



Prophylaxis for Perioperative Adrenal Crisis in a Patient with Addison's Disease Undergoing Coronary Surgery: A Case Report

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Abstract

Background: Patients with Addison's disease are at risk of developing a potentially fatal crisis in the perioperative period after cardiac surgery.

Case Report: A 61-year old male with symptomatic coronary artery disease and angiographically confirmed 70% left main coronary artery stenosis and 90% right coronary artery stenosis was referred for Coronary Artery Bypass Grafting (CABG). He had Addison's disease for 27 years. On the day of the operation, an intravenous dose of 100 mg of cortisol was given in addition to 1000 mg of cortisol in the priming volume of the cardiopulmonary bypass. The patient was weaned off CPB without inotrope or vasopressor infusion. The rest of the postoperative recovery was uneventful and patient was discharged on 5th postoperative day. There were no postoperative complications.

Conclusion: The surgical strategy in Addison's disease patients should be adapted for adequate resuscitation in a crisis and to closely monitor early Addison crisis signs and symptoms.

Keywords: Addison disease; Cardiac surgery; Adrenal crisis

Introduction

Patients with Addison's disease are at risk of developing a potentially fatal crisis in the perioperative period after cardiac surgery [1]. The signs and symptoms of a crisis may be obscured by other complication that frequently accompanies cardiac surgery; hence patients with Addison's disease should be closely monitored and the management strategy should be adapted to allow early identification of the crises [2]. We report a case of Addison's disease patient who underwent a coronary bypass surgery, and our pre and postoperative management strategy.

Case Presentation

A 61-year old male with symptomatic coronary artery disease and angiographically confirmed 70% left main coronary artery stenosis and 90% right coronary artery stenosis was referred for Coronary Artery Bypass Grafting (CABG). He had Addison's disease for 27 years. The disease was under control with oral hydrocortisone 10 mg in the morning and 10 mg in the evening along with fludrocortisone 0.1 mg in the morning. He had heart rate of 82 beats/min in sinus rhythm, blood pressure of 120/81 mmHg and oxygen saturation of 97%. Preoperative echocardiography revealed; ejection fraction 52% left ventricular hypertrophy, pulmonary artery pressure 52 mmHg, left ventricle diastolic diameter 4.6 cm, left ventricle systolic diameter 3.3 cm. The patient was consulted to an endocrinologist and 100 mg of hydrocortisone intravenously before operation was advised.

Before the induction of anesthesia, the patient was given midazolam 70 mcg/kg. The induction of anesthesia was performed by fentanyl 25 mcg/kg + midazolam 80 mg/kg + vecuronium bromide 0.15 mg/kg. Anesthesia maintenance was achieved by fentanyl 4 ng/dl + midazolam 40 ng /dl.

CABG was carried out using. The left internal thoracic artery was used for bypassing the lesion in the anterior descending artery and saphenous vein grafts were used to graft the diagonal artery, the circumflex artery and right coronary artery.

On the day of the operation, 100 mg of cortisol was given intravenously in addition to 1,000 mg of cortisol in the priming volume of the cardiopulmonary bypass. The patient was weaned off CPB without inotrope or vasopressor infusion. The corticosteroid dose was gradually tapered and until the second postoperative day when the patient resumed his regular oral steroid dosage. The

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rest of the postoperative recovery was uneventful and patient was discharged on the 5th postoperative day. There were no postoperative complications.

Discussion

Addisonian crisis may develop even in patients with well-controlled adrenal insufficiency during cardiac surgery. When addisonian crisis occurs intra-operatively, the hemodynamic instability and severe derangement of biochemical profile can be challenging especially if the surgical strategy does not provide a safe management of the potentially serious adverse effects. Debono and his colleagues [3] observed a relative decrease in adrenal function in about 25% of patients after on-pump CABG.

A large dose of cortisol administration and a lack of adrenocorticotrophic hormone secretion during cardiopulmonary bypass prevent the postoperative adrenal stress response. Although there are few reports of successfully managed acute adrenal insufficiency in the postoperative period [2-4], no strategies have been described for intraoperative addisonian crisis.

We administrated an intravenous dose of 100 mg cortisol in addition to 1,000 mg of cortisol in the priming volume of the cardiopulmonary bypass, and the dose of cortisol was then gradually decreased to maintain cortisol concentrations within the normal range [5]. There is no special preference of cortisol it might either be another replacing agent like prednisolone.

The optimal corticosteroid dosage for a crisis during on-pump cardiac surgery is not clear. The consensus statement from the international task force of the American College of Critical Care Medicine recommends 100 mg of intravenous hydrocortisone for patients with adrenal insufficiency in septic shock [6]. Regular daily recommended cortisol replacement therapy is 10 mg/m²/24 hrs while in major interventions like cardiothoracic surgery, whipple, liver transplantation etc, it is advised to increase the dosage to as high as 8-10 folds [7].

Priming procedure in CPB usually involves significant amounts of crystalloid infusion which in turn dilutes many constituents of the blood and changes its composition. The main problems that may occur are hemorrhagic problems due to coagulation factor dilution and decrease in hematocrit [8]. Another consequence of CPB priming is late decrease in serum cortisol levels which was linked to the decrease in secretion of ACTH, in which mechanism was poorly understood. However this may also be attributed to priming and dilution as mentioned above [9]. Therefore, some authors recommended that addisonian crisis should be considered in any hypotensive patient who does not respond to standard therapy after an uncomplicated procedure.

Our case was also consistent with the literature. The use of adequate preoperative corticosteroid, which dosage maybe higher than that recommended for non-cardiac patients, for the patients with adrenal insufficiency. The surgical strategy in these patients should be adapted to facilitate immediate resuscitation in a crisis, and close monitoring with increased awareness of early crisis signs and symptoms, during surgery.

Conclusion

Further investigation is needed to conclude that high dose preoperative corticosteroid prophylaxis maybe necessary for patients with adrenal insufficiency going under a cardiovascular surgery. The surgical strategy in Addison's disease patients should be adapted for adequate resuscitation in a crisis and to closely monitor early Addison crisis signs and symptoms.

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