Management of Urinary Calculi Associated with Renal Failure

Pages with reference to book, From 205 To 208

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Abstract

Three hundred and sixty patients of urinary calculi associated with renal failure were included in this prospective study. The male to female ratio was 4.1:1 while adult to paed iatric ratio was 6.5:1. One hundred and eighteen (32.8%) patients presented with calculus anuria while 242 (67.2%) were admitted with symptoms of chronic renal failure. Serum creatinine at the time of first admission ranged from 3-35 mg/100 ml. In the initial management, percutaneous needle nephrostomy was done in 217 cases, dialysis in 106, dialysis and PCN in 22 and retrograde catheterisation followed by JJ stent in 15. Definitive surgical procedures were undertaken in 277cases; 29 passed stones spontaneously after PCN. At two year follow-up 72% patients of calculus anuria and 49.5% of calculus renal failure improved their renal function and remained with serum creatinine below 2 mg/100 ml. There was 13.6% mortality in calculus anuria group and 17.4% in calculus renal failure. Overall loss to follow-up was 7.6% and 12% in the two groups respectively (JPMA 45:205, 1995).

Introduction

Urolithiasis has remained a major problem in Pakistan[1-3], specially asymptomatic and neglected stones which often precipitate renal failure[2,4]. The effective management of urolithiasis has witnessed a revolutionary change in recent years with the advent of Extracorporeal shockwave lithotripsy (ESWL), lasertiipsy, electrohydmulic lithotripsy, pneumatic lithothpsy and ureterorenoscopy[5,6]. Although the majority of stones are effectively treated by these modalities there still remains the problem of neglected, asymptomatic large and/or staghom stones associated with renal failure. These require a multifaceted approach where the mainstay of treatment remains open surgery. The object of this study was to evaluate the results of treatment in calculus renal failure patients in terms of theirrenal functions after relief of obstruction.

Patients and Methods

This was a prospective study of three hundred and sixty patients of urolithiasis who presented with renal failure and were admitted consecutively in our Institute between Janualy 1989 to December, 1990. The actual period of study was extended up to December, 1992 to have at least two year follow-up for those who were operated upon in December, 1990. These jxitients were referred to us from medical college hospitals and peripheral hospitals of various parts of Sindh. Only those cases with proved stone shadow in the region of kidney, ureter and bladder on plain x-ray abdomen, or ultrasound and proved biochemical evidence of renal failure i.e., blood urea more than 70 mg/100 nil and serum creati nine more than 3 mg/100 ml were included in this study. At the time of admission, apart from detailed history and physical examination, complete blood picture, blood urea, serum creatinine, serum electrolytes, hepatitis B surface antigen, plain x-ray abdomen and ultrasound of kidneys and bladder was done in every case. Management of these patients comprised of: (a) initial management, (b) Definitive surgical procedures.

Initial management included percutaneous nephrostomy (PCN), ureteric catheterization followed by JJ stent and dialysis. Decision for PCN was made on the basis of biochemical tests and ultrasound

findings. Those patients who had fluid overload, hyperkalaemia, acidosis, high blood urea and serumcreatinine were initially dialysed. During the period of admission, daily complete blood picture, blood urea, serum creatinine, electrolytes were done and imbalance was corrected accordingly. All patients were given antibiotics pre-operatively and these were changed according to culture and sensitivity of blood and urine. Those with high blood pressure were given antihypertensive drugs on the advice of the nephrologist. Pre-operative anaesthetic opinion was taken in all cases. Haemoglobin was corrected by blood transfusions before surgery. Bleeding and clotting profile was done in every case before open surgical procedures. Definitive surgical procedures were carried out when patients became fit for surgery after initial resuscitation with dialysis and PCN. The type of surgery varied according to site, size, number of stones, type of renal pelvis and general condition of the patient. Post-operatively all the patients were closely monitored b BP pulse, temperature, intake/output charting. Daily blood urea, semm creatininc. electrolytes and complete blood picture was done. Those who showed rise of creatinine and potassium or became anuric were dialvsed with low dose heparin. All the patients were given antibiotics post-operativelv. either 3rd generation cephalosporin or penicillin group according to pre-operative urine culture reports. Follow-up after discharge was done by weekly checkup of blood urea, serum creatinine, electrolytes, urine for culture and ultrasonography, then twice a month. then once a month and finally at three monthly period. All these patients were followed fora period of two years. The results of surgery at follow-up were defined on the basis of serum creatini ne and blood urea, as serum creatitline has been used as a more sensitive index of GFR than blood urea. Serum crcatinine was used as a marker of GFR and renal functions[7]. Post operative serurnereatininc oforless than 1.5 mg/100 ml was considered good renal function. Patients with follow-up creatinine more than 10 mg/dl were dialysed.

