A 10-Item Checklist Improves Reporting of Critical Procedural Elements during Transurethral Resection of Bladder Tumor

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Abbreviations and Acronyms

CIS = carcinoma in situ

NMIBC = nonmuscle invasive bladder cancer

TURBT = transurethral bladder tumor resection

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For another article on a related topic see page 1270.

Purpose: Previous studies have demonstrated significant variation in recurrence rates after transurethral resection of bladder tumor, likely due to differences in surgical quality. We sought to create a framework to define, measure and improve the quality of transurethral resection of bladder tumor using a surgical checklist.

Materials and Methods: We formed a multi-institutional group of urologists with expertise with bladder cancer and identified 10 critical items that should be performed during every high quality transurethral bladder tumor resection. We prospectively implemented a 10-item checklist into practice and reviewed the operative reports of such resections performed before and after implementation. Results at all institutions were combined in a meta-analysis to estimate the overall change in the mean number of items documented.

Results: The operative notes for 325 transurethral bladder tumor resections during checklist use were compared to those for 428 performed before checklist implementation. Checklist use increased the mean number of items reported from 4.8 to 8.0 per resection, resulting in a mean increase of 3.3 items (95% CI 1.9–4.7) on meta-analysis. With the checklist the percentage of reports that included all 10 items increased from 0.5% to 27% ($p < 0.0001$). Surgeons who reported more checklist items tended to have a slightly higher proportion of biopsies containing muscle, although not at conventional significance ($p = 0.062$).

Conclusions: The use of a 10-item checklist during transurethral resection of bladder tumor improved the reporting of critical procedural elements. Although there was no clear impact on the inclusion of muscle in the specimen, checklist use may enhance surgeon attention to important aspects of the procedure and be a lever for quality improvement.

Key Words: urinary bladder neoplasms, urologic surgical procedures, quality improvement, checklist, surgeons

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TRANSURETHRAL resection of bladder tumor is a common diagnostic and therapeutic procedure for patients with NMIBC. Of the 74,000 patients with newly diagnosed bladder cancer in 2015 approximately 75% presented with NMIBC.[1,2] Although patients with NMIBC generally have low cancer specific mortality, up to half experience intravesical recurrence and require additional TURBTs.[2] Most of the 600,000 survivors of bladder cancer today have a native bladder and are at risk for intravesical recurrences and multiple TURBTs, resulting in added patient morbidity and increased health care costs.[3,4]

The quality of surgical resection may have a significant impact on the risk of intravesical recurrence. According to data from European intravesical chemotherapy trials of almost 2,500 patients with NMIBC treated at a total of 63 hospitals, the early intravesical recurrence rates varied from 0% to 43% depending on where patients were treated.[5] These differences persisted after accounting for disease and treatment related factors, and were thought to be explained by variations in TURBT quality. There is strong evidence that more complete resection is associated with improved NMIBC outcomes[5–8] and some patients undergo grossly incomplete TURBT.[9]

Improving the quality of care for patients with NMIBC may be possible by modifying the TURBT surgical technique.[10,11] When attempting to improve surgical outcomes, it is critical to measure and compare processes of care.[12] However, there is no structure in which to measure TURBT quality due to the lack of procedural standardization and reporting methods. Whereas successful efforts have been made to standardize the reporting of colonoscopy and diagnostic radiology as a means of quality improvement, relatively little has been done for TURBT.[13,14] We sought to define TURBT quality and investigate the use of a checklist to improve surgical quality.

METHODS

We formed a multi-institutional group of urologists with expertise in bladder cancer and an interest in surgical quality. Our first objectives were to define high quality TURBT and identify the operative steps necessary to achieve a successful operation. The group used an iterative process to identify key TURBT elements associated with oncologic and safety end points from an extensive list of potentially important factors identified from a literature review, current guidelines and expert opinions. These results were compiled into a set of 10 critical and 3 optional items that should be performed, at minimum, during every high quality TURBT. These items included the steps needed to assign disease risk (tumor number, size, multifocality, characteristics, concern for presence of CIS and recurrent vs primary tumor), clinical stage (examination with anesthesia and assignment of clinical tumor stage), adequacy of resection (visually complete resection and visualization of muscle at the resection base) and presence of complications (assessment for perforation). These items were assembled into a user-friendly list with suggestions on how each item can be documented (see Appendix).

Our second objective was to determine whether checklist use at surgery could improve operative reporting, which may be a proxy for surgical quality. We first evaluated the quality of TURBT reporting at each institution by retrospectively counting the number of critical elements in each operative report for consecutive TURBTs. When evaluating these reports, we considered a description of tumor characteristics as any effort to describe the visual appearance of the tumors (flat, papillary, sessile, etc). Likewise, we considered any description of tumor size (1 cm, large, extensive, etc) and number (solitary, multiple, 3, etc) adequate. We considered the items related to adequacy of resection, visualization of muscle at the resection base, presence of CIS and evaluation for perforation to have been addressed if they were mentioned in the operative report whether or not they occurred. For instance, surgeons were credited for documenting completeness of resection even if a tumor was incompletely resected, and for documenting presence of CIS if there was no concern for CIS.

Each institution then prospectively implemented the checklist during TURBT. Surgeons were directed to consult the checklist prior to TURBT and when entering the operative report. We included all TURBTs in which a cutting loop was used to resect tissue concerning for carcinoma regardless of final pathology findings. Institutional review board approval was obtained at each institution when required.

Outcome

The primary outcome was the number of critical procedural elements included in the TURBT operative report. To determine whether improved reporting was associated with a clinically meaningful outcome, our secondary outcome was the percent of TURBT specimens that contained detrusor.

Statistical Analysis

We compared the absolute difference in the mean number of checklist items documented per operative report at each institution before and after checklist implementation. Results at each institution were combined using a meta-analysis with random effects to obtain an estimate of the overall change in the mean number of items documented. We used the chi-square test for comparing the proportion of operative notes with documentation of all 10 steps before and after checklist implementation as well as for reporting the rates of each checklist item. The relationship between the probability of muscle in the TURBT specimen and the number of documented checklist items