Prognosis of patients with carcinoid heart disease after valvular surgery

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Abstract

A best evidence topic in cardiac surgery was written according to a structured protocol. We addressed the following question: in patients who are diagnosed with carcinoid heart disease (CHD), do valvular surgeries improve their prognosis? Fifty percent of the patients with clinically diagnosed carcinoid syndrome had cardiac involvement which was present either as valvular dysfunction or as cardiac metastases. These patients often require surgery due to their heightened risk of cardiac disease. Altogether 217 relevant papers were identified as a result of the below-mentioned search, of which 10 papers represented the best evidence to answer the question. The author, journal, date and country of publication, patient group studied, study type, relevant outcomes, results and study weaknesses were tabulated. Of the patients who were identified to have carcinoid heart disease in different studies, 193 patients had valve procedure, mainly replacements at tricuspid, mitral and aortic valve positions and either valvuloplasty or replacement at pulmonary valve. Tricuspid and pulmonary valves represented the majority of the excised valves among patients undergoing valvular surgery for CHD. The pathology of carcinoid valve was attributed to the presence of plaque, causing thickening and retraction. Pure regurgitation was the most common finding in all the valves except pulmonary valve which had both stenosis and insufficiency. Thirty-day mortality was 17% (range 1–63%) and long-term survivors were reported to be alive at an average of 58 months (28–80 months) after the valve surgery. The evidence demonstrates that surgical intervention can lead to improved prognosis and reduce the symptoms of heart failure. Postoperative mortality was mainly due to the carcinoid disease itself and not as a complication of the surgery. Therefore, surgery could be considered for symptomatic palliation in carefully selected individuals.

Keywords: Carcinoid syndrome • Valvular disease • Valve surgery

INTRODUCTION

A best evidence topic was constructed according to a structured protocol. This protocol is fully described in ICVTS [1].

THREE PART QUESTION

In [patients with carcinoid heart disease], does [valvular surgery] improve [their prognosis]? 

CLINICAL SCENARIO

A 50-year-old woman presents with symptoms of right heart failure. She is known to have carcinoid syndrome with liver metastasis. Echocardiogram reveals fibrotic endocardial plaques causing retraction and thickening of valvular leaflets causing dysfunction of the tricuspid and pulmonary valve. After discussing the various options of management, the patient asks whether cardiac surgery will give her any benefit in improving her quality of life. You then decide to search the literature.

SEARCH STRATEGY

Databases: MEDLINE 1980 to December 2013 using the OVID interface. A search for (exp Heart Valve Diseases/OR exp Specialties, Surgical/ OR Surgery.mp) AND (exp Carcinoid Heart Disease/) resulted in 217 articles, 10 of which provided the best evidence to answer the question.

SEARCH OUTCOMES

Two hundred and seventeen papers were returned, 10 of which were identified as being suitable for inclusion in this BET (Table 1).

RESULTS

Of the 10 papers selected, 9 were retrospective studies and 1 was a case series. 

A retrospective study reported by Mokhles et al. [2] analysed patients who underwent valvular surgery for carcinoid heart disease (CHD) during a 7-year period (1993–2010). Nineteen patients had valvular surgery. They reported one 30-day mortality; 12 patients survived at 1 year with improved functional status and...
<table>
<thead>
<tr>
<th>Author, date, journal and country</th>
<th>Patient group</th>
<th>Outcomes</th>
<th>Key results</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Komoda et al. (2011), Gen Thorac Cardiovasc Surg, Germany [4]</td>
<td>12 patients with carcinoid heart disease with severe tricuspid regurgitation had surgery over an 8-year period</td>
<td>30-day mortality</td>
<td>16.7%</td>
<td>Postoperative outcomes after valvular surgery in carcinoid heart disease become worse when preoperative left ventricular systolic function is borderline and left ventricular internal diameter dimension is larger</td>
</tr>
<tr>
<td>Arghami et al. (2010), J Thorac Cardiovasc Surg, USA [5]</td>
<td>Period 1989–2010</td>
<td>30-day mortality</td>
<td>1 (14%)</td>
<td>Valvular surgery is a reasonable option for functional improvement in patients with carcinoid heart disease even if it involves all four valves</td>
</tr>
<tr>
<td>Castillo et al. (2008), J Am Coll Cardiol, USA [6]</td>
<td>Period 2001–06</td>
<td>30-day mortality</td>
<td>2 (20%) due to right heart failure and vasoplegia</td>
<td>Surgical outcomes have improved over the years due to early patient referral and better perioperative management</td>
</tr>
</tbody>
</table>

Continued
a reduction in right ventricular size. Long-term follow-up reported 9 survivors with a mean follow-up period of 6.3 years.

