Immediate Postoperative Intravesical Instillation of Chemotherapy after Transurethral Resection of Bladder Tumor: Findings from the National Surgical Quality Improvement Program Database

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Introduction

A postoperative dose of intravesical chemotherapy (POIC) following transurethral resection of bladder tumors (TURBT) for non-muscle invasive bladder cancer has been shown in literature to decrease tumor recurrence. Despite strong evidence demonstrating the effectiveness of treatment and the ease of instillation, it remains significantly underutilized. In this study we analyze the utilization rates and available outcomes of patients receiving POIC following TURBT reported in a national surgical database .

Methods

We queried the American College of Surgeons' National Surgical Quality Improvement Program (ACS-NSQIP) database to identify all patients undergoing TURBT from 2005-2018. Preoperative characteristics, 30-day postoperative outcomes and 30-day readmission rates stratified by POIC treatment were analyzed. The outcomes included cardiac, pulmonary, renal, infectious, thromboembolic, and bleeding complications; re-operation rates; and re-admission rates; Chi-square test, Student's t-test, and logistic regression were used as appropriate with statistical significance defined as $p < 0.05$.

Results

Table 1: Demographics and Preoperative Characteristics for Patients Undergoing TURBT

		POIC	No POIC	P Value
Patients, n (%)		2557 (4.88)	49850 (95.12)	
Age, years (Median, IQR)		72 (64-80)	73 (64.5-81.5)	0.034
Gender, n (%)				0.141
	Male	1967 (76.92)	37699(75.62)	
	Female	590(23.08)	12151(24.38)	
Race, n (%)				
	White	2110 (82.52)	35948 (72.11)	<0.001
	Black	106 (4.15)	2400 (4.81)	
	Asian	62 (2.42)	1182 (2.35)	
	Other/None	279 (10.91)	10320 (20.70)	
Ethnicity – Hispanic, n (%)		81 (3.16)	1900 (3.81)	0.107
ASA Class				
	I - Healthy	48 (1.88)	1076 (2.16)	0.073
	II - Mild	904 (35.35)	17607 (35.32)	
	III- Severe	1463 (57.22)	27815 (55.80)	
	IV- Threat to Life	142 (5.55)	3352 (6.72)	
Diabetic , n(%)		570 (22.3)	1111(22.28)	1
Current Smoker, n(%)		521(20.4)	9890(19.83)	0.524
History of Bleeding Disorder, n(%)		113 (4.42)	2165 (4.34)	0.854
Distant Cancer, n(%)		48 (1.88)	1175 (2.36)	0.1335
Pre-Cr, Median (IQR)		0.98 (0.77-1.19)	0.98(0.75-1.21)	0.260
Pre-Hct, Median (IQR)		40 (37.8-42.2)	39.83(37.13-42.5)	<0.001
Frailty Index, n(%)				0.617
	0	783 (30.62)	15614 (31.32)	
	1	1089 (42.59)	21251 (42.63)	
	2	474 (18.54)	9248 (18.56)	
	3	132 (5.16)	2417 (4.85)	
	4+	79 (3.09)	1320 (2.65)	
Resident Involved, n(%)		89 (3.48)	5270 (10.57)	<0.001
BMI (kg/m^2), median (IQR)		28.26 (24.8-31.7)	27.81 (24.2-31.3)	<0.001
Outpatient Procedure, n (%)		2224 (86.9)	36678 (73.57)	<.0.001
Operative Time (minutes), mean +/- SD		31.85 +/- 24.43	33.73+/- 30.77	<0.001
Tumor Size, n (%)				
	< 2 cm	1098 (42.9)	21434 (42.9)	<0.0001
	2-5 cm	1013(39.6)	17389 (34.8)	
	> 5 cm	446 (17.4)	11027 (22.1)	

