Case report - Coronary

Off-pump myocardial revascularization in a Jehovah’s Witness patient with pheochromocytoma

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Abstract

We present a female Jehovah’s Witness patient with concomitant severe left main and left anterior descending coronary artery disease and pheochromocytoma who underwent successful off-pump myocardial revascularization. Perioperative management of this patient included alpha-blockade with Doxazosin followed by beta-blockade with Metoprolol. A short-acting Phentolamine was used for alpha-blockade before surgery. Because she refused transfusion of blood and blood products, erythropoietin and iron was used to increase her hemoglobin in both the preoperative and postoperative periods. Intraoperative strategy included off-pump myocardial revascularization, the use of a pulmonary catheter to monitor hemodynamics, the use of norepinephrine and epinephrine to increase blood pressure, the employment of the cell saver, and transesophageal echocardiography.

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1. Introduction

Concomitant coronary artery disease and pheochromocytoma are significant surgical challenges. Combined and staged operative procedures have been detailed in the literature [1–9]. We present a case of an off-pump coronary artery bypass procedure performed in a Jehovah’s Witness patient with pheochromocytoma. This is the first report in which myocardial revascularization was achieved without blood products and without resection of the pheochromocytoma.

2. Case report

A 55-year-old Jehovah’s Witness female with a past medical history of coronary artery disease, hypertension, non-insulin dependent diabetes, hypercholesterolemia, cerebrovascular disease with transient ischemic attack, and pheochromocytoma, presented to the emergency room with angina. She had a cardiac history significant for 2 myocardial infarctions 2 years previously, leading to stenting of the circumflex coronary artery 3 months previously. She had a newly diagnosed right adrenal mass measuring 3 × 2.5 cm. Increased norepinephrine and metanephrine levels in the urine, and elevated plasma levels of norepinephrine, were demonstrated (see Table 1).

The patient’s cardiac catheterization demonstrated 80% stenosis of her left main and 85% stenosis of her left anterior descending coronary arteries (see Fig. 1). Her ejection fraction was 20% with severe mitral valve insufficiency. Echocardiography 3 months previously demonstrated normal left ventricular size and systolic function, an ejection fraction of 55%. Her hemoglobin was 9 g/dl. She was a Jehovah’s Witness who refused blood and blood products. An intraortic balloon pump (IABP) was placed. The patient was offered off-pump revascularization when her hemoglobin increased. Erythropoietin and ferrous sulfate were started. Her hemoglobin improved to 12 g/dl. Preoperative alpha blockade was accomplished with Doxazosin. A shorter acting drug, Phentolamine, was used the day before surgery. Metoprolol was used for beta blockade. She received a Bupivicaine epidural. Erythropoietin (18,000 units per week) was continued prior to surgery and in the postoperative periods. Norepinephrine and epinephrine would be used to increase blood pressure. Pulmonary artery catheter was placed to accurately monitor cardiac hemo-

Table 1

<table>
<thead>
<tr>
<th>Catecholamine</th>
<th>Patient</th>
<th>High normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norepinephrine</td>
<td>1682 μg/dl</td>
<td>1 μg/dl</td>
</tr>
<tr>
<td>Dopamine</td>
<td>202 μg/dl</td>
<td>440 μg/dl</td>
</tr>
<tr>
<td>Normetanephrines</td>
<td>1769 μg/dl</td>
<td>650 μg/dl</td>
</tr>
<tr>
<td>Plasma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Norepinephrine</td>
<td>1060 pg/ml</td>
<td>520 pg/ml</td>
</tr>
<tr>
<td>Epinephrine</td>
<td>28 pg/ml</td>
<td>200 pg/ml</td>
</tr>
<tr>
<td>Dopamine</td>
<td>&lt;20 pg/ml</td>
<td>20 pg/ml</td>
</tr>
</tbody>
</table>

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before myocardial revascularization, 9g was transferred to a step-down unit. Her hemoglobin was 18,000 units subcutaneous injection every other day and she continued on a regimen of erythropoietin before resection of the pheochromocytoma, and 3) combined revascularization and resection of the pheochromocytoma in one procedure. Our patient added to the clinical challenge due to her Jehovah’s Witness status and significant comorbidities. It was decided to perform a staged procedure for this patient with myocardial revascularization before laparotomy for resection of the pheochromocytoma. Specific reasons for this decision were: (1) The patient’s admitting symptoms were angina, she required an IABP preoperatively, and had an ejection fraction of 20% with severe mitral valve insufficiency. These factors pointed to her cardiac status as requiring initial treatment; (2) The inability to transfuse packed red blood cells or blood products. Bleeding has been a complication of all three management strategies, leading to death of one of the reported cases [3]; (3) The sternotomy and laparotomy would be difficult in a 55-year-old with multiple comorbidities. Reported combined procedures have had longer hospitalizations prior to discharge [4,6].

Blood conservation and surgical techniques previously outlined by the authors were employed [10]. Off-pump techniques were used to avoid excess catecholamine release seen with cardiopulmonary bypass and hypothermia. We agree with Seah et al., and if cardiopulmonary bypass were necessary, aprotonin therapy to minimize perioperative bleeding is part of our management strategy [4]. The first priority in blood pressure management was blockade of alpha-adrenergic receptors to prevent unopposed vasoconstriction.

References

Fig. 1. Coronary angiogram. (A) Left main injection in LAO projection demonstrates distal left main stenosis (black arrow) with diffuse left anterior descending coronary artery disease. (B) Left main projection in RAO Projection demonstrates distal left main coronary artery stenosis (black arrow) and proximal left anterior descending coronary artery stenosis (white arrow).