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Novel Dual-Balloon Urinary Catheters Reduce Catheter-Associated Urinary Tract Infections

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Introduction

Background

- **The design of the Foley-type urinary catheter has remained relatively unchanged since 1937.**
- **Hospitals and clinicians struggle to manage catheter-associated urinary tract infections (CAUTIs), one of the most common healthcare-associated infections.[1]**
- **Traditional Foley catheters cause mechanical irritation and trauma to the bladder mucosa, increasing the risk of CAUTIs.**
- **The Duette™ dual-balloon urinary catheter, a new bladder drainage system, is specifically designed to reduce mucosal trauma.**

Objectives

- **This study compares the CAUTI infection rates between Bard™ and Duette™ catheters, in an effort to provide a benchmark regarding the utility of these novel urinary drainage devices.**

Materials & Methods

- **Patients included in this study had either a Duette™ or a Bard Foley urinary catheter inserted and cared for in Tampa General Hospital's neuroscience intensive care unit (NSICU).**
- **Data was collected on catheters placed from July 2014 through June 2015.**
  - No protocol/CAUTI bundle changes occurred during the study period.
- **All patient-care personnel received the appropriate training regarding the insertion technique and methods of care for these new catheters.**
- **Patient demographics, including catheter insertion/removal date and CAUTI diagnosis (using the CDC's NHSN criteria), were collected and analyzed to assess infection rate.[2]**
- **Fisher's exact test, Student's T-test, and Z-scores were used to compare the two groups.**

Results

- **During the study's 1-year timeframe, 165 patients had Duette™ catheters placed and 231 patients had Bard™ catheters placed in the NSICU.**
  - This accounted for a total of 887 Duette™ catheter days and 1131 Bard™ catheter days.
- **Of the patients with dual-balloon catheters, there was only one CAUTI.**
  - Duette™ CAUTI rate = 1.1 per 1000 catheter-days.
- **Of the patients with traditional Foley catheters, there were seven CAUTIs.**
  - Bard Foley CAUTI rate = 6.2 per 1000 catheter-days.
- **The Duette™ infection rate is not only lower than the Bard™ rate, but is also lower than the NHSN benchmark for NSICUs with traditional Foley catheters (5.3 infections per 1000 catheter-days).[3]**

	Single-Balloon	Dual-Balloon	*p*
Total # of patients	231	165	-
Total catheter days	1130.8	887.4	-
Avg catheter days (median)	4.6 (2.4)	5.0 (3.6)	0.48
# of males (%)	114 (49.4)	93 (56.4)	0.19
Avg age (median)	60.8 (63.0)	60.4 (63.0)	0.79
Diagnosis of DM (%)	100 (43.3)	69 (41.8)	0.84
Avg days spent in ICU (median)	7.3 (5.0)	9.7 (7.0)	0.003
# of CAUTIs	7	1	0.15
Infections per 1000 catheter-days	6.2	1.1	0.07

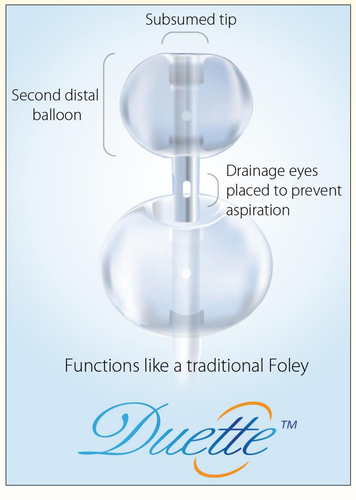

Image 1 (left). **The Duette™ foley catheter** has a second distal balloon, which helps prevent trauma to the bladder wall. The drainage eyes are between the two balloons, designed to prevent aspiration damage to the bladder mucosa.

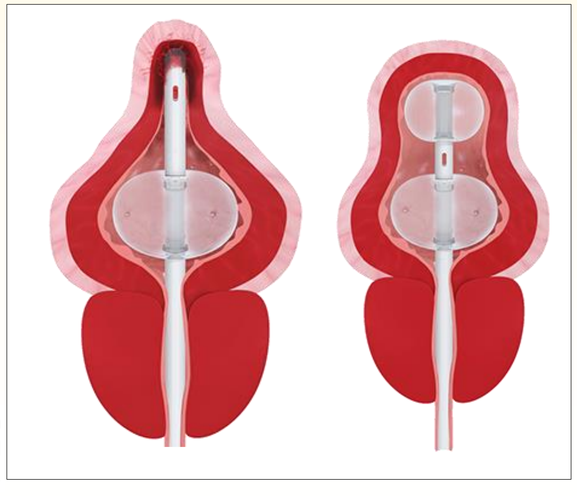

Image 2 (right). **Schematic of a dual-balloon urethral catheter** in-situ, showing the reduced stress of the catheter on the bladder wall.

Conclusion

- **The Duette™ urinary catheter, as compared to traditional Foley catheter, has a lower infectious risk.**
- **Utilizing an improved catheter design will reduce mucosal trauma and residual urine volumes, which in conjunction with proper sterile insertion techniques, daily maintenance care protocols, and minimized indwelling time will reduce the risk of CAUTIs.**
- **Hospitals and inpatient facilities should consider initiating dual-balloon catheters as standard of practice in an effort to reduce CAUTI rates, one of the National Patient Safety Goals identified by the Joint Commission.**

References

1. **Magill, S.S., et al., *Multistate point-prevalence survey of health care-associated infections.* N Engl J Med, 2014. 370(13): p. 1198-208.**
2. **CDC Device-associated Module, Urinary Tract Infection (Catheter-Associated Urinary Tract Infection [CAUTI] and Non-Catheter-Associated Urinary Tract Infection [UTI]) and Other Urinary System Infection [USI]) Events, 2016.**
3. **Dudeck, M.A., et al., National Healthcare Safety Network report, data summary for 2013, Device-associated Module. Am J Infect Control, 2015. 43(3): p. 206-21.**
4. **Picture courtesy http://www.poiesismedical.com**