

JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH

How to cite this article:

SHOBHA K.L,RAMACHANDRA L ,RAO S.P.COMPARISON OF POVODINE-IODINE VERSUS SAVLON FOR PRE-CATHETERIZATION CLEANSING AND THE ASSOCIATION OF BACTERIURIA WITH ITS ANTIBIOTIC SUSCEPTIBILITY IN CATHETERISED PATIENTS OF SURGICAL WARD. Journal of Clinical and Diagnostic Research [serial online] 2008 August [cited: 2008 August 14]; 2: 991-996.

Available from

http://www.jcdr.net/back_issues.asp?issn=0973-709x&year=2008&month=August &volume=2&issue=3&page=991-996 &id=218

ORIGINAL ARTICLE

Comparison Of Povodine-Iodine Versus Savlon For Pre-Catheterization Cleansing And The Association Of Bacteriuria With Its Antibiotic Susceptibility In Catheterised Patients Of The Surgical Ward

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ABSTRACT

Background: Urinary tract infection is one of the most common nosocomial infections, and urinary catheterization is the most frequent predisposing factor. Nosocomial infections associated with urinary catheters may increase the mortality rate upto three times. These infections also pose a considerable financial burden. Different methods for urinary tract infection prophylaxis have been proposed for patients who undergo continuous catheterization. This study compared the disinfection of the genital area with Povodine -Iodine or Savlon (Chlorhexidine and Cetrimide) before inserting the Foley's catheter with respect to the quantitative results of the urine culture and sensitivity to commonly used antibiotics.

Methods: Hundred inpatients who underwent clean continuous catheterization with the Foley's catheter post operatively in the surgical ward, were divided into groups 'A' and 'B'. Group 'A' and group 'B' consisted of 50 patients each. Group 'A' patients were directed to use povodine -iodine as a disinfectant for pre-catheterization cleansing, and group 'B' was directed to use savlon. The control group included 50 post operative patients, those who were not on urinary catheters. The urine sample was collected shortly after the catheter was inserted, and the samples with no growth on the culture plate were only included in the study. Patients with a previous history of urinary tract infection or with growth on the culture plates collected from urine immediately after catheterization, and patients with congenital urinary tract anomaly, were excluded from the study. Catheter samples were collected using a sterile needle and syringe. Urine samples collected on the third and fifth day of catheterization were processed and considered to be culture positives if the count was $>10^4$ organisms per milliliter of urine. Midstream urine samples were collected from the postoperative patients without urinary catheters. Organisms were identified by conventional biochemical methods, and susceptibility to antimicrobial agents was tested by the Kirby-Bauer standardized disc-diffusion technique.

Results: 14% patients in group A and 16% in group B developed bacteriuria and candiduria by the end of the 5th day of catheterization. Females had higher rate of bacteriuria than males, following three days and five days of catheterization in both the groups (Group A female: male bacteriuria ratio on third day was 2(8%):1(4%) and on fifth day 4(16%): 3(12%). Group B female: male bacteriuria ratio on third day and fifth day were 2(7.62%):1(4.16%) and 5(19.23%):3(6.25%). None from group A and one from group B presented with symptoms. .Klebsiella species was the commonest organism isolated, followed by candida species and E.coli. Our study showed no significant difference between disinfecting with Povodine -Iodine or Savlon in the pre-catheterization cleansing procedure and the occurrence of bacteriuria..Microorganisms were sensitive to cephalosporins and amikacin, and were resistant to commonly used

antibiotics like Trimethoprim-sulfamethoxazole, ampicillin and gentamicin. None of the controls had any bacteriuria.

Interpretation: Performing catheterization by a proper aseptic procedure using available disinfectants should be thought as a preventive measure, and use of appropriate antimicrobial drug therapy with developing drug resistance should also be considered during treatment.

KEY MESSAGE

1. Povodine -Iodine or Savlon in pre-catheterization cleansing and the prevention of bacteriuria.
2. Females had higher rate of bacteriuria than males
3. Klebsiella species was the commonest organism isolated from both groups
4. Microorganisms were sensitive to cephalosporins and amikacin.

Key Words: Bacteriuria, urinary catheters, surgical ward

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Introduction

Urinary tract infection (UTI) is one of the most common nosocomial infections[1][2], and urinary catheterization is the most frequent predisposing factor[3] in eighty percent[1] of patients. In another study, all of the nosocomial urinary tract infections were associated with the (Foley's) catheter. There is also a strong prevalence of UTI in catheterized females[5]. In spite of a change from open to closed drainage systems, more than 30% of catheterized patients develop UTI[[2],[3],[4],[5],[6] but many remain asymptomatic[7]. Nosocomial infections associated with urinary catheter may increase the mortality rate upto three times[7]. These infections also pose a considerable financial burden[8]. In the current study, comparison of Povodine-Iodine versus Savlon for pre-catheterization cleansing and the association of bacteriuria with duration of catheterization were analysed. Causative organisms and their antibiograms for catheter associated bacteriuria in a surgical

ward at Kasturba Medical College Hospital, Manipal, were studied.

