Preoperative and Operative Factors Associated with Complications Following Radical Nephroureterectomy

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Abstract

Radical nephroureterectomy (RNU) is the gold standard for managing upper-tract urothelial carcinoma. We review preoperative, operative, and pathologic characteristics of patients undergoing RNU to identify factors associated with perioperative complications. A retrospective review of institutional databases from 8 academic centers identified 732 patients who underwent RNU. Data on preoperative, operative, and pathologic indices were collected. Almost 40% of patients in our cohort experienced a complication within 30 days of RNU. Increasing age, higher Charlson score, and lower baseline renal function were independently associated with patients developing complications. Longer OR duration and intraoperative transfusion requirement were also associated with post-RNU complications. Other operative and pathologic factors did not predict complications following surgery. These metrics should be determined prior to surgery and may guide patient counseling and surgical expectations.

Methods

A retrospective review of institutional databases from 8 academic centers in the United States and Europe identified 732 patients (81 from Jefferson) who underwent RNU. Data on preoperative clinical, demographic, comorbidity indices, operative, and pathologic data were collected. Complications occurring in these patients within 30-days of surgery were graded using the modified Clavien-Dindo scale. Univariate and multivariate analyses determined the association between preoperative, operative, and pathologic variables and presence of complications.

Results

Table: Preoperative Factors

- 371 men and 361 women, with a median age of 70 years, a median BMI of 27, and 75% of the cohort were Caucasian
- Comorbid Factors:
  - Median Charlson score of 4 (range, 1 – 14)
  - ASA ≥ 3 in 44% and ECOG status ≥ 2 in 11%
  - Comorbid medical conditions: hypertension (55%), hyperlipidemia (41%), coronary artery disease (24%), diabetes (17%), and pulmonary disease (14%)
  - Median baseline eGFR (CKD-EPI) was 58 ml/min/1.73m²
  - CKD stage ≥ III in 50%
- Complication Rate:
  - 270 patients (37%) experienced a post-operative complication, and >Clavien 3 in 54 patients
- Univariate Analysis:
  - Patient age, race, baseline eGFR, comorbidities and all comorbidity indices were associated with post-RNU complications
- Multivariate Analysis of above:
  - Patient age (OR 4.0, 95% CI 1.7 – 6.3, p=0.003)
  - Charlson index (OR 4.5, 95% CI 2.1 – 6.8, p=0.003)
  - eGFR (OR 7.8, 95% CI 3.4 – 12.1, p=0.005)

Table: Operative/Pathologic Factors

- 73% of cases were performed via a minimally invasive approach and 36% had a lymph node (LN) dissection
- Operative Variables:
  - Median OR duration: 200 minutes (range, 60 – 977)
  - Median EBL: 165cc (range, 10 – 5000)
  - 12% of patients received an intraoperative transfusion
- Final Pathology:
  - 56% of tumors were located in the kidney/renal pelvis
  - 50% were muscle invasive
  - 68% were high grade
  - 10% had positive lymph nodes
  - 6% had positive surgical margins
- Univariate Analysis:
  - EBL, OR duration, intraoperative transfusion, tumor location, pathologic stage, and surgical margin status were associated with complications
  - Surgical approach and LN dissection were among variables not associated with post-RNU complications
- Multivariate Analysis of above:
  - OR duration (OR 8.3, 95% CI 3.6 – 10.8, p=0.004)
  - Intraoperative transfusion (OR 6.8, 95% CI 2.4 – 8.7, p=0.009)

Conclusions

- 37% of patients experienced a complication within 30 days of RNU.
- Increasing age, higher Charlson score, and lower baseline renal function were associated with patients developing complications.
- Longer OR duration and intraoperative transfusion requirement were associated with post-RNU complications.
- Other operative (surgical approach, LN dissection) and pathologic (stage, grade) factors did not predict complications following surgery.

References