Utilization of Immediate Postoperative Instillation of Intravesical Chemotherapy: A Quality-of-care Concern in Older Patients With Non-muscle-invasive Bladder Cancer

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ABSTRACT

Introduction and Objective: Immediate postoperative instillation of intravesical chemotherapy (IPOIC) reduces the odds of bladder tumor recurrence by 30% to 40% compared with transurethral resection of the bladder tumor (TURBT) alone in patients with non-muscle-invasive bladder cancer (NMIBC). For this reason, its use is recommended or presented as an option in United States (US) and European urology guidelines. However, population-based studies have reported utilization rates ranging from 0.33% to 17%. We undertook this study to determine if elderly patients are equally likely to receive IPOIC on a first resection for NMIBC as younger patients.

Methods: In a nationwide survey of 259 urologists (425 invited, 61% response rate), each was asked to document the last 4 treated cases of NMIBC (n=1,010) with elaborate detail on patient and disease characteristics, as well as provider characteristics. We identified 171 patients who were treated for a first occurrence of NMIBC; 79 (45.9%) under age 65 and 92 (54.1%) 65 or older. We compared utilization of IPOIC in patients undergoing a first TURBT for NMIBC between age groups and across strata of patient, provider, and disease characteristics. Variables significant on univariate analysis (*P*<0.05) were included in the final multivariate logistic regression.

Results: Use of IPOIC was significantly lower among patients age 65 and over (92/677, 13.6%) compared to younger patients (79/333, 23.7%; P < 0.02). Its use was higher in the West (27.1%) and lower in the Midwest (10.8%) compared to other regions, and was higher among patients who were treated for a shorter length of time (mean length of time under physician's care was 27.0 months for those receiving IPOIC and 42.2 months for those not receiving IPOIC; P < 0.02). In addition, use of IPOIC was higher in patients treated by physicians with fellowship training in urologic oncology (31.2% vs 13.8%; P < 0.02). After controlling for each of these covariates in a multivariate model, age remained a significant independent predictor of use of IPOIC (odds ratio [OR]: 0.97, P < 0.001). All tumor characteristics tested in the analyses were not significant predictors of receiving IPOIC.

Conclusions: While IPOIC reduces recurrence of NMIBC, its utilization remains below expected levels. Utilization is lowest among older Americans and those in the Midwest, while patients seeing a physician with fellowship training in urologic oncology have a higher likelihood of receiving treatment. This variation in use of IPOIC raises concerns for a quality-of-care gap across age strata, region, and provider type, which should be further explored in future studies.

