Original Study

Incidence and Predictors of 30-Day Readmission in Patients Treated With Radical Cystectomy: A Single Center European Experience

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Abstract

Radical cystectomy (RC) is associated with significant complication rates, however, no data exist about incidence of readmission after RC in European series that are characterized by longer length of stay (LOS) compared with American series. We found a rate of 12% of 30-day readmission, moreover, an increase of LOS seems effective to prevent readmission only in patients older than 70 years.

Introduction: Previous studies showed high hospital readmission rates after radical cystectomy (RC) for bladder cancer (BCa), however at the time results of a European series analyzing this event were still missing. **Patients and Methods:** Overall, 1090 consecutive BCa patients treated with RC at a single center between January 2002 and August 2012 were identified. Logistic regression analyses were used to test the association between covariates and 30-day readmission in the overall population and after stratifying according age at the time of surgery. **Results:** Mean length of stay (LOS) was 19 days (median, 16 days), and the overall 30-day readmission rate was 12.2%. The most frequent reasons for readmission at 30 days were ileus (n = 15; 11.3%), lymphoceles (n = 11; 8.3%), wound infection (n = 10; 7.5%), and fever (n = 12; 9.0%). In multivariable logistic regression analysis, age (odds ratio [OR], 1.02; $P = .04$) and LOS (OR, 0.94; $P < .01$) were associated with 30-day readmission. However, when analyzed according age at the time of surgery, a beneficial effect from a longer LOS was observed only in patients older than 70 years ($P < .003$). **Conclusion:** In the first European series on the effect of 30-day readmission, our data showed that even with a relative high mean LOS, 30-day readmission remained an ineradicable factor. Of note, older patients and shorter LOS were associated with an increased risk of readmission at 30 days, however, an increase of LOS to prevent readmission seemed effective only in patients older than 70 years.

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Introduction

Radical cystectomy (RC) with pelvic lymph node dissection (PLND) represents the treatment of choice for muscle-invasive and recurrent bladder cancer (BCa).[1] However, RC is a complex surgical procedure associated with significant risk of intra- and postoperative complications.[2-5] In context, attention is increasing in the consideration of hospital readmission after surgery that has been recently scrutinized as driver of health care spending, a finding that many believe to be preventable.[6-8] Following these considerations, the Centers for Medicare and Medicaid Services have started to penalize hospitals with higher 30-day readmission rates.[9]

Several authors captured incidence and predictors of 30-day readmission.[10-16] At the time, however, no one had ever described this occurrence in a European series. The importance of our study is twofold[1]: we address the paucity of data about incidence and related factors of readmission after discharge in BCa patients who underwent RC in European series. This is pivotal considering the differences that exist between American and European health systems[2];

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our study population presents some characteristics indicated by several American series as a possible solution to limit the readmission rate after discharge such as longer length of stay (LOS) in a context without concomitant subacute care facilities.[17]

In this light, we report incidence and predictors of 30-day readmission after discharge in a large monocentric European contemporary cohort of patients with BCa treated with RC at a tertiary referral center.

Patients and Methods

Study Population

After institutional review board approval was obtained, we evaluated 1090 consecutive patients with urothelial carcinoma of the bladder treated with open RC and bilateral PLND between January 2002 and August 2012 at a single tertiary referral center. The current study was undertaken with the approval and oversight of the institutional ethics committee review board (Vescica/2010).

Prognostic Factors and Outcomes

Preoperative patient clinical, pathological, and intrahospitalization characteristics were recorded and were comprehensive of: year of surgery, age at the time of surgery (years), sex (male vs. female), body mass index (calculated as height [m^2]/weight [kg]), comorbidities (0-2 vs. > 2), pathological T stage (p0-pT2 vs. pT3 vs. pT4), Grade (G1-2 vs. G3), soft tissue surgical margin (STSM), carcinoma in situ (yes vs. no), number of nodes removed, lymph node invasion (LNI; yes vs. no), lymphovascular invasion (yes vs. no), admission to intensive care unit after surgery (yes vs. no), complications during recovery (yes vs. no), LOS (days), and transfusion (yes vs. no). Pathological stages were classified according to the 2009 tumor, node, metastases classification.[18] Tumour Grade was assessed according to the 1973 World Health Organization grading of the urothelial papilloma. Dedicated genitourinary pathologists examined all surgical specimens. All removed lymph nodes were examined for the presence of nodal metastases. LNI was invariably defined as 1 or more metastatic lymph nodes. STSM was defined as the presence of tumor at inked areas of soft tissue on the RC specimen. Transfusion was defined as transfusion of allogenic red blood cells during RC or the postoperative hospitalization. Transfusion with other products were not recorded. The primary outcome was defined as 30-day readmission, defined as a readmission in the time between discharge and the subsequent 30 days.

