

Massive hemolysis after mitral valve repair

Mitral kapak tamiri sonrasında masif hemoliz

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Hemolysis is a rare, but serious complication of mitral valve repair. It should be considered in every patient with the history of mitral valve repair and who has unexpected impairment in the functional capacity during early or late postoperative period. If the functional impairment is not consisted with the severity of patient residual mitral regurgitation, hemolysis should always be considered. In this article, we present two cases suffering from intravascular hemolysis after mitral valve repair.

Key words: Hemolysis; mitral valve repair; mitral valve replacement.

Hemolysis following open heart surgery may have various causes, such as the damaging effects of cardiopulmonary bypass circuit or direct shear stress related to mechanical valve prosthesis or any other foreign material used in cardiac reconstruction.^[1]

Mitral valve repair procedures have been the preferred operation method in recent years with the concomitant increase in the incidence of relatively rare complications like hemolysis. For this reason, any patient who fails to show the expected recovery after valve repair surgery should be examined for its presence. We hereby report on two such patients and discuss the best management strategy.

CASE REPORT

Case 1- A 30-year-old woman was admitted to the cardiac surgery department because of persistent dyspnea on exertion and fatigue seven months after a mitral annuloplasty with a Hemashield® (Boston Scientific, Natick, MA) synthetic graft and Alfieri suture technique. On admission, she appeared cachectic with a yellowish color on her sclera. Her hematocrit (Htc) was 23%. Lactate dehydrogenase (LDH) and

Hemoliz, mitral kapak tamirinin nadir, ancak ciddi bir komplikasyonudur. Mitral kapak tamiri öyküsü olan her hastada ameliyat sonrası erken veya geç dönemde fonksiyonel kapasitede beklenmeyen bozulma olması halinde akla getirilmelidir. Eğer hastadaki fonksiyonel bozulma rezidüel mitral yetersizliğin ciddiyeti ile uyumlu değilse, hemoliz her zaman düşünülmelidir. Bu yazıda, mitral kapak tamiri sonrasında intravasküler hemoliz gelişen iki olgu sunuldu.

Anahtar sözcükler: Hemoliz; mitral kalpak tamiri; mitral kapak replasmanı.

direct/indirect bilirubin levels were 1373IU/dl and 0.51/2.7 mg/dl, respectively. Renal and hepatic serum markers were within normal limits, and Coombs' test results were negative. An echocardiogram showed grade 3/4 eccentric mitral regurgitation. Schistocytes were present on peripheral smear suggesting mechanical damage to the erythrocytes. No sign of immune-mediated hemolysis was present; thus, we suggested mitral valve repair as a cause for the hemolysis.

The patient underwent mitral valve replacement (MVR) with a St Jude® (St Jude Medical, St Paul, MN, USA) mechanical mitral valve prosthesis. A month after the procedure, her Htc was 39% and her blood biochemistry was within normal limits. On her blood smear, schistocytes were no longer seen.

Case 2- A 46-year-old male was admitted to the cardiology department with symptoms of listlessness, weight loss, and increasing dyspnea on exertion five months after mitral annuloplasty with a St. Jude® mitral ring. His past medical history revealed the presence of dark urine that he experienced three days after his surgery and blood transfusions during that period.

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Although his preoperative Htc and LDH levels were 47.2% and 226 IU/dl, respectively, we detected lower values at admission: Htc 27%; LDH 5425 IU/dl, and direct/indirect bilirubin 0.36/2.2 mg/dl. Peripheral smear showed schistocytes and nucleated erythrocytes suggesting mechanical lysis of erythrocytes and increased erythropoiesis (Figure 1). Moreover, both transthoracic and transesophageal echocardiographies showed grade 2/4 eccentric mitral regurgitation and the partial dehiscence of the ring (Figure 2).

The patient was followed up for the resolution of hemolysis as the mitral regurgitation was not severe. During the four-month follow-up period, the hemolysis failed to resolve, and there was no improvement in the patient's symptoms. Nine months after his initial mitral valve repair, the patient underwent mitral valve replacement with a St Jude® mechanical mitral valve prosthesis. Five weeks after the procedure, his Htc was 36% and his blood biochemistry was within normal limits. On his blood smear, schistocytes and nucleated erythrocytes were no longer seen.

