Can Preoperative Postvoid Residual Predict Postoperative Urinary Retention? An Evaluation of Total Joint Arthroplasty Patients

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INTRODUCTION:

Postoperative urinary retention (POUR) is a common complication after total hip and knee arthroplasty. Postvoid residual (PVR) scanning is a simple, noninvasive method commonly used to evaluate for this complication. Preoperative PVR (PrePVR) has previously been suggested as a risk factor for postoperative catheterization. A PrePVR <30ml is insignificant whereas residual volumes >50ml may indicate an increased risk of retention. The aim of this study was to prospectively assess the importance of PrePVR and its relationship with urinary catheter placement, urology consult, and length of stay postoperatively. Our secondary outcomes were to evaluate the changes of PVR before and after surgery and to identify risk factors associated with an increased difference in PVR. Finally, we identified other risk factors (Age, BMI, ASA etc.) associated with POUR.

METHODS:

Data was prospectively and consecutively collected at a single institution by two physician assistants from the patients of two fellowship trained arthroplasty surgeons. All patients were bladder scanned preoperatively to collect PrePVR. Patients were subsequently scanned on postoperative days zero and one to collect Postoperative PVR (PostPVR). Chart review was performed to determine the number of straight catheterizations, foley placement, urology consult and length of stay. A Wilcoxon rank-sum test was used to test whether there is a significant difference in PVR from pre-surgery to post-surgery. The difference in PVR was dichotomized based on a prespecified threshold of 50mL.The binary variable was modeled using logistic regression with a backwards stepwise selection method. The associations between case characteristics and outcome variables were explored via Fisher Exact tests for categorical variables and nonparametric Kruskal-Wallis tests for continuous variables.

RESULTS:

Ninety-four patients were included in this study. There was a significantly increased PostPVR as compared to PrePVR (48.0 mL vs 21.0 mL; p<0.0001) (Table 1). A PrePVR >50 mL was not associated with a significant difference in postvoid residual before and after surgery (p=0.13); length of stay (p=0.08), need for straight catheterization (p=0.11), post operative foley placement (p=1.0), or urology consult (p=1.0). Female patients had a 17% probability of a large increase in PVR (>50 mL) compared to 45% of males on final logistic regression model. The only significant risk factor identified for postoperative foley catheter placement was age with the mean age of a patient (77.7 vs 64.2; P = 0.02).

DISCUSSION AND CONCLUSION:

Our findings suggest that PrePVR may not be an accurate predictor of POUR. Postvoid residual significantly increased in all patients, however this was not indicative of catheterization need and questions the utility of routine bladder screening in this population.

Table 1: Difference in Post-Void Residual before and after surgery

	Pre surgery PVR, mL	Post-surgery PVR, mL	Difference in PVR (post – pre surgery)	p-value
Mean (SD)	32.2 (43.40)	101.1 (145.29)	76.6 (144.19)	
Median (Range)	21.0 (1.0, 341.0)	48.0 (0.0, 602.0)	14.0 (-38.0, 559.0)	<0.0001[a]
N	92	67	66	

[a]P-value from Wilcoxon signed rank test

Table 2: Post-op outcomes/interventions by PrePVR category

	Pre-surgery PVR			
	<50 (N=80)	*50+ (N=12)*	*Total (N=92)*	*P-value*
Difference in Postvoid Residual (Post-surgery - Pre-surgery)				0.1321[1]
Mean (SD)	75.6 (136.30)	87.2 (225.65)	76.6 (144.19)	
Median (Range)	16.5 (-38.0, 559.0)	-23.5 (-32.0, 537.0)	14.0 (-38.0, 559.0)	
N	60	6	66	
Length of stay (days)				0.0805[1]
Mean (SD)	1.3 (1.00)	0.8 (0.94)	1.2 (1.00)	
Median (Range)	1.0 (0.0, 5.0)	1.0 (0.0, 3.0)	1.0 (0.0, 5.0)	
N	80	12	92	
Straight catheter, n (%)				0.1140[2]
No	62 (77.5%)	12 (100.0%)	74 (80.4%)	
Yes	18 (22.5%)	0 (0.0%)	18 (19.6%)	
Post-op Foley catheter, n (%)				1.0000[2]
No	77 (96.3%)	12 (100.0%)	89 (96.7%)	
Yes	3 (3.8%)	0 (0.0%)	3 (3.3%)	
Any post-op catheter, n (%)				0.0624[2]
No	60 (75.0%)	12 (100.0%)	72 (78.3%)	
Yes	20 (25.0%)	0 (0.0%)	20 (21.7%)	
Urology Consult, n (%)				1.0000[2]
No	76 (95.0%)	12 (100.0%)	88 (95.7%)	
Yes	4 (5.0%)	0 (0.0%)	4 (4.3%)	

[1]Kruskal-Wallis p-value; [2]Fisher Exact p-value;