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COMPARATIVE STUDY BETWEEN ANTIBIOTIC PROPHYLAXIS AND NO PROPHYLAXIS IN CYSTOUROTHROSCOPIC PROCEDURE

Surgery

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ABSTRACT

INTRODUCTION: Cystourethroscopic procedure is day care procedure for evaluation of lower urinary tract. Antibiotic prophylaxis is debatable in these procedures hence more and more study is needed with larger sample.

AIMS AND OBJECTIVES: Aim of our study is to compare the efficacy of single dose antibiotic prophylaxis v/s no prophylaxis in day care cystourethroscopic procedure for preventions of urinary tract infection in patients with sterile urine.

MATERIAL AND METHODS: Total of 247 patients of age ranging between 21 – 85 years with initial negative urine cultures were recruited for day care cystourethroscopy. All the patients underwent day care therapeutic or diagnostic cystourethroscopy. Patients were randomized into two groups: with prophylaxis and without prophylaxis. All the patients had underwent urine analysis for bacterial culture and sensitivity on 2nd and 20th post procedure day, some other parameters were also recorded like fever and dysuria.

RESULT: Out of the 247 patients underwent cystourethroscopy for various causes, only 7 patients had developed UTI. Out 10 patients having history of anti-tubercular treatment 2 patients having pyuria without bacteriuria in pre and post-cystourethroscopic urine analysis. 2 patients lost in first follow-up and 9 patients lost in second follow-up.

CONCLUSSION: From this study we can conclude that antibiotic prophylaxis doesn't play much role in prevention of UTI following cystourethroscopic day care procedure. Injudicious use of antibiotics may lead to development of resistance hence it should be cautiously used.

KEYWORDS

Cystourethroscope, Uti, Antibiotic Prophylaxis, Bacteriuria, Pyuria.

INTRODUCTION:

Recent trend of surgery is shifting from open operative towards endoscopic or minimally invasive surgery, which has multiple applications with varied outcomes comparable to open surgery. The goal of endoscopic or minimal invasive surgery is to decrease the morbidity associated with surgical procedures, minimize hospital stay, better cosmesis, and improved patient's quality of life. Endourology, which began with the development of cystoscopy, initially defined as "the closed and controlled manipulation within the urinary tract[1]". Day care diagnostic and therapeutic cystourethroscopy is becoming a popular procedure like in lower urinary tract evaluation, punched biopsy, follow-up case of urological cancer, foreign body retrieval, microscopic and macroscopic hematuria evaluation etc. Based on these indications, it is important to notice its risks to prevent future complications. Pain, hematuria, lower urinary tract symptoms and urinary tract infection (UTI) are the main adverse effects encountered following the procedure[2]. For prevention of UTI related symptoms following cystourethroscopy, antibiotic prophylaxis were routinely used[3] but there is no documented sufficient data available for it, whether antibiotic prophylaxis will reduce the post-operative infections or not. Earlier reports suggest strict routine antimicrobial prophylaxis but recent studies have favored no prophylaxis during these day care procedures. UTI is one of the most common nosocomial infection[4]. UTI most commonly caused by gram negative organism. Hence antibiotic prophylaxis usually given should cover gram negative organism. Previously and recently there were a lot of discussion over antibiotic prophylaxis but no conclusive uninimous results have been put forwarded for surgeons to follow. In current clinical practice some urologist prefer to use antimicrobial agents for prophylaxis. Moreover, unnecessary extensive utilization of prophylactic antibiotic may provide the emergence of antibiotic resistant organism. Hence it must be further studied to whether antibiotic prophylaxis is necessary or not[5].

The aim of our study is to compare the efficacy of single dose antibiotic prophylaxis against no prophylaxis in day care cystourethroscopic procedure for prevention of UTI.