INTRODUCTION AND OBJECTIVE

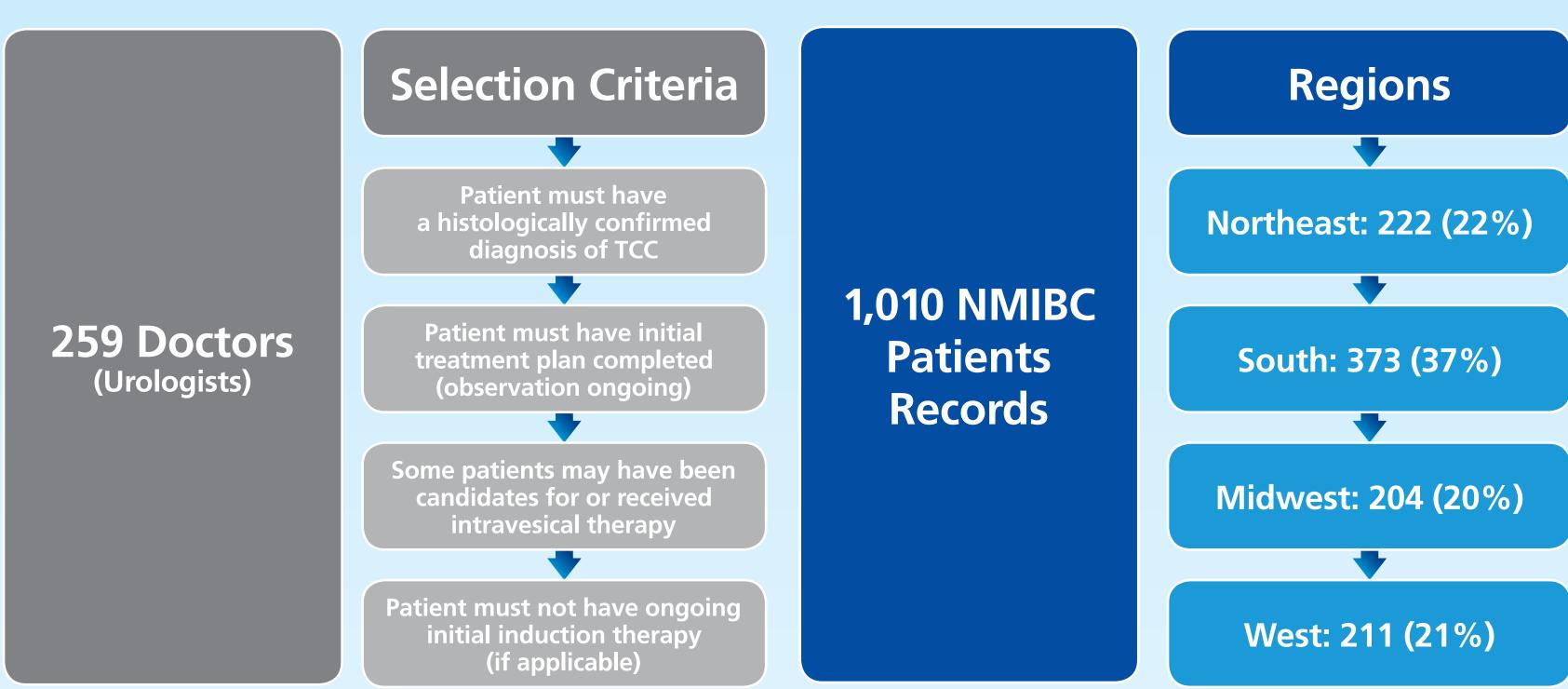
- NMIBC is a common disorder, accounting for 75% to 80% of all bladder cancer cases.¹
- IPOIC reduces the odds of bladder tumor recurrence by 30% to 40% compared with TURBT alone in patients with NMIBC.²
- Use of immediate IPOIC is recommended or presented as an option in US and European urology guidelines.^{3,4}
- Population-based studies have reported utilization rates ranging from 0.33% to 17%.^{5,6}
- The objective of this study was to determine if elderly patients are equally likely to receive IPOIC on a first resection for NMIBC as younger patients.

METHODS

Study Design

- In a nationwide survey, 259 urologists were asked to document the last 4 treated cases of NMIBC with elaborate detail on patient and disease characteristics, as well as provider characteristics.
- Selection criteria included the following: patient must have a histologically confirmed diagnosis of transitional cell carcinoma (TCC), initial treatment plan must be completed, and patients must not have ongoing initial induction therapy (if applicable) (Figure 1).

Figure 1. Study Sample Inclusion Criteria and Geographic Characteristics



Key: NMIBC – non-muscle-invasive bladder cancer; TCC – transitional cell carcinoma

Endpoint

• We compared utilization of IPOIC in patients undergoing a first TURBT for NMIBC between age groups and across strata of patient, provider, and disease characteristics. Variables significant on univariate analysis (P<0.05) were included in the final multivariate logistic regression.

Statistical Analysis

- For data on an interval scale, analysis of variance or *t*-tests were used. For categorical or nominal data comparisons, Chi-square tests of independence and *z*-tests for column proportions were used. An alpha level of 0.05 was used to determine statistical significance.
- Statistical analyses were adjusted to account for differences between urologists and the volume of NMIBC patients. An appropriate weight was applied to ensure that each patient's probability of being selected was accurately reflected in study results.
- Univariate analysis showed that TCC subtype, number of tumors, tumor diameter, presence of concomitant carcinoma in situ (CIS), stage, and grade did not significantly contribute to the model, and were not included.
- A binary logistic regression model was constructed to determine significant predictors of whether a patient receives IPOIC at initial diagnosis when the other tested factors are held constant.

