Short-Term Indwelling Foley Catheters Do Not Reduce the Risk of Postoperative Urinary Retention: A Randomized Controlled Trial

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INTRODUCTION:

The purpose of this randomized controlled trial was to determine if a short-term foley catheter (inserted in the operating room and removed upon arrival to the orthopaedic floor) would reduce the risk of postoperative urinary retention (POUR) in patients undergoing primary total hip (THA) and total knee arthroplasty (TKA).

METHODS:

A total of 388 patients undergoing inpatient primary TKA (n=228) or THA (n=160) with spinal anesthesia were randomized to receive a short-term foley catheter (n=194) or no foley (n=194). POUR was the primary outcome and defined as requiring ≥2 straight catheterizations when indicated by retention of ≥450cc on a bladder scan. Secondary outcomes included urinary tract infections (UTIs) within three weeks and requiring ≥1 straight catheterization. Power analysis determined 194 patients per group were required to detect a 7% difference in POUR rates at 80% power and alpha of 0.05. Intention-to-treat and per-protocol analyses were performed (two patients received incorrect treatment). Outcomes were compared between groups with univariate and multivariate analysis, with alpha <0.05.

RESULTS: Nine patients developed POUR: four in the short-term foley group and five among controls (2.1% vs. 2.6%; p=1.00). Twenty-four patients required ≥1 straight catheterization: 10 in the foley group and 14 among controls (5.2% vs. 7.2%; p=0.40). There were four UTIs: three in the foley group and one among controls (1.5% vs. 0.5%; p=0.62) one intention-to-treat analysis and four in the foley group and none among controls (2.1% vs. 0.0%, p=0.12) on per-protocol analysis. Use of a catheter was not related to the occurrence of POUR (OR 0.65, 95% CI [0.16-2.74], p=0.56). Female gender significantly decreased the risk of POUR (OR 0.09, 95% CI [0.01–0.75], p=0.03).

DISCUSSION AND CONCLUSION:

The use of a short-term foley catheter inserted in the operating room and removed on arrival to the orthopaedic floor does not decrease the rate of POUR.

Table 1: Patient demographics by randomization

Variable	Foley Catheter	No Catheter	P-value
Patients, n	194	194	
Mean age at surgery, years (SD)	67.3 (9.6)	67.2 (8.7)	0.829
Mean BMI, kg/m^2 (SD)	33.0 (7.5)	32.2 (7.1)	0.212
Gender, n (%)			0.599
Male	69 (35.9)	74 (38.3)	
Female	125 (65.1)	120 (62.2)	
ASA Score, n (%)			0.832
1	2 (1.0)	4 (2.1)	
2	111 (57.8)	111 (57.8)	
3	78 (40.6)	79 (40.7)	
4	1 (0.5)	0 (0.0)	
IPSS Score, n	6.6 (5.4)	6.0 (4.7)	0.397
History of urinary retention, n (%)	3 (1.6)	3 (1.6)	1.000
History of urinary incontinence, n (%)	23 (11.9)	21 (10.8)	0.749
History of BPH, n (%)	9 (4.7)	15 (7.8)	0.211

Table 2: Surgical characteristics by randomization

Variable	Foley Catheter	No Catheter	P-value
Laterality, n (%)			0.223
Left	106 (54.6)	94 (48.5)	
Right	88 (45.4)	100 (51.6)	
Joint, n (%)			0.409
Knee	118 (60.8)	110 (56.7)	
Hip	76 (39.2)	84 (43.3)	
Surgical Time, minutes (SD)	77.8 (15.6)	78.3 (18.1)	0.833
Total IV Fluids, mL (SD)	1159.0 (455.3)	1075.4 (368.8)	0.05
EBL, mL (SD)	170.0 (147.5)	143.3 (135.5)	0.039
Length of stay, days (SD)	1.7 (1.2)	1.5 (0.9)	0.334
Intraoperative complications, n (%)	1 (0.5)	2 (1.0)	1.000

Table 3: Postoperative outcomes, with both intention-to-treat and per-protocol analyses reported when differences existed

Variable	Foley Catheter	No Catheter	P-value
POUR (2 straight catheterizations), n (%)	4 (2.1)	5 (2.6)	1.000
≥ 1 straight catheterization, n (%)	10 (5.2)	14 (7.2)	0.399
UTI (urinalysis-positive), n (%)			
Intention-to-treat analysis	3 (1.5)	1 (0.5)	0.623
Per-protocol analysis	4 (2.1)	0 (0.0)	0.123
UTI (culture-positive), n (%)	2 (1.0)	0 (0.0)	0.499
Urinary symptoms postoperatively, n (%)	45 (23.2)	36 (18.6)	0.261
PJI, n (%)	0 (0.0)	3 (1.6)	0.248
Any complication, n (%)	6 (3.1)	10 (5.2)	0.307

Table 4: Patient demographics and surgical characteristics of patients with POUR compared to patients without POUR

Variable	POUR	No POUR	P-value
Mean age, years (SD)	65.3 (6.2)	67.3 (9.2)	0.325
Mean BMI, kg/m^2 (SD)	36.5 (7.8)	32.5 (7.3)	0.122
Gender, n (%)	1 (1.5)	1 (0.5)	0.002
Male	8 (88.9)	135 (35.6)	
Female	1 (11.1)	244 (64.4)	
ASA Score, n (%)			0.575
1	0 (0.0)	6 (1.6)	
2	4 (44.4)	218 (57.8)	
3	5 (55.6)	152 (40.3)	
4	0 (0.0)	1 (0.3)	
Laterality, n (%)			0.325
Left	3 (33.3)	197 (52.0)	
Right	6 (66.7)	182 (48.0)	
Joint, n (%)			0.170
Knee	3 (33.3)	225 (59.4)	
Hip	6 (66.7)	154 (60.6)	
Surgical Time, minutes (SD)	74 (9.2)	78.1 (17)	0.559
Total IV Fluids, mL (SD)	1322.2 (657.9)	1111.7 (408.4)	0.630
EBL, mL (SD)	280.6 (325.0)	155.5 (134.0)	0.186
Length of stay, days (SD)	2 (0.7)	1.6 (1.1)	0.022
IPSS score	7.7 (6.1)	6.3 (5.0)	0.602
History of urinary retention, n (%)	1 (11.1)	5 (1.3)	0.132
History of urinary incontinence, n (%)	8 (0.0)	44 (11.6)	0.006
History of benign prostatic hyperplasia, n (%)	2 (22.2)	22 (5.8)	0.103

Table 5: Multivariable logistic regression evaluating independent risk factors for POUR

Variable	Odds Ratio	95% Confidence Interval	P-value
Age	1.005	0.910 – 1.110	0.920
Gender (female vs. male)	0.087	0.010 – 0.752	0.027
History of benign prostate hyperplasia	1.717	0.198 – 14.902	0.624
History of urinary retention	5.603	0.305 – 102.924	0.246
Surgical time	0.976	0.927 – 1.027	0.346
Total intravenous fluids	1.001	1.000 – 1.002	0.191
Treatment group (catheter vs. no catheter)	0.651	0.155 – 2.744	0.559
IPSS score	1.016	0.888 – 1.163	0.818
BMI	1.105	0.991 – 1.232	0.072