MATERIALS AND METHODS

A prospective randomized trial was designed to assess all the patients who underwent day care diagnostic and therapeutic cystourethroscopy in Department of Urology PMCH Patna between June 2016 to December 2017. Total of 247 patients of age ranging between 21 – 85 years had been chosen for the study. Simple statistics is used for calculating the data. Out of these total patients only 36% (89/247) were females and 64% (158/247) were males. Pre-procedure urine culture and sensitivity (C/S) was done in all these patients. Those who has negative C/S reports are included in study but those who have positive C/S report or taken antibiotic 1 month prior to this procedure have been excluded from study. Ethical clearance was taken for this study from ethical committee PMCH Patna. All the patients have been prior informed about the study, its purpose, advantages, disadvantages, potential complications particularly UTI and most devastating complication like sepsis. Written consent was taken from all patients or their attendant. Patients were randomly classified into two groups one is without prophylaxis and another one was with prophylaxis. Prophylaxis of injection ceftriaxone (1gm intravenously) given on table prior to procedure, keeping in mind that ceftriaxone is effective against UTI casing gram negative bacteria. 31% (76/247) patients underwent double-J stent removal, 50% (124/247) patients underwent diagnostic cystourethroscopy, in 9% (22/247) punched biopsy were taken and rest in 10% (25/247) cystolithotomy was done. All these patients were subdivided into two groups (with and without prophylaxis) equally. Post-cystourethroscopy all patients were discharged on same day and followed 2nd post procedure day mainly for appearance of any other symptoms like dysuria, fever and for C/S of urine. Taking all the antiseptic measure best possible urine sample were collected and sent for urine analysis. Sample analysed for any microbial growth, its antimicrobial sensitivity and leucocytes.A growth of $>10^5$ colony forming unit per-high power field was regarded as significant bacteriuria. Microscopic analysis for urinary sediments was utilized to determine pyuria as over 5 leukocytes identified under high power magnifications. 2nd and last follow up were on 20th post procedure day and same procedure for urine analysis was being followed.

Rigid cystourethroscope of 21fr is being used. Patients positioned in lithotomy, perineal area and external genitalia is swabbed with povidone-iodine solution. For male 2% lignocaine ointment is used as local anesthetic agent but in female no local anesthetic agent is required. In cystourethroscopic procedure fluid with 1.5% glycine is used for bladder irrigation. For sterilization of instruments 2% glutaraldehyde is used at least for 30 minutes.

RESULTS: Demographic characteristics of all 247 have been summarized in table 1. No statistical difference regarding age and gender between these groups. Various Indications of cystourethroscopy and number of patients underwent these procedures are also described in table 1. These two groups were similar with regard to the distribution of cystourethroscopic indications. Out of the 247 patients undergone cystoscopy for various causes only 7 patients had developed UTI. 4 patients were in the group of without prophylaxis and 3 were in with prophylaxis group. In prophylaxis group 3 were female and in without prophylaxis group 2 were female. In both the groups each, only 1 were male.

TABLE 1: showing different urethrocystoscopic procedure

S/N	Name Of Procedures	Without Prophylaxis	With Prophylaxis
1	Double-J stent removal	38	38
2	Bladder stone	13	12
2	Diagnostic cystourethroscopy	62	62
3	Punched biopsy	11	11
4	Total	124	123

Out 10 patients having history of anti-tubercular treatment 2 patients have pyuria without bacteriuria in pre and post-cystourethroscopic urine analysis. 2 patients lost follow-up in 2nd post-procedure day and total of 9 patients lost follow-up in 20th post-procedure day follow-up. From this study we can conclude that antibiotic prophylaxis doesn't play much role in prevention of UTI. Hence inadvertent use of antibiotics may lead to emergence of antibiotic resistance.

DISCUSSION

Cystourethroscopy is minimal invasive procedure to investigate pathology of urethra, bladder and related structures hence it is called as cystourethroscopy. Max Nitze in 1879 pioneered the first modern endoscope for cystoscopy. Nitze published the first photographic atlas of the pathology of bladder in 1893. It's a day care procedure don't need sophisticated anesthesia except local application of lignocain.

Cystourethroscope may be rigid or flexible[6] types, we have used only rigid cystoscope of size 21 fr. for all patients. Cystoscopy may be recommended in various conditions such as[7]:

- Lower UTI
- Microscopic or macroscopic hematuria
- Incontinent or overactive bladder
- If any unusual cells found in urine microscopic examinations
- Evaluation of uretrovaginal fistula (UVF), vesicovaginal fistula (VVF)
- Dysurea, chronic pelvic pain, interstitial cystitis
- Urinary flow obstruction due to prostatic enlargement or stricture urethra
- Bladder calculi
- Evaluation of unusual growth, polyp or bladder cancer.
- Evaluation of congenital anomaly in paediatric population like posterior urethral valve
- Retrograde pyelography for upper urinary tract evaluation
- Various therapeutic indications like
    - Treatment for stricture urethra
    - Bladder neck procedure
    - Intravesical procedures like: treatment of bladder stone, bladder ulcer, bladder tumor, foreign body retrieval, ureteral catheterization and botulinum toxin injections
    - Reflux treatment in paediatric populations like posterior urethral valve

There are some contraindications of cystoscopy like: febrile patient with UTI and patient with coagulopathy.