Materials and Methods

Hundred inpatients in the age group of 19 years to 60 years, admitted to the surgical ward at Kasturba Medical College hospital, Manipal, were included in the study. A prospective study was conducted in the period from November 2005 to July 2006. The study group was divided into group 'A' and 'B'. Consent was taken from the patients before the procedure, and the patients were divided into two groups. The first male patient was included in group 'A' and the second male patient was included in group 'B'. Similarly, the first female patient was included in Group 'A' and the second female patient was included in Group 'B'. No other criteria was considered in the division of groups. Our study did not include any blinding methods. Exclusion criteria in our study included patients with a history of urinary tract abnormalities, and patients with a history of previous urinary tract infection and the first urine sample collected immediately after catheterization showing significant bacteriuria. Group 'A' consisted of 50 patients with 25 females and 25 males,

and group 'B' consisted of 50 patients with 24 females and 26 males. 50 patients with 25 females and 25 males in the age group of 18 to 60 years who underwent surgery, but were not on urinary catheters postoperatively, were the controls. Group 'A' Patients were directed to use Povodine –Iodine IP5% W/V (Available iodine 0.5% W/V) (Wockhardt limited ,Aurangabad , India), and group 'B' was directed to use Savlon 1% (Chlorhexidine IP 0.75% and cetrimide IP 0.15%, Isopropile alcohol IP 0.04% , purified water QS) (Kasturba medical college pharmacy,Manipal,India) for pre-catheterization cleansing. Male patients were injected 2ml of 2% lidocaine jelly into the urethral meatus before inserting the Foley's catheter, and for female patients, the Foley's catheter was lubricated with lidocaine jelly before inserting the catheter. Urine cultures and urine analysis were carried out immediately after catheterization on the third day and fifth day of insertion of the catheter, with a total of 3 samples from each patient. Catheter samples were collected by using a sterile needle and syringe, and the urine was processed and considered culture positive if the count was $>10^4$ organisms per milliliter of urine .Urine samples were refrigerated immediately after collection, and were kept for no longer than an hour before being plated with a calibrated loop onto blood agar, CLED medium and MacConkey's agar. The plates were incubated at 37⁰ C aerobically, and were read after 24 hours of incubation. The presence or absence of bacteria or fungus, the number of colonies, and the isolated types were identified according to the conventional biochemical methods described by Weaver and colleagues[9]. Susceptibility to antimicrobial agents

were tested by the Kirby-Bauer standardized disc–diffusion technique[10] · Mueller-Hinton agar (Hi-Media,Mumbai ,India) was used for the inoculation of readymade antibiotic discs(Span Diagnostics,Surat,India) .The density of the organisms was adjusted to approximately 10^8 colony –forming units by comparing its turbidity with that of 0.5 Mc Farland opacity standard. Control strain E.coli ATTC 25922 was used in the antibiotic discs quality control. Zones of complete growth inhibition around each of the discs were carefully measured. The interpretation of zone size into susceptible or resistant was based on the Kirby- Bauer interpretation chart. The inclusion criteria were that patients with their urine samples collected and inoculated into culture plates shortly after the catheter insertion, and those showing no growth on the culture plates, were only included in the study. Patients with a previous history of urinary tract infection, those with growth on the culture plates after they were inoculated with urine collected immediately after catheterization, and patients with a history of urinary tract abnormality, were excluded from the study.

Results

A prospective study of hundred inpatients divided into groups 'A' and 'B', with 50 patients in each group, were included. Females had higher rate of bacteriuria than males, following three days and five days of catheterization in both the groups. None from group A and one from group B presented with symptoms. Females had higher rate of bacteriuria than males following three days and five days of catheterization in both the groups. [Table/Fig 1] The most common

organism isolated was Klebsiella species in both males and females, followed by Candida species, E.coli and other organisms (3 strains, each organism had only one strain each and it was grouped as others) (Pseudomonas species 1, Citrobacter species 1, Coagulase negative staphylococcus species 1 strain).[Table/Fig 1]

