Long-Term Renal Function Outcomes after Radical Cystectomy with Orthotopic Neobladder in Patients with Chronic Kidney Disease

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Disclosures

• None
Introduction

- Orthotopic neobladder (ONB) reconstruction is discouraged in patients with chronic kidney disease (CKD)\(^1\):
  - May cause electrolyte disturbances and worsening renal function in the long run

- Traditionally, glomerular filtration rate (GFR) > 60 ml/min is recommended for patients receiving ONB \(^2\).

- Risk of renal function decline is not significantly different following incontinent versus continent diversion in patient with preoperative stage IIIa CKD \(^3\).

\(^1\)Daneshmand et al., *Curr Opin Urol*, 2015
\(^2\)Lee et al., *BJU Int*, 2014
\(^3\)Eisenberg et al., *J Urol*, 2014
Objectives

- To evaluate long-term renal function outcomes of bladder cancer patients with CKD stage IIIa (GFR between 45-60 ml/min) who underwent radical cystectomy and ONB formation

- To identify predictors of decline in GFR overtime
Methods

- IRB approved, prospectively maintained bladder cancer database

- 2182 patients with bladder cancer who underwent RC with intent to cure from January 2003 to December 2018:
  - 1280/2182 (59%) received ONB
  - 273/1280 (21%) ONB patients had 45 < GFR < 60 ml/min

- Patients without long term follow-up creatinine were excluded.
Methods

• Postoperative creatinine:
  • 1.5, 3, 6, 9 and 12 months within the first year
  • Every six months afterwards

• Baseline and follow-up GFRs calculated using MDRD formula

• Significant GFR drop: A decrease in GFR > 10 units

• For patients with preoperative hydronephrosis who underwent stent/nephrostomy tube placement, nadir creatinine was used to calculate baseline GFR
Methods

• Clinical and demographic information
  • Age/gender
  • Body Mass Index (BMI)
  • Baseline diabetes and hypertension
  • Charlson comorbidity index
  • Pathologic stage
  • Neoadjuvant/Adjuvant chemotherapy
  • Post-operative complications

• Multivariate analysis to detect predictors of significant GFR drop controlling for:
  • Age
  • Past medical history
  • Post-operative complications
  • Perioperative chemotherapy
Demographics

- 257 patients
- Median Pre-op GFR: 53.6 ml/min (IQR: 49.9 – 56.6)
- Pre-op hydronephrosis: 69 (26.8%)
- Pre-op stent/nephrostomy tube: 36 (14%)
- Median follow-up: 2 years (IQR: 7 months - 5 years)

<table>
<thead>
<tr>
<th></th>
<th>Age (median)</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI (median)</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>97 (38%)</td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td>44 (17%)</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>226 (88%)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>31 (12%)</td>
<td></td>
</tr>
<tr>
<td>Neoadjuvant Chemotherapy</td>
<td>74 (28.7%)</td>
<td></td>
</tr>
<tr>
<td>Adjuvant Chemotherapy</td>
<td>20 (7.8 %)</td>
<td></td>
</tr>
<tr>
<td>Pathologic Stage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organ Confined</td>
<td>174 (67%)</td>
<td></td>
</tr>
<tr>
<td>Extra-Vesical</td>
<td>39 (15%)</td>
<td></td>
</tr>
<tr>
<td>Node Positive</td>
<td>44 (17%)</td>
<td></td>
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</tbody>
</table>
# Post-operative Complications

<table>
<thead>
<tr>
<th></th>
<th>30-day Complications</th>
<th>90-day Complications</th>
<th>Important complications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minor</td>
<td>Major</td>
<td>Infection</td>
</tr>
<tr>
<td></td>
<td>82 (32%)</td>
<td>23 (9%)</td>
<td>59 (23%)</td>
</tr>
<tr>
<td></td>
<td>Minor</td>
<td>Major</td>
<td>Reflux</td>
</tr>
<tr>
<td></td>
<td>88 (34%)</td>
<td>42 (16%)</td>
<td>5 (2%)</td>
</tr>
<tr>
<td></td>
<td>Major</td>
<td></td>
<td>Stricture</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>22 (8.5%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hydronephrosis</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>46 (18%)</td>
</tr>
</tbody>
</table>
Results

- The median time to significant GFR drop was 1 year (IQR: 2 months – 3.5 years).

- After 2.5 years, 132 (51.3%) patients did not have any significant GFR drop.

- GFR remained above 45 in 125 (49%) patients.
Kaplan-Meier curve for significant GFR drop-free survival
## Predictors of significant GFR drop on multivariate analysis

<table>
<thead>
<tr>
<th>Predictors</th>
<th>HR</th>
<th>95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1.3</td>
<td>1.3 - 5</td>
<td>0.006</td>
</tr>
<tr>
<td>Neoadjuvant Chemotherapy</td>
<td>1.83</td>
<td>1.2 - 2.7</td>
<td>0.002</td>
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<tr>
<td>Diabetes</td>
<td>1.6</td>
<td>1 - 2.6</td>
<td>0.02</td>
</tr>
<tr>
<td>30-day Complications</td>
<td>1.47</td>
<td>1 - 2.1</td>
<td>0.04</td>
</tr>
</tbody>
</table>
Discussion

• Change in GFR following either conduit or continent diversions was not statistically different in patients with preexisting renal insufficiency at short-term \(^1\).

• Better long-term renal function after orthotopic ileal bladder substitution than ileal conduit diversion in patients with predisposing risk factors for CKD \(^2\).

• 5 years postoperatively, the risk of >10 ml/min decrease in GFR was 57\% \(^3\).

• Postoperative renal complications, urinary tract infection, age, hypertension and diabetes represent potential factors associated with decreased renal function \(^3\).

\(^1\)Winters et al., *UroToday Int*, 2013
\(^2\)Jin et al., *Euro Urol*, 2012
\(^3\)Eisenberg et al., *J Urol*, 2014
Strengths

• Long-term follow-up

• Large sample size

• Focusing on ONB

• Evaluating risk factors and predictors
Limitations

• Retrospective, Single institution

• Lack of a control group

• Definition of GFR drop is arbitrary and there is no standard definition

• Creatinine clearance is not the most accurate estimate of renal function

• Missing unknown confounding factors causing renal function deterioration
Conclusions

• A considerable proportion of patients with CKD stage IIIa and ONB does not have a significant GFR drop over time.

• Baseline GFR does not affect their long term renal function outcome.
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