Study of Resistance Profile of Internal Microflora Derived From DJ Stents Used In Urology Department, Rims, Ranchi

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Abstract
INTRODUCTION:-
Today's era of medical advancement, acknowledges quenching benefits from immense number of medical devices and among them, urinary catheter -stents proved its frontrunner.
DJ stents bypass upper genitourinary obstruction due to calculus , mass, fibrosis or stricture thus maintaining patent & effortless urinary flow. It hence, prevents from creating any external surgical diversion. It's length , 5-12"(12-30cm) with luminal diameter , 0.06-0.2"(1.5-6mm) and having multiple openings over its surface (overcomes obstruction & dilates ureter 2-3 times) , made of materials like polyurethane (UROLOGY,RIMS), silicone ,c-flex , urosoft , metal mesh , drug eluting stents etc. It is inserted retrogradely with help of cystoscope and placed between bladder and kidney through ureter under mild sedation , LA or GA .
AIM AND OBJECTIVES :-
To study resistance profile of isolated colonizing microorganisms obtained from DJ stent culture & antibiotic sensitivity.
MATERIAL AND METHODS :-
82 DJ stents brought from Urology Department were cross sectionally studied from Feb 2019-Sep 2019 (7 months) in Microbiology Department, RIMS. Data entry and analysis has been done in MS EXCEL.
DJ stents were made sterile externally and both ends cut and dropped in BHI broth ,incubated overnight . Resulting,turbid broth suspension is inoculated on BA,MA and NA followed by overnight incubation to identify isolates by observing growth pattern, colony morphology , motility and biochemical properties. Pure isolated colonies obtained by subcultures are swabbed over MHA after preparing lawn culture.MHA plates swabbed with isolates are dried and impregnated with 14 antibiotic disks , 6 in each plate.
In Vitro AST , were performed by Kirby Bauer Disc Diffusion method and interpreted by CLSI Guidelines ,2019.
RESULTS :-95.12% of all 82 stents showed colonization .Rest 4.87% were sterile. Pseudomonas aeruginosa , 44.87% ,Enterococcus spp , 17.94% ,Klebsiella spp , 15.38% ,S.aureus , 11.53% , E.coli ,3.84% were common isolates.
29.48% isolates were panresistant (Pseudomonas- 43.47%) ,25.64% isolates showed sensitive to single drug and 7.69% sensitive to both drugs .Hence, 62.82% stent isolates were MDR.
74.28% of all Pseudomonas isolates were MDR and 28.57% were panresistant. Acinetobacter spp. and Enterococcus spp were 100% MDR.
CONCLUSION :-
13 Pseudomonas were sensitive to only 1 drug and 84.61% responded to Amikacin .In my study , i found where higher antibiotics like 3 rd gen cephalosporin , betalactams and imipenems expressed resistance , simple antibiotics like amikacin and chloramphenicol showed promising response .Thus, emperical use of higher antibiotics should be prohibited and use of simple antibiotic should be encouraged.
Hydroureter or Hydroureteroureterostomy or Hydroureteroneocystostomy or Hydroureteroneocystostomy

1. Introduction

Our study is retrogradely inserted through cystoscope under mild sedation or local anaesthesia. The cell suspension obtained in BHI broth is incubated overnight and then inoculated to Blood Agar and Nutrient Agar which is further incubated overnight to obtain growth. Pure colonies from growth were identified on basis of colony morphology, growth pattern, motility and biochemical testing. Once identification of internal micro flora of stent is complete, In Vitro Antibiotic Susceptibility Testing were performed by Kirby Bauer Disc Diffusion method and interpretation done according to CLSI 2019 guidelines. 14 Antibiotic Disk were used with 6 disk in each MHA plate, once the plate is swabbed with lawn culture.

2. Materials and Methods

The DJ stents used in study were brought from Department of Urology, RIMS, after their removal from patients and further processed in Department of Microbiology, RIMS. This was a cross sectional study in which 82 DJ stents were processed in a time span of about 7 months, started from Feb 2019 - Sept 2019. 49 stents were derived from male and 33 from female patients. Data entry has been done in M.S EXCEL and Analysis by M.S EXCEL.

III. Results and Discussion

95.12% DJ stents showed colonization where mere 4.87% were sterile. Colonization also depends on composition of stent. In a study it was found that stent made of Polyeugenyl showed 100% colonization followed by 62.6% with silicone, 56% with Urosoft and 55.5% with C flex. Since, polyurethane stent were used and studied, colonization % correlates with study made by Hasan et al. In his study, 67.9% of stents were colonized (he used different type of catheter) and Pseudomonas aeruginosa were the most common isolates.

