

Suprapubic Cystostomy: Urinary Tract Infection and other short term Complications

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Abstract

Aims: To evaluate the frequency of urinary tract infection in patients with suprapubic cystostomy and other complications of the procedure within 30 days of placement.

Methods: Patients characteristics, indication and types of cystostomy and short term (within 30 days); complications were analyzed in 91 patients. Urine analysis and culture was done in all patients to exclude those with urinary tract infection. After 15 and 30 days of the procedure, urine analysis and culture was repeated to evaluate the frequency of urinary tract infection. The prevalence of symptomatic bacteriuria with its organisms was assessed. Antibiotics were given to the postoperative and symptomatic patients and the relationship of antibiotics on the prevention of urinary tract infection was determined.

Results: Of the 91 cases 88 were males and 3 females. The mean age was 40.52 ± 18.95 with a range of 15 to 82 years. Obstructive uropathy of lower urinary tract was present in 81% cases and 17 (18.6%) had history of trauma to urethra. All these cases had per-urethral bleeding on examination while x-ray urethrogram showed grade H or grade III injury of urethra. Eighty two of the procedures were performed per-cutaneously and 7 were converted to open cystostomies due to failure of per-cutaneous approach. Nine patients had exploratory laparotomy. Duration of catheterization was the leading risk factor for urinary tract infection found in 24.1% at 15 days and 97.8% at 30 days. There was low prevalence of symptomatic urinary tract infection. E.Coli was the prevalent organism. Antibiotics did not play a significant role in controlling catheter associated urinary tract infection. Blockage and macroscopic hematuria (self limiting) were the predominant complications encountered.

Conclusion: Duration of catheterization is the leading risk factor for the development of urinary tract infections. Catheter-associated bacteriuria are usually asymptomatic. Macroscopic hematuria and blockage of catheter are frequent which can be managed promptly without surgical intervention (JPMA 52:557; 2002).

Introduction

Suprapubic cystostomy is a non-continent; direct drainage of bladder, which may be accomplished suprapubically by an open procedure or by a punch technique with trocar¹.

It is a safe and effective technique and is a common procedure practiced in urology, gynecology and traumatology for urinary diversion and drainage².

Although suprapubic cystostomy is a relatively safe procedure, but like all other invasive procedures has potential complications. Bacteriuria is an almost inevitable consequence of suprapubic cystostomy, but most catheter related urinary tract infections are asymptomatic and bacteriuria is diagnostic of these infection³. Pakistani data is not available on the frequency of urinary tract infection with suprapubic cystostomy, the prevalent organisms and their sensitivity pattern. We present our results of frequency of urinary tract infection and other short term complications of suprapubic cystostomy.

Patients and Methods

This is a hospital based prospective study, which included 100 consecutive patients undergoing suprapubic cystostomy. Nine patients were excluded from the study (five had urinary tract infection, 4 were lost the follow up), leaving 91 patients (88 males and 3 females) for analysis. Patients were evaluated with detailed history and complete general physical and systemic examination to evaluate the cause and indications for suprapubic cystostomy. In case of trauma urethral meatus was examined to see any blood and abdominal examination was done to see any other associated injury or urinary retention secondary to rupture urethra. In case of chronic retention pressure effects like hydronephrosis or associated renal pathology were ruled out. All the patients had detailed urinary analysis and culture prior to the suprapubic cystostomy. Patients with positive culture or sterile pyuria were excluded from the study.

Urine analysis, retrograde urethrogram, ultrasound abdomen, trans-rectal ultrasound of prostate and CT scan of the abdomen were done where indicated. The indication for cystostomy was justified on present and past history, clinical examination and relevant investigations. All patients were catheterized with aseptic technique either as a closed or open procedure⁴. Patients were observed for 24 hours for any complication of the procedure and were followed after 2 and 4 weeks of the procedure. At each visit, complications were noted and managed accordingly and urine samples were collected from the newly changed catheter at, 2nd and 4th weeks post suprapubic cystostomy. The sample were immediately transported to the laboratory for detailed urine analysis, culture and sensitivity. The detailed examination of urine was done considering the standard protocol.

