

Intravesical Povidone Iodine Instillation in Patients on Long Term Urinary Catheters- A Comparative Study In A Tertiary Care Hospital

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Abstract

Introduction: Urinary tract infection (UTI) is one of the common hospital-acquired infections and there is increasing interest developing in this area because of external forces, such as mandatory public reporting of nosocomial infections and “zero tolerance” to hospital-acquired infections. Most of the literature concerning the use of antimicrobial catheters for prevention of CAUTI is limited by improper study methods or by a failure to understand the difference between CAUTI and ASB. In our institution we investigated the possibility of reducing CAUTI by instillation of povidone iodine in to the bladder before routine catheter change in long term catheterized patients.

Objectives of the study:

To evaluate the efficacy of instillation of Betadine into the bladder to reduce the incidence of catheter associated urinary tract infection in patients on long term catheterisation.

Materials & methods:

Our study included 100 patients, who are all catheterized for prolonged durations (more than 30 days) and developed symptomatic bacteriuria. It includes both suprapubic and urethral catheterised patients. Urine culture and sensitivity was done in all these patients. Specimen was collected from the catheter by aspiration with syringe. Urine was cultured by inoculating the specimen onto Blood agar, MacConkey agar, CLED medium. They are randomized in to two groups. One group of patients will undergo routine catheter change with antibiotics alone for 1-2 weeks. In the other group of patients, before catheter removal about 50ml of 2% povidone iodine was instilled, and after 10 minutes was allowed to drain through the catheter.

Results:

A total of 100 patients with CAUTI were selected for study, 50 in each group, from February 2015 to February 2016. 3 patients lost to follow up and 2 patients underwent surgery in first group. In second group 3 patients lost to follow up and 1 patient underwent surgery. In both two groups most common organism isolated is E.coli, it accounts for 62.5% in first and 66% in second group. 40 out of 46 (83.3%) patients in routine catheter change group and 38 out of 45 (76%) patients in betadine instillation group developed atleast one episode of CAUTI during one year follow up period. 15 out of 46 (31.3%) in routine catheter change group and 19 of 45 (38%) patients in betadine group developed one episode of CAUT, compared to multiple recurrences which is common in first group who were not given Betadine

Conclusions:

Although various techniques to reduce the incidence of CAUTI are under trial, the gold standard for prevention of CAUTI are -following sterile aseptic technique during catheterisation, avoiding unnecessary catheterisation, removing catheter as soon as possible after development of infection and maintaining closed catheter drainage system.

Keywords: CAUTI, Catheter Associated Urinary Tract Infections, Povidone Iodine

I. Introduction

Urinary tract infection (UTI) is one of the common hospital-acquired infections, and is mostly associated with indwelling urinary catheters (1),(2). In the past Catheter-associated urinary tract infection (CAUTI) had been mostly neglected in clinical research (3). However, there is increasing interest developing in this area because of external forces, such as mandatory public reporting of nosocomial infections and “zero tolerance” to hospital-acquired infections (4), (5), (6). In patient with an indwelling catheter, development of bacteriuria is common and the risk is approximately 10% per day of catheterization. The important risk factors for catheter-associated bacteriuria are duration of catheterization, female gender, absence of systemic antimicrobial agents, and catheter-care violations (7). Most of the catheter associated bacteriuria is asymptomatic (8). Only 10% to 30% of Patients who are in short-term catheter placement, will develop typical

symptoms of acute infection. Similarly, though patients with long-term catheters are bacteriuric, febrile episodes occur at a rate of only 1 per 100 days of catheterization. Most of the untreated catheter infections not only cause discomfort to the patient but also are a recognised cause of bacteraemia. In patients with long-term catheterization of more than 30 days, the bacteriuria is usually polymicrobial. The bacterial populations in these patients tend to be dynamic. Most of the literature concerning the use of antimicrobial catheters for prevention of CAUTI is limited by improper study methods or by a failure to understand the difference between CAUTI and ASB (9). In our institution we investigated the possibility of reducing CAUTI by instillation of povidone iodine in to the bladder before routine catheter change in long term catheterized patients.

II. Aims And Objectives

To evaluate the efficacy of instillation of Betadine into the bladder to reduce the incidence of catheter associated urinary tract infection in patients on long term catheterisation.

III. Methodology:

Type of study : Prospective study
Duration of study : February 2015 to February 2016
Sample size : 100
Setting : Department of Urology, Govt. Stanley Medical College Hospital, Chennai.

