in patient with treatment for obstruction where as in our patients the result was much more different and complicated .[14]

Study in hand had six patients which were having obstructive uropathy due to BPH with deranged renal function were initially catheterized and two patients needed HD, then after achieving nider serum creatinine definitive procedure (TURP) was done on these two patients that initially required HD were labeled CRF. Still TURP is considered Gold standard procedure for BPH. In a study by Srivastava[15] conducted at Dept of Surgery, BRD Medical College, India compared three procedures for BPH and concluded equal efficacy and safety with all three which include TURP.

CONCLUSION

Obstructive uropathy has a wide spectrum of presentations. Each cause has a different management strategy and variable outcomes. Obstruction can take place anywhere, from the urethra to the kidney with differing outcomes and concerns at each level. Obstruction causing renal failure at assentially any level along the urinary tract should at a minimum lead to a urologic evaluation. Special concern in all of these cases must be paid to concurrent obstruction with fever and infection because they may be an indication for immediate intervention. ultimately, management decisions should take into account not only expected outcomes but also the morbidity for the intervention and the overall state and goals of care of the patient but early intervantion is batter than late and highly effective on outcome .

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Authors Contribution: * *Data Collection, Manuscript writing*** *DData Analysis **** *References setting ***** *Review the manuscript*

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