[Table/Fig 1] Duration and number of cases of bacteriuria in males and females

Group A	No of bacteriuria cases and organism on 3 rd day	No of bacteriuria cases and organism on 5 th day	Group B	No of bacteriuria cases and organism on 3 rd day	No of bacteriuria cases and organism on 5 th day
Total no of Females(25)	Klebsiella:1 E.coli :1 Candida :1 2 (8%)	Klebsiella:2 E.coli :1 Candida :1 4 (16%)	Total no of females(26)	E.coli :1 Coagulse negative staphylococcus species:1 2 (7.62%)	E.coli :1 Coagulse negative staphylococcus species:1 Klebsiella:1 Candida :1 Pseudomonas:1 5 (19.23%)
Total no of males (25)	E.coli 1 1(4%)	Klebsiella:1 E.coli 1 Candida 1 3(12%)	Total no of males (25)	Klebsiella 1 1(4.16%)	Klebsiella 1 Candida 1 Citrobacter species 1 3(6.25%)

Mid stream urine collected from the control group, when processed, did not grow any organisms on the culture plates. Organisms isolated were sensitive to cefotaxime and amikacin. Most of the strains were resistant to ampicillin, and Trimethoprim-sulfamethoxazole [Table/Fig 2]

[Table/Fig 2] Organism and sensitivity pattern

Organism	Klebsiella species Sensitivity %	Escherichia coli Sensitivity %	Others(Pseudomonas, Citrobacter, Coagulase negative staphylococcus species) sensitivity %
Gentamicin (10µg)	3 (60)	2 (66.6)	2 (66.6)
Ampicillin (10 µg)	0	0	1 (33.3)
Trimethoprim-sulfamethoxazole (TMP/SMX)(1.25/23.75 µg)	2 (40)	1 (33.3)	1 (33.3)
Piperacillin (100µg)	4 (80)	2 (66.6)	2 (66.6)
Amikacin (30µg)	5 (100)	3 (100)	3 (100)
Cefotaxime (30µg)	5 (100)	3 (100)	3 (100)
Oxacillin (1µg)	Not done	Not done	1 (100)
Vancomycin (30µg)	Not done	Not done	1 (100)
Total strains	5 (100)	3 (100)	3 (100)

Discussion

Our finding showed that 14% of patients in group A using povodine –iodine, and 16% in group B using Savlon as disinfectant for pre-catheterization cleansing, developed bacteriuria. The number of cases of bacteriuria increased with the longer duration of catheterization. This study was in concordance with the study conducted by Kunin CM and Stamm WE et al [11][12]. The study conducted by Stamm WE et al, Coropeti EA et al, Shoefr AJ et al and Hilton P et al, showed that more than 30% of patients developed catheter associated bacteriuria [2],[3],[4],[5],[6]. A study conducted by Garibaldi et al showed that risk of bacteriuria increased by 5% for each additional day the catheter is in situ [11]. Our study showed an overall 15% bacteriuria which was in concordance with the study conducted by Raz R et al [12], who had 12.3% patients having bacteriuria in the surgical ward. There was correlation between duration of catheterization and occurrence of bacteriuria (P<0.05). 14% patients in group A and 16% in group B had developed bacteriuria and candiduria by the end of the 5th day. None from group A and one from group B presented with symptoms. Platt R et al [7] and Paul A et al [13] in their study, found that more than 90% of the infected patients were asymptomatic. Our study also had the same findings. Out of 15 patients with bacteriuria, only one presented with symptoms. Group A on the third day, had 2 females and one male with bacteriuria, and on the fifth day, 4 females and 3 males presented with bacteriuria (Female: Male bacteriuria, 4:3). Group B on the third day had 2 females and 1 male with bacteriuria, and on the 5th day, 5 females and 3 males presented with bacteriuria (

Female:Male bacteriuria ,5:3). Females were more prone to develop bacteriuria than males. This study was in concordance with the study conducted by Hussain et al [14] and Jespen OB et al [5]. Klebsiella species was the commonest organism isolated, followed by candida species and E.coli. Our study showed no significant difference between disinfecting with Povodine – Iodine or Savlon in pre-catheterization cleansing in preventing bacteriuria, probably because the number of cases of bacteriuria were very few. Microorganisms were sensitive to cephalosporins and amikacin, and resistant to commonly used antibiotics like Trimethoprim-sulfamethoxazole (TMP/SMX), ampicillin and gentamicin.

Conclusion

The results of this study showed no significant difference between the two disinfectants when compared, Povodine –Iodine or Savlon in pre-catheterization cleansing and the prevention of bacteriuria. Performing catheterization with proper aseptic procedure, using available disinfectants, should be thought as the preventive measure, and use of appropriate antimicrobial drug therapy with developing drug resistance should also be considered during treatment

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