Inclusion Criteria:

All catheterized symptomatic patients with significant bacteriuria.

Exclusion criteria:

- Asymptomatic and Culture negative patients
- Asymptomatic bacteriuria
- Recently catheterized patients (less than 4 weeks)
- Female patients
- All patients who did not follow up.
- All patients who refused to give consent.
- Immuno-compromised patients

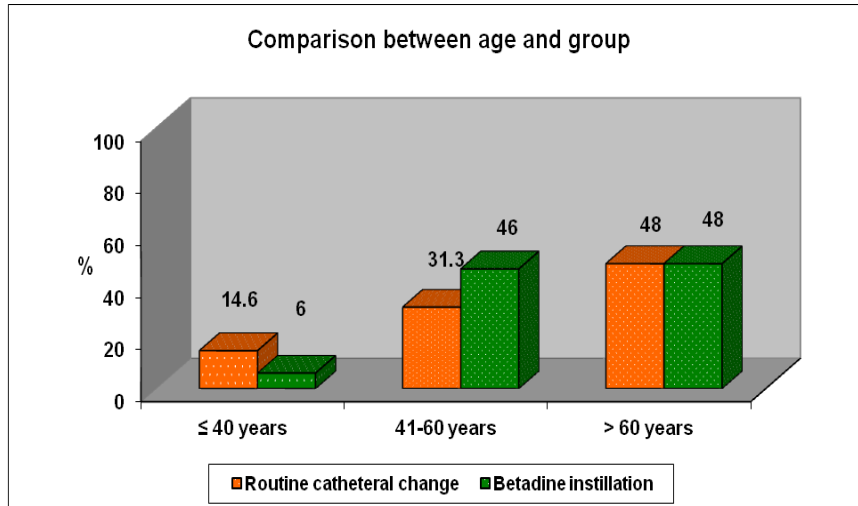
Procedure

Our study included 100 patients, who are all catheterized for prolonged durations (more than 30 days) and developed symptomatic bacteriuria. It includes both suprapubic and urethral catheterised patients. Urine culture and sensitivity was done in all these patients. Specimen was collected from the catheter by aspiration with syringe. Urine was cultured by inoculating the specimen onto Blood agar, MacConkey agar, CLED medium. They are randomized in to two groups. One group of patients will undergo routine catheter change with antibiotics alone for 1-2 weeks. In the other group of patients, before catheter removal about 50ml of 2% povidone iodine was instilled, and after 10 minutes was allowed to drain through the catheter. Catheter was changed under standard sterile aseptic precautions and antibiotics given for 1-2 weeks. We usually do catheter change once in every 3 weeks. All patients are followed up regularly, and those who present with UTI, a repeat urine culture and sensitivity was done and appropriate antibiotics are given. Careful attention was given to look for development of any adverse reaction to betadine. We performed statistical analysis of the data obtained using the Fisher exact and Pearson chi-square test to determine associations among the three groups. Sensitivity, Specificity, Positive predictive value (PPV), Negative predictive value (NPV) of the three methods were calculated. A literature search was made in PUBMED for comparison of results and information.

IV. Results

A total of 100 patients with CAUTI were selected for study, 50 in each group, from February 2015 to February 2016. 3 patients lost to follow up and 2 patients underwent surgery in first group. In second group 3 patients lost to follow up and 1 patient underwent surgery. Distribution of age group listed in fig-1.

Fig-1



In both two groups most common organism isolated is E.coli, it accounts for 62.5% in first and 66% in second group.

E.coli(table1)

Crosstab

			Group		Total
			Routine Catheteral Change	Betadine Instillation	
E-coli	Present	Count	30	33	63
		% within Group	62.5%	66.0%	64.3%
	Absent	Count	18	17	35
		% within Group	37.5%	34.0%	35.7%
Total		Count	48	50	98
		% within Group	100.0%	100.0%	100.0%

Protease (table 2)

Crosstab

			Group		Total
			Routine Catheteral Change	Betadine Instillation	
Protease	Present	Count	21	18	39
		% within Group	43.8%	36.0%	39.8%
	Absent	Count	27	32	59
		% within Group	56.3%	64.0%	60.2%
Total		Count	48	50	98
		% within Group	100.0%	100.0%	100.0%

Pseudomonas(table 3)

Crosstab

			Group		Total
			Routine Catheteral Change	Betadine Instillation	
Pseudomonas	Present	Count	5	7	12
		% within Group	10.4%	14.0%	12.2%
	Absent	Count	43	43	86
		% within Group	89.6%	86.0%	87.8%
Total		Count	48	50	98
		% within Group	100.0%	100.0%	100.0%