RESULTS

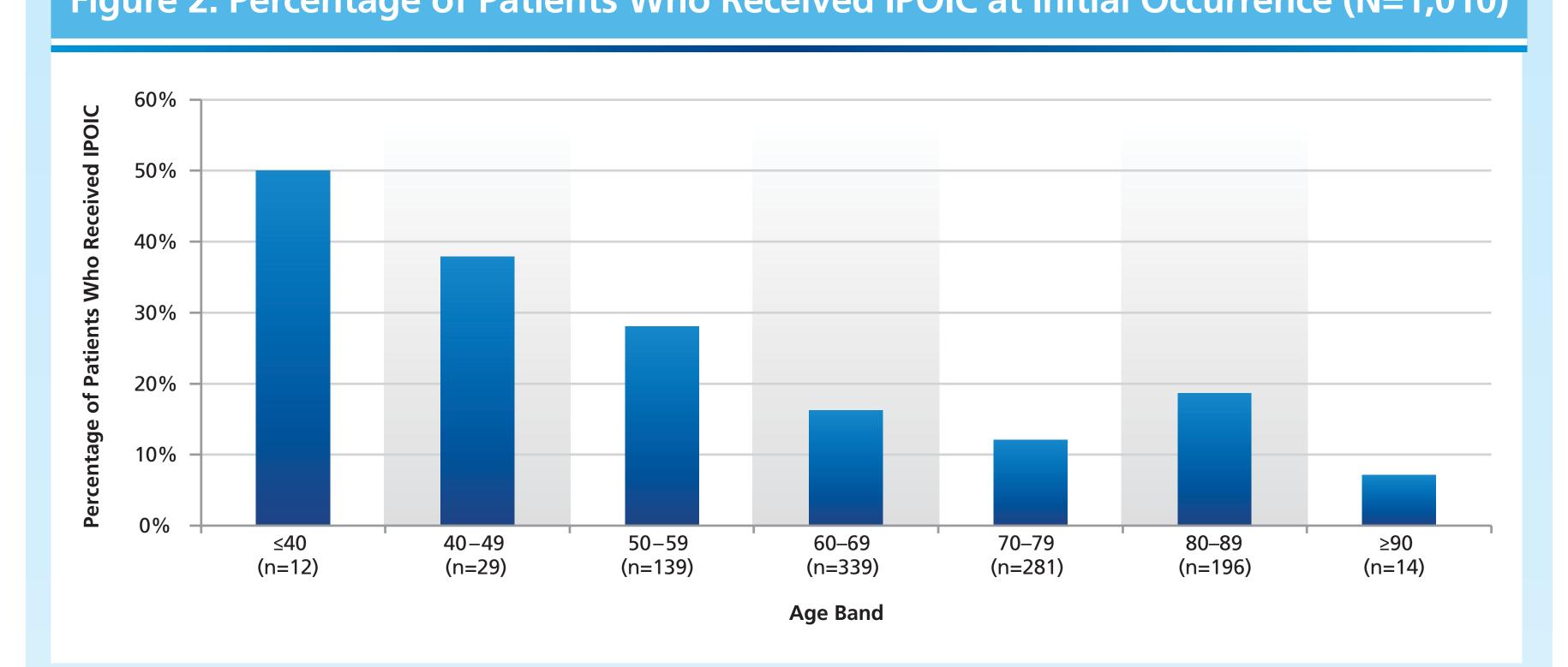
Sample

- Of 425 urologists invited to participate, 259 (61% response rate) provided information on 1,010 NMIBC cases.
- Overall use of IPOIC was 16.9%; 79/333 (23.7%) in patients age 65 and under and 92/677 (13.6%) in patients over 65.
- The mean age of patients who receive IPOIC was 65.1 years compared with 70.1 years for those who did not receive IPOIC (P<0.02).
- 74% of patients were male.
- Of the participating urologists, 30% had completed fellowship training and 16% had specific uro-oncology training.
 - 96% of urologists were board-certified.

Characteristics Associated With IPOIC

- Patients in the younger age cohorts were more likely to receive IPOIC (P<0.001) (Figure 2).
- Patients under 65 years of age were significantly more likely to receive IPOIC than those 65 years of age or older (23.7% vs 13.6% [P<0.02]).

