Effects of diabetes mellitus and chronic kidney disease on major outcomes in patients undergoing cardiac surgery

Mark W Berguson¹, Jordan Goldhammer¹, Hong Liu², Rohinton Morris³, Jianzhong Sun¹

[1] Department of Anesthesiology, Thomas Jefferson University Hospital [2] Department of Anesthesiology, University of California Davis Medical Center [3] Division of Cardiothoracic Surgery, Thomas Jefferson University Hospital

Introduction

- Diabetes mellitus (DM) is the leading cause of chronic kidney disease (CKD). CKD typically manifests in late stages of DM.
- DM and CKD are prevalent in patients with cardiovascular disease.
- The impact of concurrent DM and CKD on major adverse cardiocerebral events (MACE) in patients undergoing cardiac surgery remains unclear.¹²

Objective

- To determine the effect of DM and CKD on major outcomes in patients undergoing cardiac surgery.

Methods

- Retrospective cohort study.
- 4,255 consecutive patients from two tertiary hospitals receiving cardiac surgery, including:
  - Coronary artery bypass graft (CABG), valve surgery, CABG plus valve surgery, or other cardiac surgery.
- 4,028 met inclusion criteria and were divided into four groups:
  - No CKD or DM (control), only CKD, only DM, or concurrent CKD and DM.
- Major outcomes include:
  - MACE, 30-day mortality, renal failure, readmission, and cardiac and neurological complications.

Results

- There were significant demographic differences between the control group and the remaining three groups, with the control group tending to be younger, have fewer comorbidities, and take fewer medications (Table 1).
- Among 4,028 patients:
  - 45% (1,813) had no DM or CKD.
  - 17.6% (707) had DM.
  - 22.3% (898) had CKD.
  - 15.1% (610) had DM plus CKD.
- Outcomes for the control, DM, CKD, and DM plus CKD groups were (Figure 1, Table 2):
  - MACE rates: 5.0%, 5.1%, 12.9%, and 10.0%, respectively (DM group did not meet significance).
  - 30-day mortality rates: 2.2%, 1.6%, 8.5%, and 6.6%, respectively (DM group did not meet significance).
  - Cardiac complication rates: 5.7%, 3.3%, 10.1%, and 7.54%, respectively (DM plus CKD group did not meet significance, DM group was significantly lower).
  - Neurological complication rates: 2.1%, 3.3%, 5.0%, and 4.8%, respectively (DM group did not meet significance).
  - Renal failure rates: 2.7%, 3.0%, 8.5%, and 11.0%, respectively (DM group did not meet significance).

Discussion

- Patients with CKD or concurrent DM and CKD are more likely to experience worse outcomes following cardiac surgery than those patients without CKD or DM.
- This may indicate that end-organ damage, in particular CKD, is a major risk factor for patients undergoing cardiac surgery.

Table 1. Postoperative complications in patients with diabetes mellitus plus chronic kidney disease undergoing cardiac surgery.

<table>
<thead>
<tr>
<th>Complication</th>
<th>Control (1813)</th>
<th>DM (707)</th>
<th>CKD (898)</th>
<th>DM + CKD (610)</th>
<th>p</th>
<th>Odds Ratio p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Complications</td>
<td>0.41</td>
<td>0.45</td>
<td>0.44</td>
<td>0.50</td>
<td>0.21</td>
<td>0.15</td>
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<tr>
<td>Renal Failure</td>
<td>12.84</td>
<td>12.34</td>
<td>12.89</td>
<td>13.47</td>
<td>0.30</td>
<td>0.86</td>
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<tr>
<td>Cardiac Complications</td>
<td>5.74</td>
<td>5.71</td>
<td>5.83</td>
<td>6.21</td>
<td>0.76</td>
<td>0.43</td>
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<tr>
<td>Neurological Complications</td>
<td>3.16</td>
<td>3.19</td>
<td>3.17</td>
<td>3.16</td>
<td>0.87</td>
<td>0.88</td>
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<tr>
<td>MACE</td>
<td>4.08</td>
<td>4.07</td>
<td>4.19</td>
<td>4.25</td>
<td>0.60</td>
<td>0.85</td>
</tr>
</tbody>
</table>

References