Enterococci(table 4)

Crosstab

			Group		Total
			Routine Catheteral Change	Betadine Instillation	
Enterococci	Present	Count	8	8	16
		% within Group	16.7%	16.0%	16.3%
	Absent	Count	40	42	82
		% within Group	83.3%	84.0%	83.7%
Total		Count	48	50	98
		% within Group	100.0%	100.0%	100.0%

Mixed growth (table 5)

Crosstab

			Group		Total
			Routine Catheteral Change	Betadine Instillation	
Mixed growth	Present	Count	4	3	7
		% within Group	8.3%	6.0%	7.1%
	Absent	Count	44	47	91
		% within Group	91.7%	94.0%	92.9%
Total		Count	48	50	98
		% within Group	100.0%	100.0%	100.0%

Fig -2

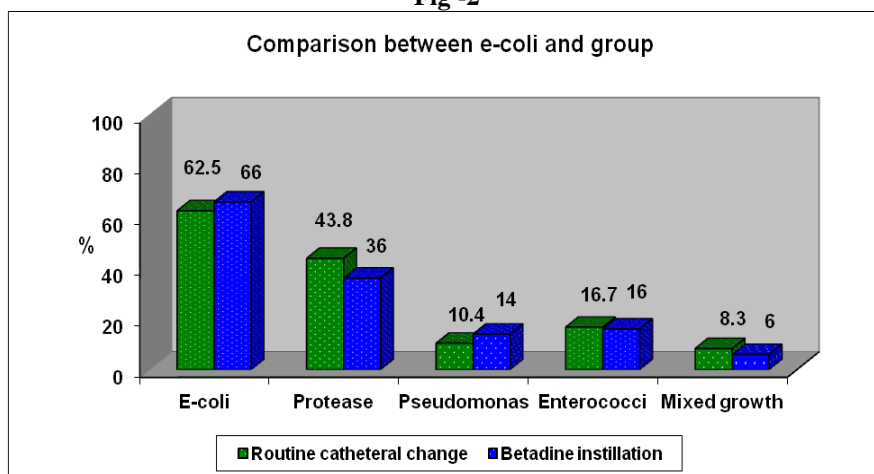


Table-6

Recurrence * Group Crosstabulation

			Group		Total
			Routine Catheteral Change	Betadine Instillation	
Recurrence	Zero	Count	8	12	20
		% within Group	16.7%	24.0%	20.4%
	One time	Count	15	19	34
		% within Group	31.3%	38.0%	34.7%
	Two times	Count	20	13	33
		% within Group	41.7%	26.0%	33.7%
	Three times	Count	3	5	8
		% within Group	6.3%	10.0%	8.2%
	Four times	Count	2	1	3
		% within Group	4.2%	2.0%	3.1%
Total		Count	48	50	98
		% within Group	100.0%	100.0%	100.0%