Statistical Analyses

Descriptive statistics of categorical variables focused on frequencies and proportions. Means, medians, and interquartile ranges (IQRs) were reported for continuously coded variables. The Mann–Whitney test and χ^2 test were used to compare the statistical significance of differences in medians and proportions, respectively. Univariate and multivariate logistic regression analyses were used to test the relationship between preoperative and intraoperative characteristics and possibility of 30-day readmission. The number of days of LOS was dichotomized according to the most informative cutoff predicting 30-day readmission. This was obtained by applying the χ^2 test for every possible cutoff value and choosing the lowest *P* value. Finally, patients were stratified into age categories and the most informative LOS was applied in each category, testing differences in 30-day readmission after discharge. Statistical significance was considered at $P < .05$. Statistical analyses were performed using SPSS version 22.0 (IBM Corp, Armonk, NY) and the R statistical package system (R Foundation for Statistical Computing, Vienna, Austria).

Results

Baseline Characteristics

Between January 2002 and August 2012, 133 patients (12.2%) were readmitted within 30 days of discharge. Clinical, surgical, pathological, and postoperative characteristics of patients included in the study are shown in Table 1. The mean age was 66 years (median, 68 years; IQR, 61-74). Mean LOS was 18.6 days (median, 16 years; IQR, 13-22). Patients who experienced a readmission within 30 days of discharge were more likeably to have the worst pathological T stage ($P = .03$), positive STSM ($P = .01$), admission to the intensive care unit after surgery ($P = .04$), and shorter LOS ($P = .01$). No differences were found considering age, body mass index, comorbidities, sex, grade, carcinoma in situ, number of nodes removed, LNI, lymphovascular invasion, and complications. Readmission characteristics after RC are shown in Table 2. The most frequent characteristics at the time of readmission within 30 days were ileus (n = 15; 11.3%), lymphoceles (n = 11; 8.3%), wound infection (n = 10; 7.5%), and fever (n = 12; 9.0%).

Univariable and Multivariable Logistic Regression Analyses Predicting 30-Day Readmission

In Table 3, the results of univariable and multivariate logistic regression analysis predicting 30-day readmission after discharge are shown. In univariable logistic regression analysis, age (odds ratio [OR], 1.03; 95% confidence interval [CI], 1.01-1.06; $P = .03$), pathological T4 stage (OR, 1.60; 95% CI, 1.02-2.52; $P = .04$), positive STSM (OR, 2.03; 95% CI, 1.21-3.41; $P = .01$), Bricker bladder reconstruction (OR, 0.59; 95% CI, 0.38-0.92; $P = .02$), LOS (OR, 0.95; 95% CI, 0.93-0.98; $P < .001$), and administration of transfusion during recovery (OR, 1.63; 95% CI, 1.13-2.35; $P = .01$) were all associated with 30-day readmission after discharge. In multivariable logistic regression analysis, only age (OR, 1.02; 95% CI, 1.01-1.04; $P = .04$) and LOS (OR, 0.94; 95% CI, 0.91-0.97; $P < .001$) were associated with 30-day readmission after discharge. Figure 1 depicts the best predictor in terms of LOS to assess the major reduction in 30-day readmission according to age. We found that only for patients older than 70 years there is a benefit from a > 10-day LOS ($P < .003$).

Discussion

Although previous studies reported incidence and predictors of 30-day readmission after RC in BCa patients, this issue has never been investigated in a European cohort. This is pivotal considering differences in terms of LOS and concomitant subacute facilities between European and American institutions. In light of this, we examined incidence and predictors of 30-day readmission in a large contemporary cohort of patients with nonmetastatic BCa treated at a single tertiary referral center. Our findings are several-fold. Overall, 133 patients (12.2%) incurred a 30-day readmission. Of these, ileus (n = 15, 11.3%), fever (n = 12, 9%), lymphoceles (n = 11, 8.3%), and wound infection (n = 10, 7.5%) were the most frequent causes of readmission. In multivariable analyses, age and LOS were associated