Results

Of 360 patients, 290 (80.5%) were males and 70 (19.5%) females with a M:F ratio of 4. 1:1. Age of the patients ranged from 1 to 90 years with mean age of 34 years. Peak age group was in the 3rd and 4th decade with an adult to paediatric ratio of 6.5:1. One hundred and eighteen (32.8%) patients presented with calculus anuria while 242 (67.2%) were admitted with calculus renal failure. Pre-treatment serum creatinine level ranged from 3-35 mg/100 ml and blood urea 70-550 mg/l00 ml. In the initial management, majority (95.8%) of the patients had either needle nephrostomy, dialysis or both (Table 1). Retrograde ureteric catheterization followed by JJ Stent was attempted in 40 patients but was successful in by-passing obstruction in 15 cases, constituting 3 7.5% success rate out of 40 patients and 4.1% of all 360 cases (Table I).

Table I. Initial management of 360 cases.

Procedure	No. of cases	%
PCN		
Unilateral	200	55.6
Bilateral	17	4.8
Dialysis	106	29.4
Dialysis and PCN	22	6.1
Retrograde catheterization follwed by JJ stent	40/15*	4.1

*J.J. stent was attempted in 40 patients but was successful in 15 cases.

Of the 360 patients, 277 underwent surgical procedures, while 29 passed stones spontaneously after PCN. Of the 54 remaining, 28 died, 20 were lost to follow-up during the initial management period and 6 were unfit for surgery. In 86 (31%) patients with branched and staghorn calculi, bilateral extended pyelolithotomy was done (with the interval of 8-12 weeks between two procedures), while 82 (29.6%) patients had unilateral pyelolithotomy and radial nephrotomies. In 42 (15.1%) patients, unilateral and in7 (2.5%) patients, bilateral ureterolithotomy was done. Twenty-seven patients with a single, solitary stone in renal pelvis and ureteric calculi had pyelouretemlithotomy. Bladder stones were removed by suprapubic cystolithotomy and litholopaxy in 13 (4.6%) patients. Extracorporeal shock wave lithotripsy was attempted in 10 patients with poor excretion of fragments and URS was done in six for extraction of ureteric calculi while only four patients who had pyonephrotic non-functioning kidneys (less than 10% function on DTPA scan) underwent unilateral nephrectomy (Table II).

Table II. Definitive surgical procedures (n=27).

Name of operation	No. of cases	Percentage
Bilateral extended pyelolithotomy	86	31.0
Unilateral pyelolithotomy and radial nephrotomies	82	29.6
Unilateral ureterolithotomy	42	15.1
Simple pyelolithotomy and ureterolithotomy	27	9.7
Bilateral ureterolithotomy	7	2.5
Cystolithotomy+litholopaxy	13	4.6
ESWL	10	3.6
URS	6	2.1
Nephrectomy	4	1.4

Results of surgery in acute calculus ariuria and calculus renal failure showed that 85 (72%) patients with calculus anuria and 120 (49.5%) in chronic calculus renal failure recovered renal functions (Table III). In the two groups, of those who had serum creatininc more than 3 mg/dl after surgery, 11 received renal transplantation while 48 were put on maintenance dialysis. Mortality at 2 years follow-up was 13.6% in calculus anuria and 17.4% in calculus renal failure group. Overall loss to follow-up was 20% in the two groups (Table III).

Table III. Comparison of results of treatment and follow-up in calculus anuria and calculus renal failure.

Serum creatinine	Calculus anuria n=118	Calculus renal failure n=242
1.5 mg	85 (72%)	120 (49.5%)
3 mg	33 (28%)	122 (50.5%)
(a) Maintainence dialysis	7 (5.9%)	41 (17%)
(b) Renal transplantation	1 (0.8%)	10 (4.1%)
(c) Mortality	16 (13.6%)	42 (17.4%)
(d) Loss to follow-up	9 (7.6%)	29 (12%)

13.6% in calculus anuria and 17.4% in calculus renal failure group. Overall loss to follow-up was 20% in the two groups (Table III).

