

Adrenal Insufficiency Due to Bilateral Adrenal Hemorrhage Following Coronary Bypass Surgery: Case Report

Koroner Bypass Sonrası Görülen Adrenal Kanamaya Bağlı Adrenal Yetmezlik

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Geliş Tarihi/Received: 28.05.2008
Kabul Tarihi/Accepted: 15.09.2008

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ABSTRACT Adrenal hemorrhage leading to adrenal insufficiency is a lethal and uncommon condition usually diagnosed at autopsy. Symptoms are usually non-specific and easily confused with other conditions like sepsis. Hypotension, lethargy, and fever can be the presenting signs. Here in, we presented a 51-year-old man admitted with nausea, vomiting, dizziness and somnolence following coronary bypass grafting. In sight of clinical and biochemical findings, short ACTH test was done and adrenal insufficiency was shown. The patient recovered completely with the introduction of cortisol replacement therapy. This case illustrates coronary bypass grafting and intra-operative hypotension may cause adrenocortical hemorrhage which may induce adrenocortical insufficiency. Pertinent literature was reviewed.

Key Words: Adrenal insufficiency; blood loss, surgical

ÖZET Adrenal kanamaya bağlı adrenal yetmezlik nadir rastlanan ama ölümcül ve genelde otopside tanısı konan bir durumdur. Semptomları spesifik değildir ve kolaylıkla sepsis gibi diğer durumlarla karıştırılabilir. Hipotansiyon, letarji ve ateş başvuru izlenen bulgulardır. Koroner "bypass" operasyonu sonrasında 51 yaşındaki erkek hasta kliniğimize bulantı, kusma, baş dönmesi ve uykuya meyil ile başvurdu. Klinik ve biyokimyasal bulgular ışığında kısa ACTH testi yapıldı ve adrenal yetmezlik tanısı kondu. Kortizol tedavisinin başlamasıyla hasta tamamen düzeldi. Bu vaka koroner "bypass" operasyonu ve intra-operatif hipotansiyonun adrenal kanamaya neden olabileceğini ve bu kanamanın da adrenokortikal yetmezliğe yol açacağını göstermiştir.

Anahtar Kelimeler: Adrenal yetmezlik; cerrahi kanama

Türkiye Klinikleri J Med Sci 2010;30(2):762-5

Acute adrenal insufficiency due to adrenal hemorrhage is an unusual but life-threatening condition although autoimmune destruction of adrenal gland is the main cause of the disease. Adrenal hemorrhage following meningococcal septicemia, known as Waterhouse-Friderichsen syndrome, is the typical representation.¹ Additionally, anticoagulation therapies,^{2,3} thromboembolic diathesis,⁴ surgical stress, orthotropic liver transplantation,⁵ trauma and adrenocorticotrophic hormone (ACTH) administration⁶ may trigger adrenal hemorrhage. Diagnosis may be difficult due to non specific symptoms, and requires high index of suspicion. Furthermore, corticosteroid replacement therapy can be life saving.⁷

We reported a case of acute adrenal insufficiency due to bilateral adrenal hemorrhage occurred after coronary artery bypass grafting and which was diagnosed in outpatient settings after the discharge from the coronary surgery intensive care unit.

CASE REPORT

A 51-year-old man presented with nausea, headache, disorientation, and drowsiness 10 days after the coronary bypass surgery. He was diagnosed as diabetes mellitus type 2 six months before the operation and he had had a successful coronary arteriogram and percutaneous transluminal coronary arterioplasty intervention for the stenosis of left anterior descending coronary artery. His medications included digoxin 0.25 mg/day, atenolol 50 mg/day, isosorbide mononitrate 20 mg/day and clopidogrel 75 mg/day. His blood pressure was 90/50 mmHg, pulse rate was 90 beat/min and body temperature was 36.4 °C. His physical examination was normal except for the pleural friction sound which was attributed to the recent coronary surgery. He was found to have following abnormal laboratory values: hemoglobin 11.3 g/dl, hematocrit 33%, trombocyte count 136.000/mm³, sodium 118 mEq/L, potassium 4.9 mEq/L. Doppler echocardiography was normal. A computerized tomography (CT) scan of the abdomen revealed bilateral adrenal masses which a density of 42 HU that did not show contrast enhancement (Figure 1). With the preliminary diagnosis of acute adrenal insufficiency, serum early morning ACTH and cortisol levels were measured. Plasma ACTH level was 370 pg/ml (laboratory normal range: 9.0-52.0 pg/ml) and plasma cortisol was 15.06 ng/ml (60-285 ng/ml). Short adrenal stimulation test with synacthen was performed which revealed an abnormal response consistent with adrenal hypofunction. He needed profound electrolyte replacement therapy and in addition, prednisolone 7.5 mg/day was started immediately. Within 24 hours of therapy, his complaints resolved, and his serum electrolytes returned to normal in weeks. Possible diagnoses of malignancy and tuberculosis were ruled out with a CT guided fine needle aspiration biopsy and culture of the aspirate in the following days. After two years of follow up, adrenals returned to nor-



FIGURE 1: CT scan of the patient (bilateral adrenal masses after surgical operation).

mal on CT examination. However, his hypoadrenalism did not resolve; early morning plasma cortisol and plasma ACTH levels were 1.28 mcg/dl (5-23 mcg/dl) and 113 pg/ml (5-50 pg/ml), respectively. He is still on an adrenal corticosteroid replacement regimen without any deterioration of his well being.