For culture, urine was streaked with a calibrated wire loop on cystine leukocytes electrolyte deficient sugar media and incubated at 37°C for 24 hours. Growth was considered significant if 10⁵ or more bacteria were present per ml. The organisms were further tested for antibiotic sensitivity pattern using disc diffusion method.

All patients with history of trauma, those with extravasation of urine and those with failed per-urethral catheterization and bleeding while catheterization received prophylactic antibiotics for 7 days. Patients with symptomatic urinary tract infection at 15 days were treated according to culture and sensitivity for 7 days and recurrence of urinary tract infection was evaluated. Epi 6.0 was used for statistical analysis with the help of computer.

Results

One hundred consecutive patients were included in the study of whom 9 were excluded leaving 91 cases for final analysis. Of 91 patients, 74 (81.3%) had obstructive uropathy of lower urinary tract due to stricture urethra(66), enlarged prostate (5), urethral stenosis (2) or urethral carbuncle (1). All 74 patients presented with acute retention of urine and per-urethral catheterization failed in all. Seventeen cases (18.6%) had history of trauma to urethra and all had per-urethral bleeding on examination, while xray urethrogram showed grade II to grade III injury of urethra. Suprapubic cystostomy was performed in these cases.

Of 91 patients, per-cutaneous cystostomy was performed initially in 82 cases while 9 had exploratory laparotomy (open cystostomies). Of 82 patients with initial percutaneous cystostomy, 7(8.53%) had failure to percutaneous approach so procedure was converted to open while in 75 patients percutaneous procedure was successful. All patients with failure had history of previous abdominal surgery and due to fibrosis of the scar at the lower abdomen, trocar failed to penetrate the bladder.

Significant association between duration of catheterization and acquisition of bacteriuria was observed (Table 1).

Table 1. Frequency of urinary tract infection and duration of Cystostomy.

Duration		Positive culture	Negative culture
15 days	n=91	22	69
30 days	n=91	89	02
Chi-Square test showed p-value < 0.001			

Most of the patients were asymptomatic. After 15 days out of 22 patients with bacteriuria, 5 (22.7%) were symptomatic (p value<0.02). Of 89 bacteriuric patients 30 (33.7%) were symptomatic after 30 days of cystostomy (N.S.).

On day 15 and 30, 19.6% and 100% of the patients who did not receive antimicrobials had positive cultures as compared to 28.5% and 94.2% who did receive antibiotics (difference not significant) (Table 2).

Table 2. Positive cultures in relation to the antibiotics.

Antibiotics	15 days*		30 days**	
	Positive culture n=22	Negative culture n=69	Positive culture n=89	Negative culture n=2
Yes n=35	10 (28.5%)	25 (71.4%)	33 (94.2%)	2 (5.7%)
No n=56	11 (19.6%)	45 (80.3%)	56 (100%)	-

* Chi square Test p value 0.32

** Fisher exact test p value 0.1

E.Coli was the prevalent organism followed by Proteus at 15 and 30 days. On 15 days post-cystostomy only single species was grown, after 30 days of cystostomy 79 patients had colonies of single species while 10 had two species. (Table 3).

Table 3. Prevalent Urinary Pathogens.

Organisms	15 days n = 22	30 days n = 89
E.Coli	13 (59%)	38 (42.6%)
Proteus	2 (9%)	16 (17.9%)
Klebsiella	3 (13.6%)	7 (7.8%)
Pseudomonas	1 (4.5%)	5 (5.6%)
Enterobacter	1 (4.5%)	6 (6.7%)
Staphylococcus	-	4 (4.4%)
E. coli/Protelus	-	5 (5.6%)
E. coli/Pseudomonas	-	3 (3.3%)
Pseudomonas/Proteus	-	2 (2.2%)
Candida	2 (9%)	3 (3.3%)

Blockage of the catheter and macroscopic hematuria was the most common urological complications encountered (Table 4.).

Table 4. Complications of suprapubic cystostomies.