Bhattacharyya et al. [3] looked at the outcomes of patients with CHD undergoing valvular surgery. Twenty-two patients underwent surgery with the majority of them having tricuspid and pulmonary valve replacements. The 30-day mortality was shown to be 18%. The cause of death in these patients included right ventricular dysfunction and carcinoid crisis. The first- and second-year survival rates were 56 and 44%, respectively. Sixty-seven percent of patients who survived the initial operation reported significant symptomatic improvement post-surgery. There was no difference in mortality between those in New York Heart Association (NYHA) Class I and II (P = 0.56) and NYHA Class II and III (P = 0.91). The most common cause of mortality in these patients on follow-up was noted to be due to the progression of carcinoid disease.

Komodo et al. [4] carried out a retrospective study of 12 patients who had tricuspid valve surgery for CHD. Three patients had repairs and 9 had valve replacements with severe tricuspid regurgitation.

### Table 1: (Continued)

<table>
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<tr>
<td>Connolly et al. (1995), J Am Coll Cardiol, USA [7]</td>
<td>66 patients had carcinoid heart disease with NYHA III/IV symptoms, of whom 26 patients underwent valve surgery, (TVR ± PV procedure)</td>
<td>30-day mortality</td>
<td>35%</td>
<td>Symptomatic improvement in survivors after surgical intervention although it was associated with high perioperative mortality rate</td>
</tr>
<tr>
<td>Retrospective observational study (level 3)</td>
<td>Survival of surgical group was compared with that of a control group of 40 medically treated patients</td>
<td>Late mortality</td>
<td>35%</td>
<td></td>
</tr>
<tr>
<td>Retrospective observational study (level 3)</td>
<td>Mortality</td>
<td>13 deaths: 9 deaths in the first period and 4 in the later period. 15% due to multiorgan failure 77% due to heart failure 8% due to metastatic disease</td>
<td></td>
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</tr>
<tr>
<td>Moller et al. (2005), Circulation, USA [9]</td>
<td>Period 1989–2000</td>
<td>30-day mortality</td>
<td>16%</td>
<td>There was a decline in mortality between the 2 periods. There were no details about whether they were early or late mortality</td>
</tr>
<tr>
<td>Retrospective non-randomised study (level 3)</td>
<td>200 patients diagnosed with carcinoid heart disease, of whom 87 patients underwent valvular surgery</td>
<td>Longest survival</td>
<td>68.5 months</td>
<td>The study did not comment on improvement in functional status after surgery. There was improvement in perioperative mortality over the period</td>
</tr>
<tr>
<td>Robiolio et al. (1995), Am J Cardiol, USA [10]</td>
<td>Period 1981–93</td>
<td>30-day mortality</td>
<td>63%</td>
<td>Valvular surgery for carcinoid heart disease is associated with a significant mortality rate although it can offer prolonged palliation</td>
</tr>
<tr>
<td>Retrospective study (level 3)</td>
<td>19 patients were diagnosed with carcinoid heart disease and 8 underwent</td>
<td>Long-term survivors</td>
<td>2 at 48 months 1 at 146 months</td>
<td></td>
</tr>
<tr>
<td>TVR with bioprosthesis valve</td>
<td>TVR: n = 6</td>
<td>TVR and PVR: n = 2</td>
<td></td>
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<tr>
<td>Disesa et al. (1985), Chest, USA [11]</td>
<td>2 women with carcinoid heart disease underwent pulmonary valve resection and TVR. Both had severe right-sided heart failure</td>
<td>Late mortality</td>
<td>50% at 49 months</td>
<td>Long-term clinical and haemodynamic improvement in heart function postoperatively. Post-mortem revealed no degeneration in TV bioprosthesis</td>
</tr>
<tr>
<td>Case series (level 4)</td>
<td>Survival at follow-up</td>
<td>61 months symptom free</td>
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</table>
Their 30-day mortality was 16.7% with a 2-year actuarial survival of 50%. They reported that preoperative variables, namely left ventricular systolic function and left ventricular internal diameter dimension, could be predictors of poor outcomes.

