

## Cardiac Surgery for a Patient with Autoimmune Haemolytic Anemia and other Co-Morbidities

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### ABSTRACT

*Cardiac surgery in patients with Autoimmune hemolytic anemia (AIHA) is one of the challenges that needs careful management. This is due to the behavior of the disease in the setting of cardiac surgery, and also due to the lack of consensus of how to manage such cases. Here we present a case of a patient with autoimmune hemolytic anemia and other co morbidities who underwent a successful cardiac revascularization by using Off pump coronary artery bypass graft (OPCABG).*

### Keywords

Autoimmune haemolytic Anemia, RBCs, Cardiac surgery.

### Background

Autoimmune haemolytic anaemia (AIHA) occurs when antibodies directed against the person's own red blood cells (RBCs) cause them to lyse. It is classified as either warm autoimmune hemolytic anemia or cold autoimmune hemolytic anemia. The main risk for patients of AIHA with cardiac surgery is the life threatening haemolysis that can be induced by the use of cardiopulmonary bypass which reportedly injures and weakens the erythrocyte membrane, resulting in a reduced erythrocyte life span [1]. This risk is clearer in case of presence of cold antibodies, where intracoronary haemagglutination leading to inadequate cardioplegia distribution, thrombosis, embolism, ischaemia or infarction [2-5]. However, here we present a case of warm antibody autoimmune haemolytic anaemia and other serious co-morbidities who had cardiac surgery with smooth post operative course.

### Case Presentation

The patient was a 56 yrs old lady, with a history of Hypertension, Diabetes Mellitus on Insulin, autoimmune hypothyroidism, secondary hyperparathyroidism, chronic renal failure on regular dialysis, vitiligo, pulmonary embolism, hysterectomy and Autoimmune hemolytic anemia. She was found to have an ischaemic heart disease 2 years prior to her last presentation for which PCI was attempted to the totally occluded RCA but complicated by dissection and pulmonary edema. One year later she was admitted

again with ischaemic heart disease, PCI was attempted again but failed so patient was put on intensive medical therapy. This time she presented with NSTEMI. CAG done and showed triple vessel disease with left main coronary artery involvement, hence she was referred for surgical intervention. Haematology workup revealed positive haemolytic markers, blood film showed spherocytes and red cell agglutination, positive DAT and positive ANA. Anti-dsDNA was negative. Preoperative assessment by haematology team showed that her anaemia is of warm antibodies type, with positive IgG and CD3. Her haptoglobin was low and haemoglobin was dropping and LDH was high. In view of these findings patient was started on prednisolone and further precautions were taken such as use of irradiated homologous blood. Patient was then underwent off Pump Coronary Artery Bypass.

### Graft surgery

Midsternotomy, LIMA Was Harvested and half Heparinization was given, the heart was positioned and Preconditioning was Performed. The target LAD was localized and stabilized with Octopus, LIMA was Hooked To LAD with Retrofilling of D2 at the same time. Haemostasis was secured and the wound was closed in the ordinary manner. Patient had smooth post operative course and discharged home in a good condition.

### Discussion

AIHA is now known as a disease in which autoantibodies are produced that target RBC antigens, resulting in the premature destruction with inadequate compensation [6,7]. Classification of

AIHA is pathophysiologically based and divides AIHA into warm (majority), mixed or cold-reactive subtypes. This thermal-based classification is based on the optimal RBC-autoantibody reactivity temperatures. This is of particular significance in cardiac surgery as it involves the use of cardiopulmonary bypass (CPB) during which the core temperature is generally lowered to hypothermic levels.

There are two main concerns related to this topic: the first one is the absence of clear guidelines for management of such cases. In a short web-based survey conducted in the UK, ten questions regarding the optimal management of patients with AIHA undergoing Cardiac surgery were sent to all members of the Association of Cardiothoracic Anaesthetists. The survey concluded that “there is no consensus on the appropriate management of such patients, with responses ranging from canceling surgery to proceeding without additional precautions” [8].

The second concern with regard to management of cardiac surgery in AIHA patients is the behavior of the disease itself during cardiac surgery. This is observed mainly in patients with cold antibodies AIHA where the use of bypass machine can lead to serious consequences such as agglutination of red blood cells that can occur within a minute of initiation of antegrade cold blood cardioplegia at 10°C leading to embolization in the coronary [5]. Another devastating consequence that can occur is the haemolysis which can be difficult to treat and may lead to death [9].

The risk posed by warm antibodies AIHA during cardiac surgery, by the other hand, is less compared to the risk associated with the cold antibodies AIHA. However, this risk should not be taken lightly and pre-operative haematological consultation should be sought [8]. There are some important considerations that have to be born in mind: the possibility of severe haemolysis preoperatively if homologous blood transfusion was done, or intraoperatively during use of CPB, and the risks of high dose steroid therapy [10].

There are several approaches for management of patient with autoimmune haemolytic anemia undergoing cardiac surgery these may include preoperative plasma exchanges [2,11].

The mechanism of haemolysis depends on the type of antibodies; warm-reactive versus cold-reactive. In cold – reactive AIHA there is intravascular haemolysis induced by hypothermia [12,13]. In addition, complement activation has an important role in the mechanism of haemolysis in cold – reactive AIHA, whereas in warm antibody AIHA there is no major role for the complement in the pathophysiology of haemolysis [12,13]. In warm –reactive antibodies AIHA the macrophages in the reticulo endothelial system recognize and phagocytose the IgG bound erythrocyte through IgG-Fc receptor [12,13]. Therefore, the use of conventional roller pump during cardiopulmonary bypass is considered safe [10]. In addition, Avoidance of homologous blood transfusion and the use of autologous blood has also been described [10]. Furthermore,

perioperative steroid therapy has been used to prevent intra and post-operative haemolysis [14]. However, in our case we have done successful Coronary artery bypass graft (CABG) surgery for patient who is known to have warm –reactive autoimmune haemolytic anemia by using off-pump CABG, irradiated homologous blood transfusion and the patient underwent uneventful postoperative course despite the serious co-morbidities she has.

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