RES-282

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Reducing CAUTI Risk Through Biofilm Prevention: Evidence-Based Strategies for Urinary Catheter Management

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INTRODUCTION

- **CAUTI burden**: About 75% of hospital-acquired UTIs are catheter-associated. In Southeast Asia, CAUTI is the second most common healthcare-associated infection, representing 9% of all HAIs. An estimated 65-70% of cases are preventable.
- **Biofilm on catheters:** Pathogens form protective biofilms on catheter surfaces, enabling immune evasion, slower growth, and markedly higher antibiotic resistance through exopolysaccharide-rich matrices.

MATERIALS AND METHODS

- **Study design:** Prospective observational study of 109 adults with urinary catheters (Sept 2017–Jan 2018).
- **Exclusions:** Pregnancy, urinary tract anomalies, malignancy, or HIV.
- **Sampling:** Urine collected twice — right after catheter insertion and just before removal.
- **Testing:** Bacteriuria screened by flow-cytometry urinalysis and confirmed by standard culture using Vitek2.
- **Biofilm assessment:** Removed catheters cultured for biofilm; bacterial isolates from urine and catheters tested for biofilm-forming ability using Congo Red Agar (CRA).

RESULTS & DISCUSSION

Patient profile: 109 adults (18–88 years); majority female. Mean catheterization 5.6 ± 2.1 days; most ≥5 days. Diabetes in 22%; 68.8% received antibiotics.
Bacteriuria: Detected in 34% post-insertion and 20% at removal. Catheter placement significantly associated with bacteriuria (p = 0.029). Antibiotic use linked to lower post-catheterization bacteriuria (9.3% vs. 44.1%; p < 0.001; OR = 0.13).
Biofilm: Present in 73.4% of catheters; not significantly reduced by antibiotics (p > 0.05). CRA-positive isolates from urine or catheter culture 13.5× more likely to form biofilms (95% vs. 59.7%).
Risk factors & timing: Extended catheterization (>5 days; p = 0.004), female sex, and bacteriuria at insertion increased

Table 1. Relationship between the biofilm-producer bacteria and the biofilm formation

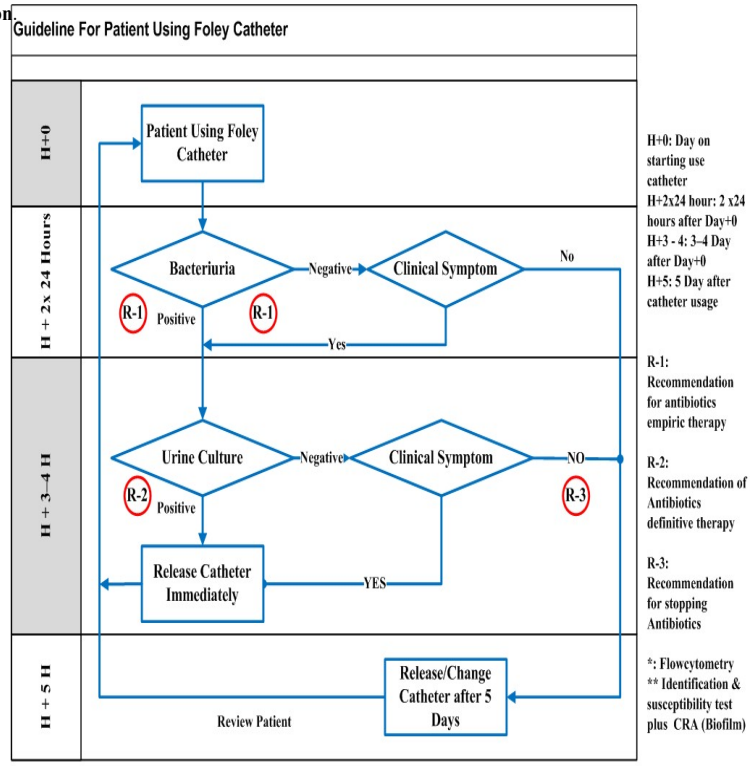
No	Bacteria	Biofilm Formation (n,%)		p-value	OD	95% CI
		Positive (n=80)(%)	Negative (n=29)(%)			
1	Biofilm-producing bacteria (CRA pos)	40(95)	2(5)	<0.001	13.500	3.007–60.605
2	Non Biofilm-producing bacteria (CRA neg)	40(60)	27(40)			

Table 2. Relationship Between Bacteriuria (Flow Cytometry) At The time Catheter Insertion and Post-Catheterization

Bacteriuria at the Time of Catheter Insertion	Amount (%)	Post-Catheterization* Bacteriuria		*p value*
		Positive (%)	Negative (%)	
Positive	**37**(34)	9(8,3)	28(25,7)	
Negative	72(66)	13(11,7)	59(54,3)	0,029
Total	109	**22**(20)	87(80)	

Table 3. Association Between Post-Catheterization Bacteriuria Detected by Flow Cytometry and Antibiotic Use

Post-Catheterization Bacteriuria	Catheter using (n = 109)		*p value*
	Antibiotic Yes (%)	Antibiotic No (%)	
Positive	7(9,3)	**15(44,1)**	
Negative	**68(90,7)**	19(55,9)	<0.001
Total	75 (100)	34(100)	



CONCLUSIONS

- This study highlights the importance of early biofilm detection and appropriate catheter management in reducing the risk of CAUTI.
- Recommended to screening Bacteriuria using flow cytometry on day 2 post-insertion and biofilm formation detected on day 3 in 62% of cases.
- Empirical antibiotics are recommended only when clinical symptoms are present and supported by laboratory findings.
- As biofilm formation and bacterial dispersal increase significantly after day 5, catheter replacement or removal by the fifth day is advised to minimize infection risk.

CONFLICT OF INTEREST

The Authors declare no conflict of interest