Original Research Article

Comparision of bacterial urinary tract infection in catheterised and non catheterised patients

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Background: The most frequent bacterial illness is urinary tract infection (UTI). If Immune system fails to eliminate the bacteria that has bypass the first line of defence it results in urinary tract infection or a more severe illness furthermore. Females are usually more distressed than males. Catheter- associated urinary tract infection develops when an indwelling urinary catheter causes an infection within 48 hours.

Aim: Compare the bacterial infection in urinary tract in non catheterized and catheterized patients.

Objectives: To know different pathogenic bacteria causing UTI in catheterized and non catheterized patients.

Materials and Methods: The present study was conducted on CAUTI & NON CAUTI patients including both male & female attending general medicine of teerthankar Mahaveer University.

Results: Infection occurred more in CAUTI patients than NON CAUTI. Ratio of females was higher than males.

Conclusion: As our study shows higher percentage of UTI in CAUTI so unnecessary catheterization should be avoided.

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1. Introduction

The most frequent bacterial illness is urinary tract infection. If Immune system fails to eliminate the bacteria that has bypass the first line of defence it results in urinary tract infection or a more severe illness furthermore. Females are usually more distressed than males. Catheter- associated urinary tract infection develops when an indwelling urinary catheter causes an infection within 48 hours. Fever, urinary urgency, stomach discomfort, difficulty in urination, pyuria, WBCs in urine are all signs of UTI. Most common uropathogens are E.coli, Klebsiella, pneumoniae, Enterobacter species etc. They are the most commonly faced nosocomial infection. It develops in patients using catheter for more than 7 days in almost 25% patients. The catheter lumen becomes clogged with crystalline deposits causing urine to be held outside the catheter and if these blocked catheters are not changed that can lead to various complications like encrustation in catheter, formation of stones in bladder, sepsis, endotoxic shock and inflammation in kidney. It is always advisable to treat only symptomatic CAUTI And periodic surveys should be implemented.

2. Materials and Methods

Study was done in microbiology department of teerthankar mahaveer hospital. 85 samples of urine were taken from catheterized patients and 85 from NON CAUTI patients attending OPD & IPD department of general medicine.

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teerthankar Mahaveer university from Nov 2019 to Feb 2021

2.1. Sample collection

It was collected from catheter tube that to from distal edge making use of sterile syringe and needle in a universal container and should be transported immediately to the laboratory. Collection from the catheter bag was avoided.

2.1.1. In non-catheterised patients

To minimize the contamination of periurethral flora clean catch midstream urine sample was taken. It was processed within one hour of collection and in case of delay it was refrigerated at 4°C for 12-14 hours.

2.1.2. In catheterised patients

2.2. Methodology

Urine sample was processed in 2 ways

1. Microscopy
2. Culture

Detection of RBC, WBC, YEAST and EPITHELIAL cells was done through wet mount microscopy using uncentrifuged sample. Gram staining was done followed by biochemicals test to find out the bacteria responsible for infection.

CLED (cysteine lactose electrolyte deficient agar) media was used for inoculating the urine samples that come to our laboratory by semiquantitative culture technique through nichrome calibrated loop.

3. Observation & Result

Table 1: Occurrence of positive CAUTI and NON CAUTI cases

<table>
<thead>
<tr>
<th></th>
<th>Positive cases of CAUTI</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAUTI</td>
<td>34/85</td>
<td>40%</td>
</tr>
<tr>
<td>NON CAUTI</td>
<td>27/85</td>
<td>31%</td>
</tr>
</tbody>
</table>

This table shows that 40% microorganisms were isolated in CAUTI cases and 31% microorganisms were isolated in NON-CAUTI cases.

Table 2: Gender wise criteria in CAUTI & NON-CAUTI patients

<table>
<thead>
<tr>
<th></th>
<th>Gender</th>
<th>No.</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAUTI</td>
<td>Male</td>
<td>10</td>
<td>29.41%</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>24</td>
<td>70.59%</td>
</tr>
<tr>
<td>NON-CAUTI</td>
<td>Male</td>
<td>6</td>
<td>22.22%</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>21</td>
<td>77.77%</td>
</tr>
</tbody>
</table>

In our study rate of infection was higher in females in both CAUTI (70.58%) & NON CAUTI (77.77%) patients.

In this study, *E. coli* (58.82%) was the most commonly isolated bacteria from CAUTI patients, followed by klebsiella (14.70%), enterobacter (11.76%), acinetobacter (5.88%), pseudomonas (5.88%) and S. aureus (2.94%).