Figure 1: Comparisons of 30-day Perioperative Outcome

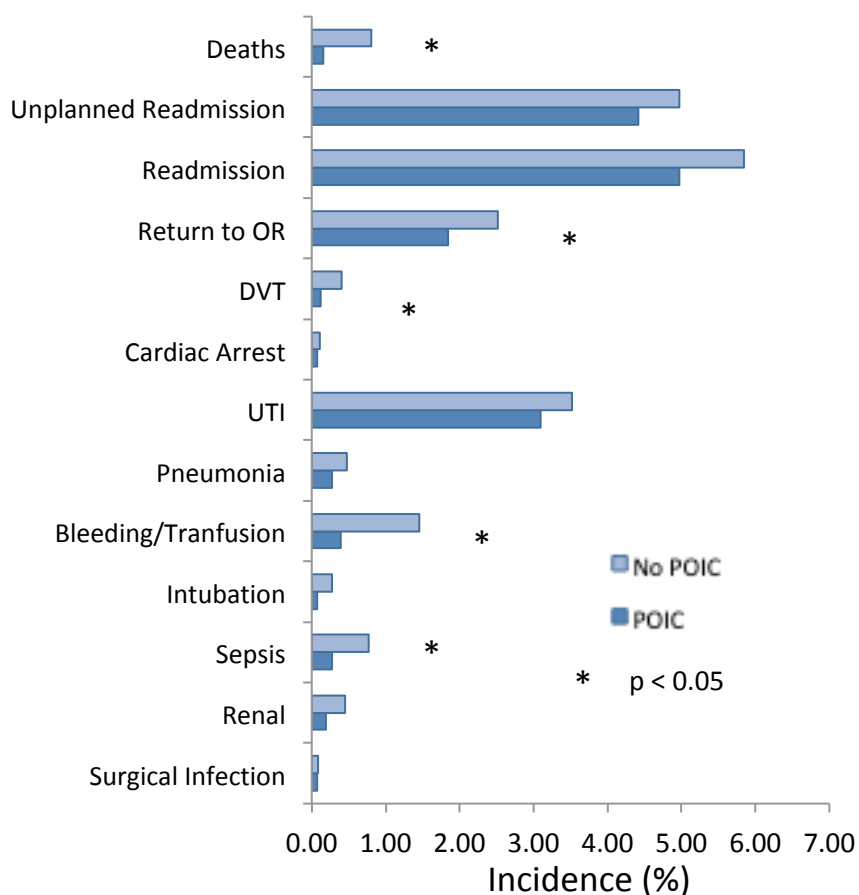### Table 2: Multivariate Analysis on Predictors on Adverse Outcomes after TURBT

	Odds Ratio	Confidence Interval (95%)	P Value
Male Sex	1.046	0.961-1.138	0.297
Age	1.003	0.999-1.007	0.122
Op Time	1.007	1.006-1.008	<0.001
Frailty Index (Ref = 0)			
1	0.982	0.888- 1.085	0.432
2	1.008	0.896-1.115	0.779
3	1.146	0.964-1.362	0.121
4	1.261	1.021-1.558	0.028
5	1.044	0.536-2.033	0.784
Race (Ref = White)			
Black/African American	0.911	0.775-1.07	0.254
Asian	0.978	0.761-1.257	0.518
None	1.096	0.754-1.221	0.913
Pacific Islander	1.19	0.645-2.194	0.571
American Indian	0.868	0.413-1.766	0.467
Current Smoker			0.997
Distant Cancer	1.708	1.484-1.968	<0.001
Weight Loss	1.509	1.172-1.944	<0.001
ASA Class (Ref = 1)			
2	1.143	0.771-1.695	0.293
3	1.392	0.937-2.069	0.101
4	1.958	1.299-2.949	<0.001
5	14.861	3.921-56.362	<0.001
Pre-op Hct	0.906	0.901-0.912	<0.001
Pre-op Cr	1.003	1.000-1.006	<0.001
Bladder Chemo	0.812	0.667-0.987	0.036
Tumor Size (Ref = Small Tumor)			
Medium Tumor	1.343	1.221-1.478	<0.001
Large Tumor	1.618	1.462-1.789	<0.001

Summary & Conclusions

Using a large national surgical database, we observed that the utilization of POIC remains low despite current evidence documenting its efficacy in reducing recurrence and incorporation in guidelines. Considering the inherent limitations of this data, the use of POIC appeared safe as it was not associated with an increase in 30-day complication rate, 30-day mortality rate, or return to the operating room in this database. Further studies are needed to validate these findings and support national educational strategies to improve utilization rates of POIC in this population.