Physician Perceptions of Patient Health: A Comparative Analysis between Urologist and Hospitalist Perceptions of Need for Inpatient Hospitalist Comanagement Following Radical Cystectomy

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Key Words

Bladder cancer • Bladder neoplasm • Cystectomy • Questionnaire • Survey • Urinary bladder tumors • Hospitalist • Comanagement

Abstract

Background/Aims: The morbidity of radical cystectomy remains high. A multidisciplinary approach utilizing hospitalist comanagement may improve outcomes. It is unclear what factors should be considered to determine which patients might benefit from this approach. We sought to determine if there are differences between the perceived need for comanagement between urologists and hospitalists. Preoperative variables were analyzed to determine which factors might be associated with need for comanagement. **Methods:** A case-based survey was emailed to urologists and hospitalists at 3 academic institutions to investigate perceptions regarding need for inpatient medical comanagement of fictitious patients following cystectomy. Decisions were rated based on patient comorbidities, age, race, sex, cancer stage, neoadjuvant therapy, alcohol intake, performance status,

and English literacy. A Wilcoxon rank sum test assessed each question for differences. A Mantel-Haenszel chi-square test was used to assess whether the proportion of respondents who advocated for comanagement increased as Charlson comorbidity score increased. **Results:** The most significant determinant of need for postoperative comanagement was patients' comorbidities. Urologists and hospitalists did not differ significantly in beliefs regarding need for comanagement. **Conclusion:** The most important determining factor for comanagement was presence of comorbidities. Further studies are needed to evaluate the impact of this multidisciplinary approach.

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Introduction

Eighty-five percent of hospitalist groups report assisting other physicians with the medical comanagement of patients in some capacity, as published in the 2005–2006

Society of Hospital Medicine survey. Orthopedics is the most common surgical subspecialty incorporating comanagement into their model at approximately 40% with urology trailing at approximately 25% [1]. The evidence supporting comanagement is mixed. One study showed a reduction in length of stay and resource utilization when an internist joined a cardiothoracic surgery team [2]. Another demonstrated decreased time to surgery in patients with hip fractures [3]. While no difference was noted in neurosurgical patients in terms of mortality, readmission rates, or length of stay, there was an increased perception of improved care by the nursing staff when hospitalists were involved with patient management [4]. One randomized controlled trial in orthopedic patients undergoing elective joint replacements showed that those randomized to comanagement demonstrated significantly fewer complications and a significant reduction in adjusted length of stay by 0.5 days [5]. The variability in results may be related to patient selection, particularly because all patients may not benefit from comanagement. Identifying those who might benefit most from comanagement may provide improved clinical outcomes and resource utilization. The 3 centers involved in this study recently integrated hospitalist comanagement into the care of select urologic patients. The patients were chosen using non-standardized criteria by the urologists and subsequently comanaged by a hospitalist. We sought to determine whether urologists and hospitalists agree with the patient selection and to identify which factors may be most important in the selection process.

Methods

Three academic institutions whose urologic surgical services actively involve hospitalist comanagement in their post-surgical patient's care participated in this study. Full Institutional Review Board approval was obtained from the participating institutions prior to proceeding with the study.

An online survey composed of 10 case scenarios was created with the common theme of a mock bladder cancer patient scheduled to undergo radical cystectomy. In the question stem, the text included 5–6 variables that alternated in each question: type and number of patient comorbidities, gender, age, race, cancer stage, use of neoadjuvant therapies, Eastern Cooperative Oncology Group (ECOG) performance status, social history, and English literacy (table 1).

Survey respondents were asked 1) "Postoperatively, do you believe the patient requires medical comanagement with a hospitalist (yes/no)", and 2) "Please rank which variables influenced this decision (1 = most important, 5 = least important)". The variables were rotated in an attempt to determine the role each played in the survey respondent's decision-making process about the necessity for hospitalist comanagement.

Questions were shuffled in the order they appeared in the survey and certain cases purposely had the same potential influential variable present. This was implemented to minimize leading bias in responses as well as to allow for differences in variable ranking based on scenario. Following the case-based scenarios, respondents were asked demographic questions regarding their area of practice, age, gender, years in practice since completing training, fellowship training, and whether they individually use hospitalist comanagement.

Survey data were collected and managed using REDCap electronic data capture tools hosted at Northwestern University [6]. The order of presentation for the variables in each question stem varied to minimize presentation bias when answering the survey. Respondents were required to rank each of the variables with a unique degree of importance and were not able to leave any variable unranked. A pilot version of the survey was sent to several urology residents uninvolved in the study to verify that the survey was functional and comprehensible. From this, there were several modifications made to the universal design of the survey but no content was altered.

