Severe Postoperative Anemia after Repair of Type A Aortic Dissection in a Jehovah’s Witness

Dong Jin Kim*
Department of Thoracic and Cardiovascular Surgery, Sejong General Hospital, Republic of Korea

Abstract
We report successful surgery for acute type A aortic dissection in a Jehovah’s Witness (JW) patient without the use of transfusion of allogeneic blood or blood products despite perioperative severe anemia. Intraoperative strategy to minimize blood loss is critical but appropriate management in the perioperative period is also crucial in saving the patient.

Introduction
Acute Type A Aortic Dissection (TAAD) is an emergent disease associated with high surgical mortality [1,2]. Multiple transfusions of blood products are often required in the perioperative period and re-exploration for bleeding is not an uncommon procedure in such patients. We report a successful treatment of TAAD without the use of blood products in the JW patient with severe perioperative anemia.

Case Presentation
An age 64 female was urgently transferred to our hospital with suspected acute aortic dissection. On admission to the Cardiac Surgery Department, the patient’s condition was relatively stable. Transhrocic echocardiography was performed, confirming the presence of dissection at the ascending aorta. There was a small amount of pericardial effusion but the cardiac function was normal (EF 65%) and also the valves showed no significant pathological changes. Laboratory tests: Hemoglobin (Hb) 11.7 g/dl, Hematocrit (HTC) 34.6%, Red Blood Cell count (RBC) 3.50 T/l, Platelet (PLT) 128 G/l, internal thromboplastin time (aPTT) 20.4 (normal range, 18.8 sec to 29.1 sec), International Normalized Ratio (INR) 1.03 (normal range 09.3 to 1.13), and creatinine 0.81 mg/dl. Unfortunately, the ascending aorta was ruptured after opening the pericardium and a sucker to the innominate artery and the left common carotid artery for bilateral cannulation for cardiopulmonary bypass was performed through the right femoral artery.

General anesthesia was induced according to the standard operating procedures. The arterial cannulation for cardiopulmonary bypass was performed through the right femoral artery. The proximal and distal parts of the aorta were reinforced with Teflon strips and the ascending aorta was replaced using a vascular prosthesis (Gelweave 30 mm). The lowest level of HCT during the cardiopulmonary bypass was 24%. Hemofiltration was performed during the cardiopulmonary bypass and modified ultrafiltration was also performed after the end of the bypass. Protamine sulfate was administered for reversing the heparin activity. The ACT was normalized after repair of the aortic arch and after aortotomy; cold crystalloid cardioplegia (HTK solution) was administered into the coronary ostia directly. The primary intimal tear site was in the mid ascending aorta and the dissection flap began from the aortic root to whole descending aorta. The total circulatory arrest was initiated when the rectal temperature reached 25ºC. Direct cannula were inserted to the innominate artery and the left common carotid artery for bilateral brain perfusion. The proximal and distal parts of the aorta were reinforced with Teflon strips and the ascending aorta was replaced using a vascular prosthesis (Gelweave 30 mm). The lowest level of HCT during the cardiopulmonary bypass was 24%. Hemofiltration was performed during the cardiopulmonary bypass and modified ultrafiltration was also performed after the end of the bypass. Protamine sulfate was administered for reversing the heparin activity. The ACT was normalized but severe medical bleeding continued. Inevitably, gauzes were packed around the aorta and a pericardial hood was fashioned by suturing a bovine pericardial patch along the Superior Vena Cava (SVC), the Right Atrial (RA) appendage, the Right Ventricular (RV) outflow tract, the main
pulmonary artery, and the thymic tissue (Figure 2). We then closed the sternal wound preparing for the scheduled delayed reoperation. The total cardiopulmonary bypass duration was 115 min, with 95 min cross clamp duration and 19 min of distal circulatory arrest duration. The patient was transported to the surgical intensive care unit postoperatively. Chest tube bleeding was minimal and re-exploration for hood and packed gauze removal was performed 16 h postoperatively. On the first operative day the patient was conscious but had left hemiplegia. Laboratory tests on the first post operative day showed: Hb 6.9 g/dl, HTC 20.5%, RBC 2.12 T/l, PLT 29 G/l, total bilirubin 3.88 mg/dl, AST 137 U/L, ALT 156 U/L, BUN 46 mg/dl, and creatinine 1.38 mg/dl. The patient received erythropoietin every other day in addition to folic acid and iron supplementation. The lowest values of blood counts were observed on day 17 after the surgery: (Hb 4.1 g/dl, HTC 13.9%, RBC 1.20 T/l, and PLT 149 G/l). The highest value of total bilirubin was checked on day 7 after the surgery (total bilirubin 13.6 mg/dl). The patient received cholestyramine every other day in addition to folic acid and iron supplementation. The lowest values of blood counts were observed on day 17 after the surgery: (Hb 4.1 g/dl, HTC 13.9%, RBC 1.20 T/l, and PLT 149 G/l). The highest value of total bilirubin was checked on day 7 after the surgery (total bilirubin 13.6 mg/dl). The level of Hb was 10.4 mg/dl on day 35 of the surgery and the patient was transferred to the general ward. She was transferred to rehabilitation medicine, walking independently, and was discharged on day 97 of the operation.

Discussion

It is critical to prepare an appropriate surgical technique and postoperative care to minimize bleeding for this circumstance in which no transfusion is accepted. We used a temporary pericardial hood with the packing of surgical gauzes around the prosthetic graft and closed the sternum considering staged delayed re-exploration. The gauze and the hood localized compression around the anastomotic site. The temporary pericardial hood was effective in managing difficult hemostasis by avoiding undue prolonging of surgery and maintaining the hemodynamic status without massive transfusion.

The risk of death is low in patients with postoperative Hb levels of 7.1 g/dl to 8.0 g/dl, but decreasing post operative blood counts incur the risk of mortality and/or morbidity rises and becomes extremely high at below 5 g/dl to 6 g/dl [3]. Even bleeding was minimal; the postoperative lowest level of Hb (4.1 g/dl) was checked at postoperative day 17. It was gradually increased and the level was above 10 g/dl after postoperative day 35. During the anemic period we focused on the patient’s nutritional support and minimizing unnecessary blood loss.

Nutritional support began with the parenteral TPN, started on post operative day 3 and continued to postoperative day 16. The mental state became more alert on post operative day 14 and the patient’s motor power improved. We then decided to taper the parenteral TPN, overlapping with the L-tube feeding. Feeding through the L-tube was gradually increased, the intake reached to appropriate calorie week later and was able to terminate parenteral feeding. As the urine output was acceptable on continuous lasix infusion, to minimize the loss of blood to the circuit, we refused to use CRRT even though it was indicated.

In summary, Intraoperative strategy to minimize blood loss is
critical but also the patient can be exposed to severe anemia in the perioperative period, but strategies to minimize blood loss and full supportive care may save the patient.

References