DISCUSSION

Intravascular hemolysis in patients undergoing open heart surgery is mainly caused by the destruction of erythrocytes in the presence of a mechanical heart valve. This type of hemolysis is more frequently encountered with the prosthesis in the aortic position.^[2] Nevertheless, paravalvular leakage, infection, and blood transfusion reactions should be ruled out in the presence of severe hemolysis in a postoperative patient.

When compared with mitral valve replacement, mitral valve repair has lower mortality (2% versus

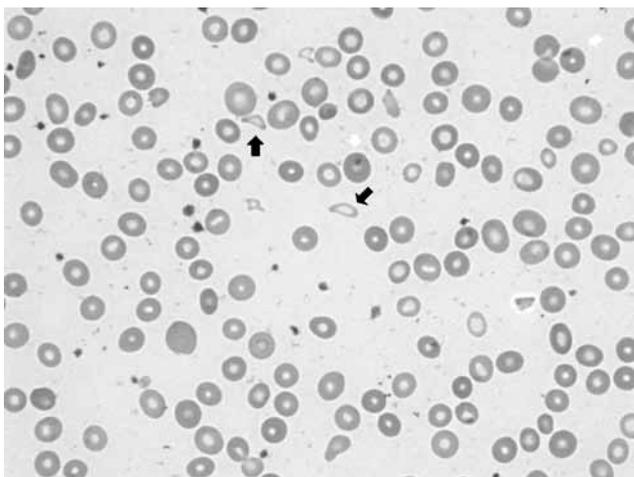


Figure 1. On peripheral smear schistocytes (black arrows) and nucleated erythrocytes (white arrows) were seen (May-Grünwald/Giemza, x 100).

6%) and a lower 10-year reoperation risk.^[3] Early complications of mitral valve repair are mainly due to cardiopulmonary bypass and general anesthesia, but hemolysis is known to be a rare and serious complication. Prompt recognition of hemolysis after mitral valve repair operations is of paramount importance because it may lead to the identification of a deterioration in the patient's clinical status and functional capacity which can then be corrected with appropriate therapy. Hemolysis after mitral valve repair can be caused by regurgitant jet fragmentation (a regurgitant jet divided by a solid structure such as a ring), rapid acceleration (a regurgitant jet originates from a small orifice such as a ring dehiscence), or other sources such as abrupt slowing due to the constraining effect of the left atrial wall in eccentric jets. Intraoperative transesophageal echocardiography may be a useful tool for the early diagnosis of echocardiographic abnormalities which would otherwise increase the risk of postoperative hemolysis. Unfortunately, Lam et al.^[4] reported that hemolysis was not associated with any preoperative or postoperative echocardiographic variables. Nevertheless, transesophageal echocardiography can detect ring dehiscence and high-velocity regurgitant jets impinging upon an annuloplasty ring which can then be corrected during surgery.

In a patient presenting with hemolysis after mitral valve repair, a hematological evaluation should be performed to determine other causes of hemolysis and anemia. If the patient has minimal functional impairment, as in our second patient, an initial trial of medical therapy with afterload reducing agents along with iron, folate, and vitamin B12 supplementation to correct anemia seems prudent. The indications for reoperation are severe hemolysis, severe anemia which is unresponsive to medical therapy, a continued need for red blood

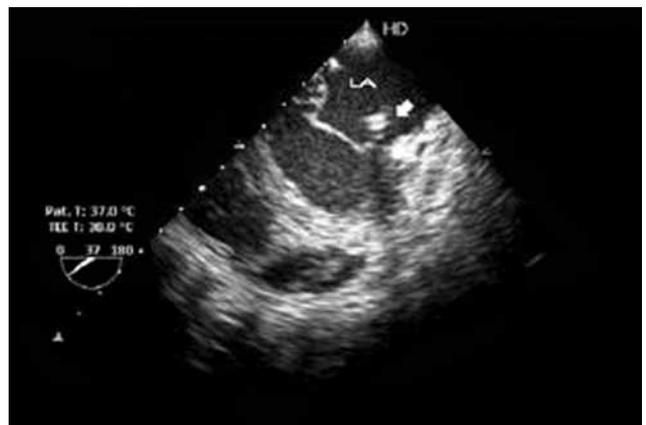


Figure 2. A dehiscence annuloplasty ring (white arrow) is visible on the transesophageal echocardiogram. LA: Left atrium.

cell transfusions, or the progression of residual mitral regurgitation to severe status.^[5]

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