Similarly in my study, Pseudomonas aeruginosa predominates as isolates with max 44.87% followed by Enterococcus species (17.94%), Klebsiella species (15.38%), Staphylococcus aureus (11.53%), Escherichia coli (3.84%), Proteus and Acinetobacter (2.56% each) and CONS (1.28%). Resistance profile revealed, 23 stent isolates among 78 (29.48%) to be Pan Resistant (resistant to all 14 antibiotics used in study) whereas 25.64% stent isolates showed resistance to all drugs except one and 7.69% stent isolates showed resistance to all drugs except 2. Hence, totalizing all, 62.82% of all stent isolates were some how multi drug resistant (MDR).

Pseudomonas, apart from predominant isolate in my study, it also accounted for maximum 43.47% of all Pan resistant isolate followed by Enterococcus spp. which shares 39.13%.

Among all 35 Pseudomonas aeruginosa isolates, 74.28% were MDR and 28.57% was Pan Resistant. Acinetobacter spp. and Enterococcus spp. were 100% MDR.

The isolates which topped among pan resistance were Acinetobacter (100%) followed by Enterococcus (64.28%) and Pseudomonas aeruginosa (28.57%). 2 VRSA strains of Staphylococcus aureus and 9 VRE strain of Enterococcus spp. were isolated among 78 isolate.
V. Conclusion

There are 13 Pseudomonas aeruginosa isolates which is sensitive to only one drug among 14 used for AST (37.14% of all Pseudomonas aeruginosa isolates). Out of all 13 isolates , 11 isolates (84.61%) responded to Amikacin , 1 responded each to Ciprofloxacin and Linezolid (7.69%). Similarly , 1 Klebsiella spp. showed sensitive to only one drug ie, Chloramphenicol.

This infers that , where all higher antibiotics like 3rd Gen Cephalosporins , Betalactams , Imipenems expressed resistance , simple drugs like Amikacin was consistently sensitive among all MDR Strains of Pseudomonas (87.5%).

We can interprate this fact to promote use of simple antibiotic like Amikacin and Chloramphenicol against Pseudomonas and other Gram negative bacteria in prefferance of using higher antibiotic like Pipracillin Tazobactum and Imipinems as imperical drugs in Urology Department.

VI. Limitations

If external surface of DJ stent is not made sterile properly we could not assure that the microflora obtained from DJ stent is resident of internal luminal biofilm coating. The cell suspension obtained from DJ stent, when innoculated on culture media seldom produce pure colony so subcultures has to be done several times for obtaining pure colony before performing AST.

VII. Recommendations

As mentioned in a study by Hasan et al regarding 100% colonization with polyurethane DJ stent corroborating similarly in my study too. Hence , good quality stent like Drug Eluting Stent , Bioabsorbable Stent , C- flex and Urosoft stent should be promoted in use.

Any stents used should ideally possess optimal flow characteristics , well patient tolerance , biocompatibility , radioopacity , visibility on USG with ease of insertion and removal along resistance to infection , corrosion and encrustations for maintaining long term patency and infection free period.

Since, DJ stent internal microflora proves nidus for bacterial infection and colonization of DJ stent is an inevitable phenomenon , patients are to be monitored for stent related complications like irritative voiding symptoms , incontinence,haematuria ,pyuria encrustations ,migration , malposition ,biofilm formation, vesico ureteric reflux, discomfort, hyperplastic urothelial reactions, forgotten stent etc and prophylactic simple antibiotic like amikacin , chloramphenicol, ciprofloxacin , amoxycillin , sulfadoxime pyrimethamine may be used to achieve handsome gain. This is a small initiative to achieve bigger goal of impeding rapid pace of emerging MDR in present scenario.

CONFLICT OF INTEREST :-
No conflict of interest from any other researchers or any other institutional bodies. No funding recieved from any other source.