Email addresses were collected from all faculty urologists practicing adult urology and from all faculty hospitalists participating in postoperative management of surgical patients. An invitation and link to the survey was emailed to all potential respondents through REDCap. Surveys were distributed in March 2015 and respondents were given 1 month to respond. Reminder emails to complete the survey along with the survey link were sent out 1 week and 1 day prior to the survey closure date.

For each scenario, a Pearson chi-square or Fisher's exact test was used to determine whether comanagement was recommended between urologists and hospitalists. Because each scenario also required participants rank patients' comorbidities as requiring management by a hospitalist, a Wilcoxon rank-sum test was also used to assess for differences in these rankings between urologists and internal medicine physicians. Finally, a Mantel-Haenszel chi-square test for trend was used to assess whether the proportion of respondents who advocated for hospitalist intervention increased as Charlson comorbidity score (CCS) increased.

Results

The survey was emailed to 89 physicians and 35 (39.3%) responded. Among these respondents, 12 (34%) identified as urologists and 18 (51%) identified as hospitalists. Among the urologists, 11 (92%) were male and 1 (8%) was female; there were 9 (50%) male hospitalists and 9 (50%) female hospitalists. The median years in practice for urologists was 15 years [interquartile range (IQR) = 4.75–34.00] and for hospitalists was 6 years (IQR = 3.00–15.00).

Age was only a significant predictor of comanagement in scenario 1, where the patient was notably 82 years old ($p < 0.001$). For all other scenarios, age was not a significant factor in the decision to include or exclude comanagement. Patient comorbidities played a marked role in estimating respondents' use of comanagement.

Table 1. Case-based survey question stems and variables within each stem that respondents were asked to rank from 1 (most important) to 5 (least important) as having influenced their decision about necessity for hospitalist comanagement

Question	Question stem followed by “Post-operatively, do you believe the patient requires medical comanagement with a hospitalist?”	Ranked variables	CCS
1	Ms. X is an 82-year-old Caucasian woman with recently diagnosed muscle-invasive bladder cancer and no other medical problems. She is scheduled to undergo radical cystectomy with urinary diversion.	age, cancer stage, comorbidities, gender, race	2
2	Mr. X is a 72-year-old Asian man with recurrent BCG-refractory carcinoma <i>in situ</i> of the bladder who has opted to proceed with early radical cystectomy with urinary diversion. He has a history of a myocardial infarction.	age, cancer stage, comorbidities, gender, race	3
3	Ms. X is a 48-year-old African American woman with recently diagnosed muscle-invasive bladder cancer, and a history of congestive heart failure and diabetes with no end-organ damage. She is scheduled to undergo radical cystectomy with urinary diversion.	age, cancer stage, comorbidities, gender, race	4
4	At 65 years old, Mr. X recently successfully completed neoadjuvant chemotherapy for muscle-invasive bladder cancer. He is a Hispanic male, and otherwise healthy, and is now scheduled to undergo radical cystectomy with urinary diversion.	age, cancer stage, comorbidities, gender, neoadjuvant therapy, race	2
5	Mr. X is a 60-year-old Caucasian man with a history of peptic ulcer disease, hypertension, and moderate renal disease (GFR 40 ml/min/1.73m ²). He is scheduled to undergo radical cystectomy with urinary diversion for his clinical stage T3 bladder cancer.	age, cancer stage, comorbidities, gender, race	5
6	68-year-old Ms. X was recently diagnosed with muscle-invasive bladder cancer. She is African American and has a history of hypertension, peripheral vascular disease, diabetes with end-organ damage, and moderate liver disease. She is scheduled to undergo radical cystectomy with urinary diversion.	age, cancer stage, comorbidities, gender, race	8
7	Mr. X is a 65-year-old Caucasian man with recurrent BCG-refractory carcinoma <i>in situ</i> of the bladder who has opted to proceed with early radical cystectomy with urinary diversion. He has a history of a myocardial infarction, but is able to carry out most activities with only slight shortness of breath.	age, cancer stage, comorbidities, ECOG performance status, gender, race	3
8	Caucasian 76-year-old Mr. X, who enjoys 3 glasses of bourbon daily, was found to have hematuria at his annual check-up for mild chronic liver disease. He was ultimately diagnosed with muscle-invasive bladder cancer. He is now scheduled to undergo radical cystectomy with urinary diversion.	age, alcohol intake, cancer stage, comorbidities, gender, race	3
9	Ms. X is a 77-year-old Hispanic woman with a history of diabetes with end-organ damage, hypertension, and severe renal disease for which she is on hemodialysis. She is mostly confined to home, except for medical appointments. She is scheduled to undergo radical cystectomy with urinary diversion for her muscle-invasive bladder cancer.	age, cancer stage, comorbidities, ECOG performance status, gender, race	6
10	Ms. X is a 60-year-old Caucasian woman with a history of peptic ulcer disease, hypertension, and moderate renal disease (GFR 40 ml/min/1.73m ²). She comes to the office to learn more about her muscle-invasive bladder cancer and discuss scheduling her radical cystectomy with urinary diversion. She is not English-literate.	age, cancer stage, comorbidities, english literacy, gender, race	5