Arghami et al. [5] analysed the outcomes of patients who had quadruple valve replacements for CHD during 1989–2010. Seven patients underwent quadruple valve replacements. They found that surgery offered functional improvement in symptomatic patients with acceptable risk. There was only one 30-day mortality. Left ventricular end-diastolic diameter and right ventricular size and function improved in 5 and 3 patients, respectively.

Castillo et al. [6] reported their 5-year analysis of all patients who had valvular surgery for CHD. Ten patients who underwent surgery had their data and follow-up obtained through patients’ records. All of them had tricuspid valve and pulmonary valve replacements except one. The 30-day mortality was reported to be 20%. There were 8 late survivors with a mean follow-up of 37 months. This better outcome has been attributed to early patient referral and better perioperative management.

Connolly et al. [7] compared the mortality of patients undergoing cardiac surgery for CHD with that of a control group of 40 medically managed patients. The 30-day mortality was 35%. This high mortality was attributed to postoperative arrhythmias, right ventricular failure, haemorrhage and multisystem failure. Comparison of pre- and postoperative functional classes of the surviving patients showed a significant symptomatic improvement after valvular surgery. Two-year postoperative survival was estimated to be 40% [95% confidence interval (CI) 0.25–0.65] compared with 8% (95% CI 0.32–1.29) for patients on medical treatment after onset of NYHA Class III symptoms.

Weingarten et al. [8] analysed data from two periods grouping patients from 1985–94 and 1995–2003. They reviewed the effects of vasopressors and aprotinin on octreotide administration and mortality by univariate analysis in 100 consecutive cases of CHD patients after surgery. There were 13 overall deaths, 9 in the first group and 4 in the second. The improved survival over the time in carcinoid patients in the latter group was multifactorial.

Moller et al. [9] retrospectively analysed 200 patients diagnosed with CHD between 1981 and 2000. Eighty-seven patients had valvular surgery. The outcome measured was all-cause mortality. When cardiac surgery was included as a time-dependent co-variate in a multivariable analysis, it was associated with a risk reduction of 0.048 (95% CI 0.31–0.73; P < 0.001).

Robiolio et al. [10] reported that patients undergoing cardiac surgery for CHD had a significant mortality rate although surgery offered prolonged palliation from CHD to the survivors. Among the 19 patients diagnosed with CHD, 8 underwent bioprosthetic tricuspid valve replacement and 2 had additional pulmonary valve valvuloplasty. The 30-day mortality was 63%. The cause of death included valve thrombosis, cerebrovascular accidents, renal failure and intractable right heart failure. The age of the patient appeared to be a key factor in determining survival (P = 0.036).

Disesa et al. [11] reported long-term and sustained haemodynamic improvement in 1 patient who had replacement surgery at 61 months of follow-up.

**CLINICAL CONCLUSION**

Due to the rarity of this disease, evidence is limited to retrospective studies with small sample sizes. Tricuspid and pulmonary valve represented the majority of the excised valves among patients undergoing valvular surgery for CHD, the pathology of which was attributed to the presence of carcinoid plaque, causing thickening and retraction [12]. Pure regurgitation was the most common finding in all the valves except pulmonary valve which had both stenosis and insufficiency [12]. Patients with CHD undergoing valvular surgery have higher mortality and morbidity. However, in the long-term, acceptable outcomes and better functional status is achieved. Previously, surgery was reserved for those who were severely symptomatic but as surgery has become more advanced, the number of patients undergoing valvular replacement has increased. The evidence demonstrates that surgical intervention can lead to improved prognosis and reduce the symptoms of heart failure [13]. Postoperative mortality was mainly due to the carcinoid disease itself and not as a complication of the surgery. Therefore, surgery could be considered for symptomatic palliation in carefully selected individuals as fifty percent of the patients with clinically diagnosed carcinoid syndrome had cardiac involvement which was present either as valvular dysfunction or cardiac metastases [14].

**Conflict of interest:** none declared.

**REFERENCES**