Figure 2. Percentage of Patients Who Received IPOIC at Initial Occurrence (N=1,010)

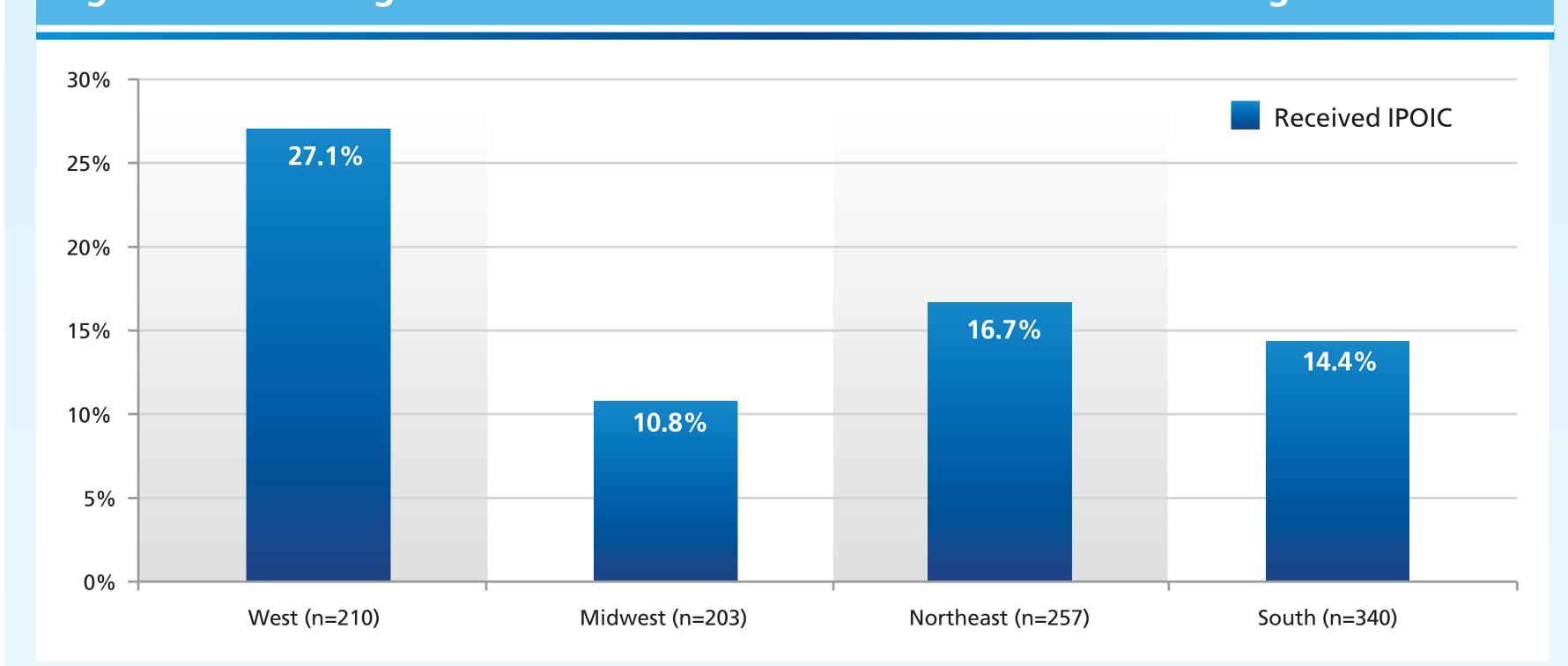


Key: IPOIC – immediate postoperative instillation of intravesical chemotherapy

Region

• IPOIC use was higher in the West (27.1%) and lower in the Midwest (10.8%) compared to other regions (*P*<0.02) (Figure 3).