Fig-3

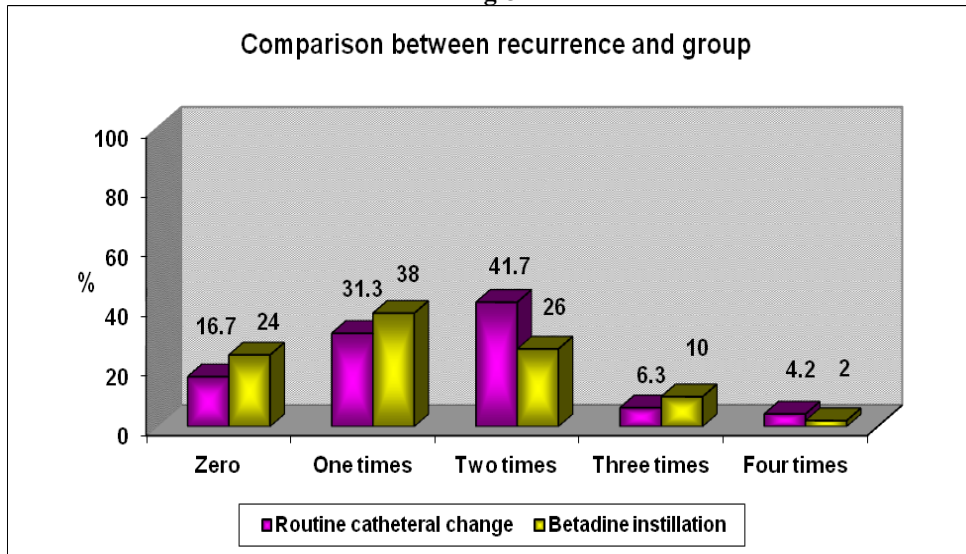


Fig-4

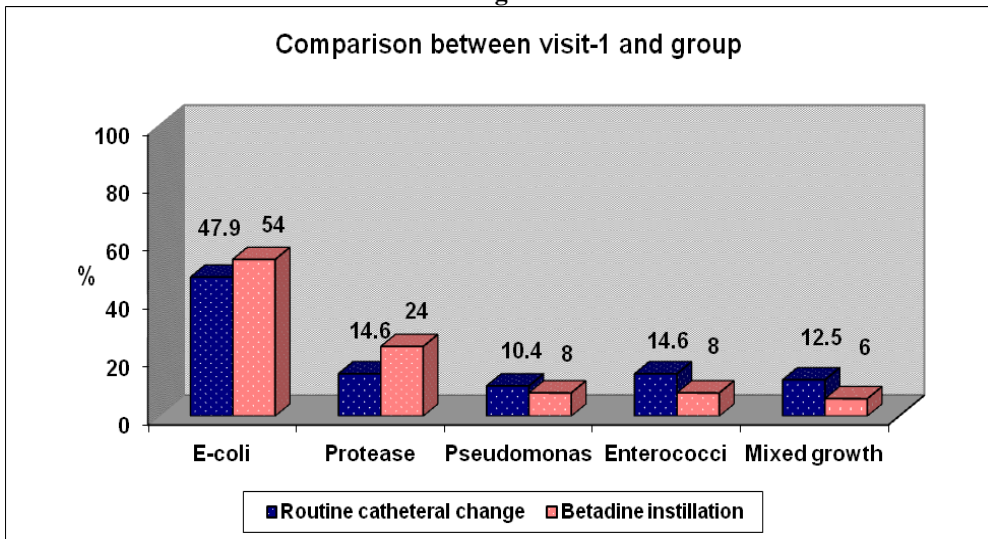


Fig-5

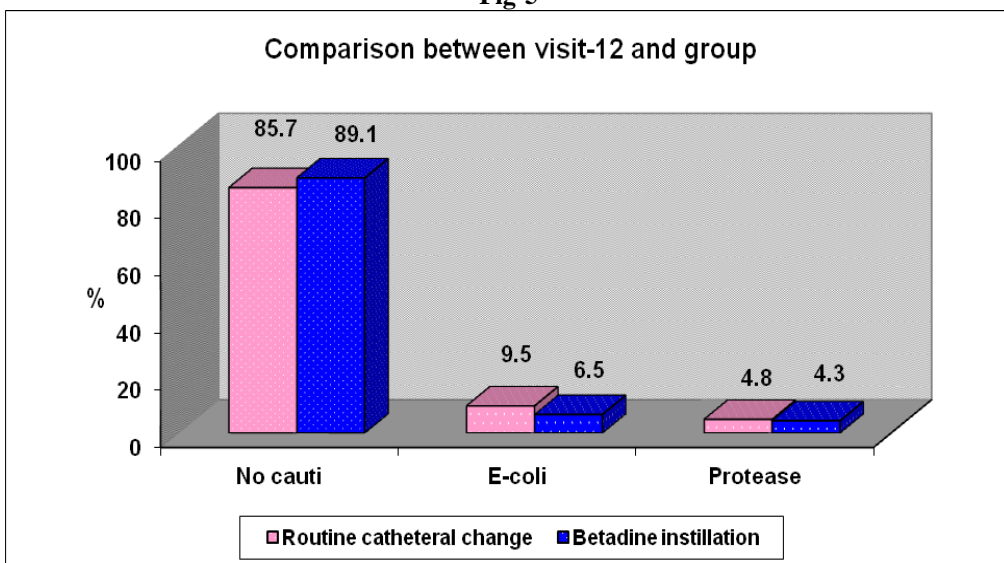
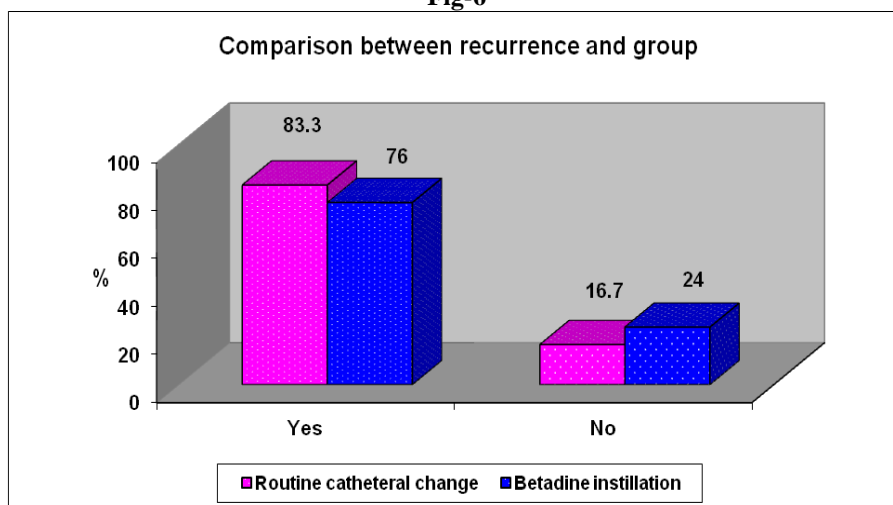