It is an invasive procedure hence may lead to injury to urethra, bladder and associated structures. Because we are dealing with lower urinary tract hence it is always prone to get injured and infected. In post-cystoscopic procedure patients may complain of burning micturition or blood at meatus. These complications are mainly seen with rigid cystoscope[8]. Some feel lower abdominal pain. Common non-therapeutic procedure to relieve the symptoms are, they are instructed to drink at least 1 liter of water within 2 hours, taking warm bath to relieve these symptoms, suprapubic hot sponging. Same instrument being used in different patients, this may also increases the chance of infections. Previous studies show there is no differences in complication rate whether we are using rigid or flexible cystourethroscop.

UTI[9] is diagnosed as a single symptom (fever, frequency, urgency, dysuria, nocturia, microscopic hematuria, suprapubic tenderness) with a culture of $> 10^5$ colony forming unit per high-power field, or two symptoms along with positive urine-analysis. In a dysuric patients threshold value for defining significant bacteriuria is 10^2 cfu/ml. UTI is most common nosocomial infection generally occur after urethral catheterization or any types of internal urethral manipulation. UTI can occur in male female both but propencity of occurance in female is far more than male because of their anatomy and reproductive physiology because of increase adherence of pathogenic bacteria to vaginal epithelial cells. In our study also out of the 7 patients with UTI 5 were female.

Most common organism isolated from urine in UTI is E. Coli, then staphylococcus species. In addition to this some other pathogens like klebsiella, pseudomonas, proteus and enterococcus species plays a minor role in conferring the infections. Staphylococcus saprophyticus is now recognized as causing 10% of symptomatic lower UTIs in young sexually active female, whereas it rarely cause infection in males and elderly individuals. In our study all the 7 patients develop UTI were due to E.Coli. A variety of parameter added to causation and progression of UTI like age, parity, pregnancy, DM and associated disease. Prevalence of bacteriuria in pregnant female is about 4-7% but prevalence of pyelonephritis in these women range from 1-4%. Increase in propensity of UTI in pregnant female in addition to anatomy and physiology there is decreased peristalsis of collecting system, hydroureter due to muscle relaxing effect of increased progesterone and to mechanical obstruction of ureter. Pregnant women with asymptomatic bacteriuria are at higher risk of developing symptomatic UTI that results in adverse fetal sequelae, complication associated with bacteriuria during pregnancy and pyelonephritis and its possible sequelae, such as sepsis in the mother. Therefore all pregnant women with asymptomatic bacteriuria should be treated.

Most inhibitory factors for UTI is osmolality of urine, urea and organic acid concentration and low PH of urine.

Bateriuria without pyuria is indicative of bacterial colonization but pyuria without bacyeriuria is indicative of TB, stone or cancer.

Extrapulmonary TB accouts for 10% of TB cases, genitourinary TB[10] accounts for about 30-40% all extrapulmonary TB. It is unlikely in children lesser than 5 years. Kidney is primary site of hematogenous spread of TB, renal cortex is favoured site. Bladder lesion is secondary to renal TB and earliest effected site is uretral orifice.

Most accurate assessment status of bladder urine is suprapubic aspiration of bladder urine. In female patient catheterization should be performed and mid catheterized urine sample should be collected, but in male catheterization is not necessary only midstream urine sample should be taken. Validation of midstream urine sample can be questioned if numerous squamous epithelial is present.

Prophylaxis is recommended for both high and moderate risk patient[11]. High risk patient include individual with prosthetic heart valve, previous bacterial endocarditis, cyanotic congenital heart disease and symptomatic pulmonary shunt or conduits. Moderate risk patient include other congenital malformation (excluding isolated secondum ASD, surgically repaired ASD, VSD, PDA), acquired valvular dysfunctions, hypertrophic cardiomyopathy, mitral valve prolapse with valvular regurgation and/or thickened leaflets.

Treatment of UTI depends upon culture sensitivity report of urine. Fluoroquinolones have broad spectrum activity this makes them ideal for empirical treatment of UTIs. Aminopenicillins and cephalosporins are considered safe and generally effective throughout the pregnancy.

CONCLUSION:

There is no significant difference between these two groups regarding complication following cystourethroscopic procedure specially UTIs. Injudicious use of antibiotics may lead to development of resistance hence it should be cautiously used. It will be beneficial with regard to emergence of antibiotic resistance and cost effectiveness. Prophylaxis may be given in selected patient specially in different cardiac pathology. This is a debatable subject hence much more study should be needed specially with larger sample.

Abbreviation :

UTI: Urinary Tract Infection, C/S: Culture and Sensitivity, DM: Diabetes Mellitus, TB: Tuberculosis, ASD: Atrial Septal Defect, VSD: Ventral Septal Defect, PDA: Patent Ductus Arteriosus.

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