BCG = Bacillus Calmette–Guérin; GFR = glomerular filtration rate.

For example, scenarios 1 and 4 comprised otherwise healthy patients with few comorbidities and, as expected, the patients’ health was the strongest reason for respondents’ decisions not to involve comanagement (table 2).

In scenarios 3, 6, and 9, where patients had multiple comorbidities, all respondents felt that comanagement was necessary and ranked comorbidities as most important or somewhat important in making that decision.

Table 2. Examining the importance of comorbidity between physician groups

	Urologist (n = 12)	Medicine (n = 18)	P
Scenario 1	8 (67%)		0.77
1 (most important)	3 (25%)	12 (67%)	
2	1 (8%)	2 (11%)	
3	0	2 (11%)	
4	0	2 (11%)	
5 (least important)	0	0	
Scenario 2	12 (100%)		0.50
1 (most important)	0	16 (89%)	
2	0	1 (6%)	
3	0	1 (6%)	
4	0	0	
5 (least important)	0	0	
Scenario 3	12 (100%)		0.99
1 (most important)	0	18 (100%)	
2	0	0	
3	0	0	
4	0	0	
5 (least important)	0	0	
Scenario 4	8 (67%)		0.79
1 (most important)	3 (25%)	14 (78%)	
2	1 (8%)	0	
3	0	0	
4	0	1 (6%)	
5 (least important)	0	3 (17%)	
Scenario 5	12 (100%)		0.99
1 (most important)	0	18 (100%)	
2	0	0	
3	0	0	
4	0	0	
5 (least important)	0	0	
Scenario 6	12 (100%)		0.99
1 (most important)	0	18 (100%)	
2	0	0	
3	0	0	
4	0	0	
5 (least important)	0	0	
Scenario 7	9 (75%)		0.99
1 (most important)	3 (25%)	14 (78%)	
2	0	4 (22%)	
3	0	0	
4	0	0	
5 (least important)	0	0	
Scenario 8	8 (67%)		0.44
1 (most important)	2 (17%)	9 (50%)	
2	2 (17%)	5 (28%)	
3	0	3 (17%)	
4	0	1 (6%)	
5 (least important)	0	0	
Scenario 9	11 (92%)		0.40
1 (most important)	1 (8%)	18 (100%)	
2	0	0	
3	0	0	
4	0	0	
5 (least important)	0	0	
Scenario 10	12 (100%)		0.99
1 (most important)	0	17 (94%)	
2	0	1 (6%)	
3	0	0	
4	0	0	
5 (least important)	0	0	

Further, as CCS increased across the scenarios, there was a significant trend in the proportion of respondents agreeing to hospitalist intervention ($p < 0.001$) (table 3).

In scenarios 1, 6, 7, and 10, hospitalists rated preoperative bladder cancer stage as being significantly more important in their decision to opt for comanagement, however these results were marginal. Urologists were overall neutral about the effect of cancer stage on the need for comanagement as compared to their hospitalist colleagues (fig. 1).

For most scenarios, race was an unimportant factor in determining the need for comanagement. However, for scenario 6, $n = 16/18$ (89%) of hospitalists felt race was unimportant while $n = 4/12$ (33%) of urologists reported race as an important determinant of comanagement ($p = 0.045$). Similarly, in scenario 8, 100% of hospitalists indicated race was unimportant whereas $n = 5/18$ (28%) of urologists indicated race was an important determinant ($p = 0.015$).