Table-7

Recurrence * Group Crosstabulation

			Group		Total
			Routine Catheteral Change	Betadine Instillation	
Recurrence	Yes	Count	40	38	78
		% within Group	83.3%	76.0%	79.6%
	No	Count	8	12	20
		% within Group	16.7%	24.0%	20.4%
Total		Count	48	50	98
		% within Group	100.0%	100.0%	100.0%

Fig-6



V. Discussion

Catheter associated urinary tract infection is the most common hospital-acquired infection. Most of the patients on prolonged catheterisation will develop bacteriuria. Many logical modifications has been attempted to reduce the development of bacteriuria in these patients, but in vain. Irrigation of the catheter and bladder with antibacterial solutions has not shown reduction in the incidence of bacteriuria. Additionally antimicrobials in the collection bag also have been shown to be ineffective. Presence of potential space between the external catheter surface and urethra allows the ascent of infective organisms and this is the most common route of infection in CAUTI. Several investigators have attempted to block this route of infection by applying topical antibacterial agents. Another method to reduce the CAUTI is by manipulating the composition of catheter (10)

In a prospective comparative study, which was published in The New England Journal Medicine, a comparison was made between patients who underwent antibiotic irrigation of bladder through catheter and those who did not. In this study 1 vial of Neomycin-Polymyxin irrigation was administered through the closed drainage urinary catheter. They compared this group to another group of patients not given antibiotic irrigation. In their observation about 18 of 98 (18%) patients not given antibiotic irrigation developed infection compared to the 14 of 89 (16%) patients who were given antibiotic irrigation developed infection, and this was not a statistically significant difference (11). In another prospective study by Verlag et al the effect of repeated instillation of antiseptic on CAUTI was analysed (12). In this study bladder washing with 3 antiseptics was compared in a catheterised bladder model. They used antiseptics like chlorhexidine(.02%) , and mandelic acid (1%). They observed that E.coli was susceptible to second instillation of chlorhexidine and mandelic acid was the most effective of this agents, double instillation has shown elimination of all bacteria except Proteus mirabilis. In one another study was conducted by “Southampton Infection Control Team “ about 10ml of 5% chlorhexidine solution was introduced in to the sterile urinary drainage bag whenever it was drained, and the catheter-meatal junction was cleaned daily with Savlodil (chlorhexidine with cetrimide). There was a significant drop in infection rate from 45% to 19% after following this method. But this is mostly possible in hospitalised patients.

The present study was undertaken in outpatient setting. In this 40 out of 46 (83.3%) patients in routine catheter change group and 38 out of 45 (76%) patients in betadine instillation group developed atleast one

episode of CAUTI during one year follow up period. 15 out of 46 (31.3%) in routine catheter change group and 19 of 45(38%) patients in betadine group developed one episode of CAUT, compared to multiple recurrences which is common in first group who were not given Betadine as shown in table 6 and figure 3.

VI. Conclusions

Although various techniques to reduce the incidence of CAUTI are under trial, the gold standard for prevention of CAUTI are - following sterile aseptic technique during catheterisation, avoiding unnecessary catheterisation, removing catheter as soon as possible after development of infection and maintaining closed catheter drainage system.

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*Muthurathinam k. "Intravesical Povidone Iodine Instillation in Patients on Long Term Urinary Catheters- A Comparative Study In A Tertiary Care Hospital." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)* 16.7 (2017): 72-78.