4. Discussion

During the period from November 2019 to January 2021, 170 urine samples were processed to determine occurrence of infection in urinary tract and catheter-associated urinary tract infection.

In our study done at microbiology department in teerthankar mahaveer medical college and research centre, occurrence of CAUTI was 40% that is 34/85 samples tested positive for bacterial infection which was equivalent to research conducted by karthak R et al and chatterjee N et.al who reported CAUTI occurrence of 42% And 35.9% respectively. A research was carried out in New Delhi by Bhatia N et al concluded occurrence of CAUTI 22.4%. Rate of UTI infection in NON-CAUTI is 31% in our study here which co relates with the study done by Khan R et al and Acharya V N et.al who reported 33.4% and 36.3% occurrence of NON-CAUTI respectively.
It was found that in our study both in CAUTI & NON-CAUTI females were more owing to many physical and anatomic factors. In CAUTI our study concluded that 70.58% females and 29.41% males were having bacterial infection and in NON-CAUTI the percentage was 77.77% in females and 22.22% in males. A study done by Patil H V et al in CAUTI got similar percentage i.e males 36.60% and females 63.69%. Also a study done on NON-CAUTI by Kumar H et al had infections in females 65% and in males 35%. Some dis similar results were also seen in some studies where males were more affected than females. Study done by Sangamithra V et al in CAUTI had more no of males affected 65% where as in females were 35%. It could be due to numerous factors as in males mild prostate enlargement causes an obstructive urinary lesion from benign prostate hypertrophy.

In the present study on CAUTI maximum no. of isolated organism was E.coli as high as 58.82% then klebsiella 14.70%, enterobacter 11.76%, pseudomonas 5.88%, aceitobacter 5.88% and s.aureus 2.94%. A resembling study was done by Eshwarappa M et al of percentage of E.coli as high as 66.9%, klebsiella 15.5%, enterobacter 4% and pseudomonas 10.2%. Bhatia N et al also did a study on CAUTI in which E.coli isolated was 59.1%, klebsiella 19.69% and klebsiella 6%. Similar Study done by Vyawahare CR et al isolated 57% E.coli, 20% klebsiella and 7% pseudomonas. E.coli remains the predominating organism as it’s attachment to uroepithelium is influenced by number of variables. Also in our study on NON-CAUTI patients E.coli again was the commonest isolated bacteria 55.55 % following klebsiella 11.11%, klebsiella 11.11%, proteus 7.40%, Pseudomonas 7.40%, s.aureus 3.70% and serratia fanticola 3.70% correlating with a study done by Karishtetti M S et al, E.coli leading the list with 56.40%, klebsiella 9.60%, klebsiella 13%. Sood S et al in his study isolated 61% E.coli, 9.24% enterococcus and 6.64% klebsiella.

5. Conclusion
The present study on comparision of bacterial urinary tract infection in catheterized patients and non catheterised patients was carried out on 170 samples, 85 catheterised and 85 non catheterized. The most frequent bacterial illness is urinary tract infection in human population. Sometimes this could also lead to complications like cystitis, biofilm formation, polynephritis and many more. Infection occurred more in catheterized patients. Percentage of CAUTI was 40% where as in NON CAUTI it was 31%. Ratio of women was high in both CAUTI and NON CAUTI that is 70.58 % and 81.48% respectively. E.coli was the predominately isolated organism in both CAUTI &NON CAUTI and the pace of infection of E.coli was higher in CAUTI (58.82%) than NON CAUTI (55.55%), in klebsiella rate was 14.70% in CAUTI and 11.76% in NON CAUTI.

Our study concluded that Infection occurred more in CAUTI patients. Females were affected more than males. E.coli was the commonest isolated bacteria followed by klebsiella, and many more. As our study shows higher percentage of UTI in CAUTI so unnecessary catheterization should be avoided.

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The authors declare that we have received no financial support for the research, authorship, and/or publication of this article.

7. Conflicts of Interest
The authors declare no potential conflict of interest with respect to research, authorship, and/or publication of this article.

References
8. Sangamithra V, Sneka, Praveen S, Manonmoney. Incidence of Urinary tract infection occurred more in catheterized patients. Percentage of CAUTI was 40% where as in NON CAUTI it was 31%. Ratio of women was high in both CAUTI and NON CAUTI that is 70.58 % and 81.48% respectively. E.coli was the predominately isolated organism in both CAUTI &NON CAUTI and the pace of infection of E.coli was higher in CAUTI (58.82%) than NON CAUTI (55.55%), in klebsiella rate was 14.70% in CAUTI and 11.76% in NON CAUTI.

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References
8. Sangamithra V, Sneka, Praveen S, Manonmoney. Incidence of


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