<table>
<thead>
<tr>
<th>ISOLATES NAME(78)</th>
<th>ISOLATES%</th>
<th>PAN RESISTANT(1)</th>
<th>SENSITIVE TO ONE DRUG(2)</th>
<th>SENSITIVE TO TWO DRUGS(3)</th>
<th>MDR(1+2+3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P.aeruginosa</td>
<td>35/78 (44.87%)</td>
<td>10/35 (28.57%)</td>
<td>13/35 (37.14%)</td>
<td>9/35 (8.57%)</td>
<td>26/35 (74.28%)</td>
</tr>
<tr>
<td>Enterococcus spp.</td>
<td>14/78 (17.94%)</td>
<td>9/14 (64.28%)</td>
<td>4/14 (28.57%)</td>
<td>1/14 (7.14)</td>
<td>14/14 (100%)</td>
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<tr>
<td>Klebsiella spp.</td>
<td>12/78 (15.38%)</td>
<td>0/12 (0%)</td>
<td>1/12 (8.33%)</td>
<td>0/12 (0%)</td>
<td>1/12 (8.33%)</td>
</tr>
<tr>
<td>S.aureus</td>
<td>9/78 (11.53%)</td>
<td>2/9 (22.22%)</td>
<td>2/9 (22.22%)</td>
<td>2/9 (22.22%)</td>
<td>6/9 (66.66%)</td>
</tr>
<tr>
<td>E.coli</td>
<td>3/78 (3.84%)</td>
<td>0/3 (0%)</td>
<td>0/3 (0%)</td>
<td>0/3 (0%)</td>
<td>0/3 (0%)</td>
</tr>
<tr>
<td>Acinetobacter spp.</td>
<td>2/78 (2.56 %)</td>
<td>0/2 (0%)</td>
<td>0/2 (0%)</td>
<td>0/2 (0%)</td>
<td>0/2 (0%)</td>
</tr>
<tr>
<td>Proteus spp.</td>
<td>2/78 (2.56 %)</td>
<td>0/2 (0%)</td>
<td>0/2 (0%)</td>
<td>0/2 (0%)</td>
<td>0/2 (0%)</td>
</tr>
<tr>
<td>CONS</td>
<td>1/78 (1.28%)</td>
<td>0/1 (0%)</td>
<td>0/1 (0%)</td>
<td>0/1 (0%)</td>
<td>0/1 (0%)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>ISOLATES (78)</th>
<th>ISOLATES %</th>
<th>PANRESISTANT ISOLATES /TOTAL PANRESISTANT (1)</th>
<th>ISOLATE SENSITIVE TO 1 DRUG/ TOTAL ISOLATE SENSITIVE TO 1 DRUG (2)</th>
<th>ISOLATE SENSITIVE TO 2 DRUGS/ TOTAL ISOLATE SENSITIVE TO 2 DRUGS (3)</th>
<th>1+2+3 TOTAL 1+2+3</th>
</tr>
</thead>
<tbody>
<tr>
<td>P.aeruginosa</td>
<td>35/78 (44.87%)</td>
<td>10/23 (43.47%)</td>
<td>13/20 (65%)</td>
<td>3/6 (50%)</td>
<td>26/49 (53.06%) OR 26/78 (33.33%)</td>
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<tr>
<td>Enterococcus spp.</td>
<td>14/78 (17.94%)</td>
<td>9/23 (39.13%)</td>
<td>4/20 (20%)</td>
<td>1/6 (16.66%)</td>
<td>14/49 (28.57%) OR 14/78 (17.94%)</td>
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<td>Klebsiella spp.</td>
<td>12/78 (15.38%)</td>
<td>0/23 (0%)</td>
<td>1/20 (5%)</td>
<td>0/6 (0%)</td>
<td>1/14 (7.14%) OR 1/78 (1.28%)</td>
</tr>
<tr>
<td>S.aureus</td>
<td>9/78 (11.53%)</td>
<td>2/23 (8.69%)</td>
<td>2/20 (10%)</td>
<td>2/6 (33.33%)</td>
<td>6/49 (12.24%) OR 6/78 (7.69%)</td>
</tr>
<tr>
<td>E.coli</td>
<td>3/78 (3.84%)</td>
<td>0/23 (0%)</td>
<td>0/20 (0%)</td>
<td>0/6 (0 %)</td>
<td>0/49 (0%) OR 0/78 (0%)</td>
</tr>
</tbody>
</table>

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We performed a study on the resistance profile of internal microflora derived from double J (DJ) stents used in urology. Our results are summarized in the table below:

<table>
<thead>
<tr>
<th>Acinetobacter spp.</th>
<th>2/78 (2.56%)</th>
<th>2/23 (8.69%)</th>
<th>0/20 (0%)</th>
<th>0/6 (0%)</th>
<th>2/49 (4.08%) OR 2/78 (2.56%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proteus spp.</td>
<td>2/78 (2.56%)</td>
<td>0/23 (0%)</td>
<td>0/20 (0%)</td>
<td>0/6 (0%)</td>
<td>0/49 (0%) OR 0/78 (0%)</td>
</tr>
<tr>
<td>CONS</td>
<td>1/78 (1.28%)</td>
<td>0/23 (0%)</td>
<td>0/20 (0%)</td>
<td>0/6 (0%)</td>
<td>0/49 (0%) OR 0/78 (0%)</td>
</tr>
</tbody>
</table>

References