Complications n=91	Immediate within 24 hours n=91	Early 24 hours - 2 week n=91	Late >2 week n=91
Blockage (46)	2 (2.1%)	16 (17.5%)	28 (30.7%)
Macroscopic hematuria (46)	23 (25.2%)	9 (9.8%)	14 (15.3%)
Problem in placement (9)	9 (9.8%)	-	-
Replaced (7)	7 (7.6%)	-	-
Extravasation (7)	7 (7.6%)	-	-
Leakage around catheter (26)	-	8 (8.7%)	18 (19.7%)
Fracture of catheter on removal (2)	-	-	2 (2.1%)

None of the patients required transfusion or hospital stays for more than 24 hours due to hematuria. Of 9 patients who had problem in the placement of suprapubic catheter, 7 required open cystostomy that was successfully performed.

The overall antimicrobial sensitivity was significantly high with Amikacin (100% and 95.9%) followed by Fosfomycin (95.4% and 94.8%) and Gentamicin (86.3% and 84.6%) after 15 and 30 days respectively (Table 5).

Table 5. The pattern of antimicrobial sensitivity.

Drugs	After 15 days (n=22)		After 30 days (n=89)	
	Sensitive	Resistant	Sensitivity	Resistant
Ampicillin	4 (18.1%)	18 (81.8%)	16 (16.3%)	82 (83.6%)
Amoxicillin+	7 (31.8%)	15 (68.1%)	31 (31.6%)	67 (68.3%)
Clavulanic acid				
Ceftazidime	12 (54.5%)	10 (45.9%)	58 (59.1%)	40 (40.8%)
Ceftriaxone sodium	13 (59.0%)	9 (40.9%)	50 (51.0%)	48 (48.9%)
Fosfomycin	21 (95.4%)	1 (4.5%)	93 (94.8%)	5 (5.1%)
Gentamicin	19 (86.3%)	3 (13.6%)	83 (84.6%)	15 (15.3%)
Amikacin	22 (100%)	-	94 (95.9%)	4 (4.0%)
Septan	8 (36.3%)	14 (63.3%)	36 (36.7%)	62 (63.2%)
Pipemidic acid	6 (27.2%)	16 (72.7%)	34 (34.6%)	64 (65.3%)
Nalidixic acid	8 (36.3%)	14 (63.3%)	30 (30.6%)	60 (61.2%)
Norfloxacin	17 (77.2%)	5 (22.7%)	70 (71.4%)	28 (28.5%)
Ofloxacin	17 (77.2%)	5 (22.7%)	74 (75.5%)	24 (24.4%)
Ciprofloxacin	15 (68.1%)	7 (31.8%)	63 (64.2%)	35 (35.7%)

associated with an indwelling catheter⁵. The rate of urinary tract infection with suprapubic cystostomy is 52% (>30 days)⁶. McDiarmid⁶ reported 100% infection in suprapubic cystostomy. In the present study, the incidence of urinary tract infection after 15 and 30 days was 24.1% and 97.8% respectively. The present study confirms previous observation that most catheters related urinary tract infections are asymptomatic and bacteriuria is diagnostic of these infections⁷. In the present study, the prevalence of symptomatic urinary tract infection was 22.7% and 33.7% after 15 and 30 days respectively. It seems logical that the prophylactic use of antibiotics would curtail the incidence of catheter-related urinary tract infection, but this practice will only postpone the onset of bacteriuria and will not prevent it. In fact, the prophylactic use of antibiotics compounds the problem by leading to the emergence of antibiotic-resistant strains⁸⁻⁹.

Blockage of catheter and gross hematuria was observed in 36% and 5% patients respectively in a series reported by McDiarmid et al⁶ while 38% catheter blockage was reported by Barnes et al¹⁰. We found blockage of catheter and macroscopic haematuria in 50.5% patients. In the present study 7.6% cases had displaced catheter, requiring reinsertion while 15% was reported by Barnes¹⁰ and 23% by Horgan¹¹. Leakage around the catheter was observed in 28.5% patients in our series. While Sethia¹² found leakage in 9.4% patients. Among all the episodes of catheter associated unimicrobial and polymicrobial respectively after 30 days. The most commonly isolated pathogen was *E. coli*. Other organisms include Enterococci, *Pseudomonas*, *Klebsiella*, *Enterobacter*, *Staphylococcus epidermidis*, *Staphylococcus aureus* and *Serratia*,^{14,15}. In the present study, *E. coli* followed by *Proteus* and *Klebsiella* were the prevalent organisms.

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