Though there were only 2 scenarios addressing ECOG performance status, it is clear that urologists and hospitalists differ when ECOG is grossly decreased (i.e. ECOG-PS 2). In scenario 9, for example, 100% of urologists felt ECOG performance status was an important determinant of comanagement whereas only 67% of hospitalists indicated ECOG performance status was important (exact $p = 0.02$). Moreover, $n = 19$ of 23 respondents (83%) who indicated that comanagement was required for scenario 8 (i.e., which specifies a gross abnormal alcohol intake level of 3 glasses of bourbon daily) also felt that such alcohol consumption was an important determinant requiring comanagement. By comparison, only $n = 5/7$ (71%) of respondents who declined comanagement for scenario 8 indicated alcohol intake was an important determinant requiring comanagement ($p = 0.04$).

Overall, urologists and hospitalists did not significantly differ in their belief regarding the need for comanagement (range: $p = 0.19$ through $p = 0.99$ for scenarios 1 through 10). However, in scenario 1, physicians who requested comanagement had significantly more years of practice [median (Mdn) = 16, IQR = 7–17] when compared to those who did not require comanagement (Mdn = 6, IQR = 4–8; $p = 0.03$). Similar results were seen in scenario 8 (trending towards significance at $p = 0.07$). Importantly, when these results were stratified by gender, there was no difference in respondents' years of practice between those who reported recommending versus not recommending comanagement. Lastly, when stratified by area of practice (urology versus hospitalist), the significance among the scenarios disappeared among urologists but persisted for hospitalists in scenario 1, where those advocating for comanagement had significantly more years of experience (Mdn = 15, IQR = 6–17) than

Fig. 1. Importance of bladder cancer stage in determining the need for comanagement.

Table 3. Survey scenario (corresponding CCS)

	CCS										
	1 (2)	4 (2)	2 (3)	7 (3)	8 (3)	3 (4)	5 (5)	10 (5)	9 (6)	6 (8)	
Answer											< 0.0001
No	19 (56%)	20 (65%)	9 (27%)	5 (16%)	7 (23%)	0	4 (13%)	5 (17%)	0	0	
Yes	15 (44%)	11 (35%)	24 (73%)	26 (84%)	23 (77%)	31 (100%)	27 (87%)	25 (83%)	30 (100%)	31 (100%)	
Total	34	31	33	31	30	31	31	30	30	31	

Note: Counts within each cell are reported with percent within column in parentheses. Significance (p) was determined using the Mantel-Haenszel chi-square test for trend.

those declining comanagement (Mdn = 5, IQR = 3–6; $p = 0.01$). Similar results were approaching significance for scenarios 2 ($p = 0.053$), 5 ($p = 0.10$), and 10 ($p = 0.08$).

Discussion

Numerous studies have been published reporting complication rates following radical cystectomy ranging from 20 to 64% in the early postoperative period [7–11].

Hospitalist comanagement of surgical patients has been well reported in the literature in various surgical subspecialties with the goal of minimizing morbidity, mortality, and length of stay [12, 13]. To our knowledge, no literature has been published to date specifically examining the use of hospitalist comanagement in postoperative urologic patients. As this is a relatively new practice, there is no standardization regarding the involvement of hospitalist comanagement and hence utilization of this resource has been inconsistent. Current practice within

our institutions varies from postoperative consultation of hospitalists on an as-needed basis to routine postoperative comanagement.

We sought to distinguish what preoperative patient variables might trigger a hospitalist consult, and if these varied between urologists and hospitalists. To our knowledge, in the published literature, our survey of 35 physicians is the first in which urologists and hospitalists were queried about their perceptions regarding comanagement in urologic surgical patients.

In our 10 case-based scenarios, the 2 specialties did not vary significantly in their decision to involve hospitalist comanagement. The most significant and consistent determinant of the need for postoperative comanagement was a patient's comorbidities. When these comorbidities were ranked based on CCS, respondents continued to be significantly more likely to answer "yes" for comanagement as the CCS increased. Age, race, gender, cancer stage, neoadjuvant therapy, alcohol intake, ECOG performance status, and English literacy were not significant factors in the perceived need for comanagement.

In several scenarios, hospitalists indicated that a patient's cancer stage was a strong factor in their involvement of comanagement, whereas urologists rated the patient's stage as neutral in affecting this decision. Three of these scenarios included patients with muscle-invasive bladder cancer, a clear indication for timely cystectomy, whereas the third patient had recurrent carcinoma *in situ*, which does not always necessitate immediate cystectomy. This likely reflects specialty-specific knowledge between the 2 disciplines about the association between cancer stage and outcomes, as the urologist's knowledge and experience with the disease is more robust than the hospitalist's.