Figure 3. Percentage of Patients Who Received IPOIC Within Each Region

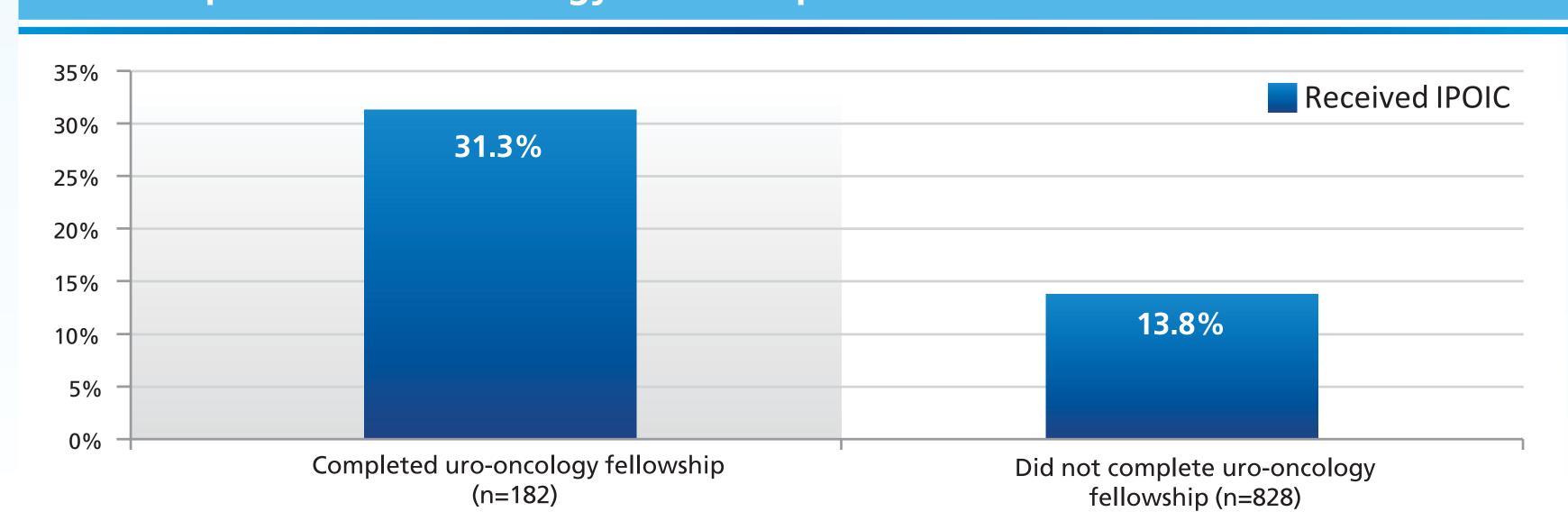


Key: IPOIC – immediate postoperative instillation of intravesical chemotherapy

Uro-oncology Fellowship Training

 Use of IPOIC was higher in patients treated by physicians with a uro-oncology fellowship than those without (31.3% vs 13.8%; P<0.02 [Figure 4]).

Figure 4. Percentage of Patients Who Received IPOIC Based on Whether Physician Had Completed a Uro-oncology Fellowship



Key: IPOIC – immediate postoperative instillation of intravesical chemotherapy

Length of Time Patient Had Been Treated by Physician at Time of Initial Diagnosis

- IPOIC use was higher among patients who were treated for a shorter length of time
 - Mean length of time under physician's care was 27.0 months (standard deviation [SD]: 32.9) for those receiving IPOIC and 42.2 months (SD: 46.4 months) for those who not receiving IPOIC (*P*<0.02).

Logistic Regression Analysis

- A binary logistic regression model was used to determine predictors of IPOIC (Table 1).
- After controlling for each covariate in a multivariate model, age remained a significant independent predictor of use of IPOIC. For each additional year of age, a patient was approximately 3% less likely to receive IPOIC at initial diagnosis.
- For patients who are living in the Western region, the likelihood of receiving IPOIC was approximately 2.5 times greater than all other regions combined.
- For each additional month treated by a physician, a patient was approximately 1% less likely to receive IPOIC at initial diagnosis.
- A patient whose physician completed a uro-oncology fellowship was approximately 3.2 times more likely to receive IPOIC.
- All tumor characteristics tested in the analyses were not significant predictors of receiving IPOIC.

Table 1. Logistic Regression Odds Ratios of Receiving IPOIC

Variable*	Odds Ratio	95% Confidence Interval	<i>P</i> -value
Age	0.970	0.943, 0.997	0.001
Living in the Western region	2.447	1.728, 3.166	<0.001
Time patient treated by physician	0.991	0.982, 1.000	0.002
Whether physician completed a uro-oncology fellowship	3.16	2.52, 3.80	<0.001

Key: IPOIC – immediate postoperative instillation of intravesical chemotherapy

CONCLUSIONS

- Factors associated with IPOIC use include younger age, treatment in the Western region, completion of uro-oncology fellowship by the physician, and less time treated by the physician.
- This variation in use of IPOIC raises concerns for a quality-of-care gap across age strata, region, and provider type, which warrant further research.

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^{*}Each value represents a separate regression model predicting the outcome variable as a function of whether the patient received IPOIC.