Discussion

Surgical management of renal calculus disease has changed dramatically since the introduction of percutaneous nephmlithotomy (PCNL), lasertripsy and ESWL. Thus, majority of the stones previously requiring open surgery are now managed with either of the above or a combination of ESWL and PCNL[8]. However, patients with large and/or staghom stones and associated renal failure pose difficult problems with these modalities for several reasons: (a) large size staghorn or multiple calculi are difficult to treat with ESWL or in combination with PCNL, (b) for prevention of recurrence. complete removal is essential which is not possible with ESWL or PCNL due to multiple large size stones, (c) kidney with impaired function cannot expel fragments after ESWL or PCNL due to multiple large size stones (d) kidney with impaired function cannot expel fragments after ESWL (e)' associated infection can only be adequately controlled after complete removal of stones (f) adhesions of kidney to penrenal fat and fascia and surrounding structures make PCNL difficult. In view of these factors open surgery continues to have a place in this group of patients. Our results are very encouraging where at two year follow up 72% patients recovered renal functions in the calculus anuna group and 49.5% in calculus renal failure group. Gupta[9] reported good recovery in 14 (23.7%) and significant improvement in 26 (44%) of his 59 patients of chronic calculus renal failure. In our series the number of fully recovered patients is 49.5% as compared to 23.7% in Gupta series. Singh[10] reported full recovery in 91.6% of acute cases and 73.6% in chronic calculus renal failure cases. Proca[11] reported cure in 62 (77%) of his calculus anuria patients with deaths in remaining 18 (23%) while in chronic calculus renal failure he operated upon 15 patients out of 108 cases, out of which, 7(46.6%) had lasting benefit from surgery. Our results are in agreement with this series. One of the factors contributing to improvement in our patients has been the early relief of obstruction by PCN rather than waiting for extended period of pre-operative dialysis to bring the renal functions to normal before surgery. In present series 93 (78.9%) patients of calculus anuria were relieved of obstruction initially by PCN while 2(1 .6%) had bilateral

PCN in order to establish urine flow. Perinetti[12] used PCN in 22 patients with obstructive renal failure out of which 3 had stone disease. He felt sepsis and azotaemia were the main indications. Harris[13] also described the role of the PCN for long term relief of obstruction due to stones and found it successful in buying time in situation in which other approaches were either hazardous or more complex. Barbaric[14] reviewed 257 PCN cases and stone disease was indicated in 41 cases. Stables[15] reviewed the literature on PCN in 516 cases with the view that it is a safe procedure for those who were unfit for surgery at the time of admission, as was the case in our study. Not only in adults but in children this procedure has been very useful. In calculus renal failure group, PCN was done in 122 (4 1.8%) cases and in another 22 dialysis and PCN both were done. In this group main indication was pain, pyonephrosis, azotaernia and to see the effect of temporary relief of obstruction on recovery of renal functions. We found it most satisfactory and easy method of relief of obstruction and infection which can be done under local anaesthesia. This is in agreement with findings of Barbaric[14]. Our experience was similar to others where dialysis was found to be life saving in correcting severe fluid and electrolyte imbalance and rendering many patients fit •for surgery[2,7,9]. We strongly feel that availability of dialysis and a nephrologist's help is necessary to reduce the morbidity and mortality in this group of patients. Retrograde ureteric catheterization followed by JJ stent was attempted in 40 patients and was successful in only 15 patients constituting 37.5%. This 37 5% success rate is similar to other studies[9,10]. More recently use of JJ stent has been described to bypass the ureteric obstruction in which case chances of dislodgement are very low[16-18]. However, it is worth noting that there may be high failure rates in bypassing multiple impacted stones and thus there is danger of introducing retrograde infection and septicaemia in these seriously ill patients. Finally, overall in 57% of patients we were able to achieve stable renal functions with creatinine of less than 2 mg/dl at two year follow-up. This is the brighter side of surgical removal of obstruction that such high number of patients get lasting benefit and several were saved from the cost of renal replacement therapy. The renal parenchyma has got great potential for recovery if obstruction is relieved early and infection is controlled in patie4fls with chronic obstructive renal failure. Renal function can be stabilized if sources of irritation, obstruction and infection are controlled.

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