The limitations of this study include its small sample size and low response rate (39.3%). We attempted to solicit responses from physicians at 3 independent academic institutions, however they were all from the same major metropolitan city and were all affiliated with tertiary care referral centers. While we used robust non-parametric models, the results may not necessarily be representative of the broader urologic or hospitalist community. Distributing the survey to a wider audience of academic and non-academic urologists and hospitalists might yield a larger sample size upon which stronger conclusions might be drawn.

Several of the variables, such as neoadjuvant therapy, alcohol intake, performance status, and English literacy, were only included 1 to 2 times in the various scenarios, therefore any observations lack the power to yield forma-

tive conclusions. Increasing the complexity of all the scenarios by incorporating these variables more frequently, however, would have put the survey respondents at risk for fatigue, thus potentially worsening the response rate.

Future studies are needed to evaluate what specific patient factors should be used to determine selection for hospitalist comanagement.

Although urologists and hospitalists contribute unique perspectives on overall patient health, they generally agreed that following radical cystectomy, patients with more comorbidities should have hospitalist comanagement. Further studies evaluating patient variables and outcomes in a real-world scenario are needed to identify the thresholds needed for initiating comanagement. These studies would help standardize the implementation of comanagement leading to potentially improved patient outcomes and more efficient and economic healthcare delivery.

References

- Sharma G, Kuo YF, Freeman J, Zhang DD, Goodwin JS: Comanagement of hospitalized surgical patients by medicine physicians in the United States. *Arch Intern Med* 2010;170:363–368.
- Macpherson DS, Parenti C, Nee J, Petzel RA, Ward H: An internist joins the surgery service: does comanagement make a difference? *J Gen Intern Med* 1994;9:440–444.
- Auerbach AD, Wachter RM, Cheng HQ, Maselli J, McDermott M, Vittinghoff E, Berger MS: Comanagement of surgical patients between neurosurgeons and hospitalists. *Arch Intern Med* 2010;170:2004–2010.
- Auerbach AD, Rasic MA, Sehgal N, Ide B, Stone B, Maselli J: Opportunity missed: medical consultation, resource use, and quality of care of patients undergoing major surgery. *Arch Intern Med* 2007;167:2338–2344.
- Huddleston JM, Long KH, Naessens JM, Vanness D, Larson D, Trousdale R, Plevak M, Cabanela M, Ilstrup D, Wachter RM: Medical and surgical comanagement after elective hip and knee arthroplasty: a randomized, controlled trial. *Ann Intern Med* 2004;141:28–38.
- Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG: Research electronic data capture (REDCap): A metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform* 2009;42:377–381.
- Chang SS, Cookson MS, Baumgartner RG, Wells N, Smith JA Jr: Analysis of early complications after radical cystectomy: results of a collaborative care pathway. *J Urol* 2002;167:2012–2016.
- Ghoneim MA, el-Mekresh MM, el-Baz MA, el-Attar IA, Ashamallah A: Radical cystectomy for carcinoma of the bladder: critical evaluation of the results in 1,026 cases. *J Urol* 1997;158:393–399.
- Shabsigh A, Korets R, Vora KC, Brooks CM, Cronin AM, Savage C, Raj G, Bochner BH, Dalbagni G, Herr HW, Donat SM: Defining early morbidity of radical cystectomy for patients with bladder cancer using a standardized reporting methodology. *Eur Urol* 2009;55:164–174.
- Richards KA, Steinberg GD: Perioperative outcomes in radical cystectomy: how to reduce morbidity? *Curr Opin Urol* 2013;23:456–465.
- Quek ML, Stein JP, Daneshmand S, Miranda G, Thangathurai D, Roffey P, Skinner EC, Lieskovsky G, Skinner DG: A critical analysis of perioperative mortality from radical cystectomy. *J Urol* 2006;175:886–889.
- de Vries S, Jeffe DB, Pruitt SL, Davidson NO, Schootman M: Patient, hospital, and geographic disparities associated with comanagement during hospitalization for colorectal cancer surgery. *J Hosp Med* 2014;9:226–231.
- Dy CJ, Dossous PM, Ton QV, Hollenberg JP, Lorch DG, Lane JM: Does a multidisciplinary team decrease complications in male patients with hip fractures? *Clin Orthop Relat Res* 2011;469:1919–1924.