DISCUSSION

Adrenal insufficiency due to bilateral adrenal hemorrhage is a rare condition which is often overlooked because of nonspecific or subtle nature of the clinical presentation. The incidence of adrenal insufficiency in autopsy series ranged between 0.14% and 1.8%.⁸ Classically, it occurs in fulminant gram-negative septicemia (Waterhouse-Friedrichsen syndrome) and adrenal apoplexy of the newborn. It has also been associated with physiologic stress due to operation or trauma, neoplastic infiltration of the adrenal gland, pregnancy, corticotrophin therapy, and coagulopathies secondary to heparin induced thrombocytopenia or anti-phospholipid syndrome.¹⁻⁴

In case of increased adrenal blood flow such as in physiologic stress, the gland may be predisposed to hemorrhagic necrosis.^{1,9,10} Blood supply of adre-

nal gland is through a subcapsular plexus originating from abdominal aorta, inferior phrenic and adrenal arteries. Transition from arteries to capillary plexus is abrupt and may act as a blood dam in cases of increased blood flow. Additionally, cortico-medullary junction which requires most of oxygen during ACTH stimulation is a watershed area of arterial circulation. On the other hand, gland is drained by a single central adrenal vein. Blood flow in the vein is turbulent and epinephrine content of the blood in the central vein is high; both of which may contribute to thrombus formation.

There was no infectious or infiltrative process involving the gland in our patient. Similarly, no documented cause of a coagulopathy including heparin induced thrombocytopenia was present. Intense physiological stress caused by coronary-bypass surgery and also intra-operative hypotension were thought as the possible causes of acute adrenal insufficiency in our patient. To our knowledge, there were five more cases in literature who had obvious adrenal insufficiency after coronary bypass procedure.^{2,11-14}

Clinical presentation of the acute adrenal insufficiency is nonspecific and consists of nausea, vomiting, flank pain, fatigue, loss of appetite, drowsiness, confusion and disorientation and can be seen in any other stress condition just like in postoperative period. In routine laboratory testing, a decrease in hemoglobin concentration or thrombocyte count, prolonged APTT, prolonged INR, hyperkalemia and hyponatremia can be seen. The clinical spectrum or laboratory findings may not be completely present in all cases; so it is extremely important to keep the diagnosis of adrenal hemorrhage in mind. Basal cortisol and ACTH levels can be guiding in subtle cases. Recently, it was shown that in patients going to coronary bypass grafting, there may be occult adrenal insufficiency which could be demonstrated only by impaired adrenal response to ACTH test.¹⁵

For confirmation of diagnosis, cosyntropin, a synthetic analogue of ACTH can be used to assess the secretion capacity of adrenals. After determination of baseline serum cortisol, ACTH 250 mcg is administered intravenously, and then measure se-

rum cortisol is measured 30 and 60 minutes after ACTH administration. An increase of less than 7 mcg/dL is considered diagnostic for adrenal insufficiency.¹⁶ Classically, bilateral adrenal calcifications can be seen on abdominal X-ray in cases of organized hemorrhage. Ultrasound, CT or magnetic resonance imaging can be used to demonstrate the adrenal hemorrhage at an earlier phase. A mass seen in CT without contrast enhancement and 50-90 HU in density is diagnostic in the acute phase.¹⁷ Since the duration between hemorrhage and the onset of the symptoms can be days, the density of the mass may decrease at the time of diagnosis.

Regardless of the etiology, urgent treatment of acute adrenal insufficiency with glucocorticoids is important. Management of the patient depends on the severity of the presentation. Treatment can be initiated after the confirmation of diagnosis in hemodynamically stable patients. For critically ill patients, preemptive steroid treatment together with volume replacement therapy should be started immediately. Usually the clinic of the patients improves within hours.¹⁸ Radiologic evaluation of the patient should be performed after stabilization of hemodynamic parameters.

CONCLUSION

Herein, we present a case of acute adrenal insufficiency following the coronary bypass surgery. Even though there are no underlying conditions other than physiological stress due to the operation itself, acute adrenal insufficiency may be seen in patients with coronary bypass surgery. The possible risk factors for our patient include the surgical procedure itself, anti-coagulants and use of anti-thrombotics as well as possible intra-operative hypotension. His presenting symptoms are non-specific and common findings for most postsurgical patients. Prognosis of acute adrenal insufficiency depends on the promptness with which the treatment is commenced. During postoperative period, in any case with hypotension or poor generalized health condition without any obvious reason, acute adrenal insufficiency must be kept in mind. Urgent diagnosis and treatment are required to minimize mortality and this can only be done by a high index of suspicion.

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