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Major thoracic surgery in Jehovah's witness: A multidisciplinary approach case report

Marco Rispoli*, Carlo Bergaminelli, Moana Rossella Nespoli, Mariana Esposito, Dario Maria Mattiacci, Antonio Corcione, Salvatore Buono

AORN dei Colli, Vincenzo Monaldi Hospital, Via Leonardo Bianchi, 80131 Napoli, Italy

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ABSTRACT

INTRODUCTION: A bloodless surgery can be desirable also for non Jehovah's witnesses patients, but requires a team approach from the very first assessment to ensure adequate planning.
PRESENTATION OF THE CASE: Our patient, a Jehovah's witnesses, was scheduled for right lower lobectomy due to pulmonary adenocarcinoma. Her firm denies to receive any kind of transfusions, forced clinicians to a bloodless management of the case.
DISCUSSION: Before surgery a meticulous coagulopathy research and hemodynamic optimization are useful to prepare patient to operation. During surgery, controlled hypotension can help to obtain effective hemostasis. After surgery, clinicians monitored any possible active bleeding, using continuous noninvasive hemoglobin monitoring, limiting the blood loss due to serial in vitro testing. The optimization of cardiac index and delivery of oxygen were continued to grant a fast recovery.
CONCLUSION: Bloodless surgery is likely to gain popularity, and become standard practice for all patients. The need for transfusion should be targeted on individual case, avoiding strictly fixed limit often leading to unnecessary transfusion.

1. Introduction

Our patient, a Jehovah's witnesses, was scheduled for right lower lobectomy due to pulmonary adenocarcinoma. Her firm deny to receive any kind of transfusions, forced clinicians to a bloodless management of the case. A bloodless surgery can be desirable also for non Jehovah's witnesses patients, but requires a team approach from the very first assessment to ensure adequate planning. Before surgery a meticulous coagulopathy research and hemodynamic optimization are useful to prepare patient to operation. During surgery, controlled hypotension can help to obtain effective hemostasis. After surgery, clinicians monitored any possible active bleeding, using continuous noninvasive hemoglobin monitoring, limiting the blood loss due to serial in vitro testing. The optimization of CI and DO2 were continued to grant a fast recovery.

2. Case presentation

A Jehovah's witness patient (female, 71-year-old, BMI 23) came to our thoracic surgery ward to undergo right lower lobectomy due to pulmonary adenocarcinoma. Patient had history of strong smoking habits (smoking pack years 79) and hypertension in non pharmacological treatment. She had cough with sputum for two month and dyspnea after exercise (METS >4), she underwent a computed tomography (CT) scan which showed a 2.6 × 2.0-cm mass in the right lower lobe of the lung with no significant mediastinal lymph node enlargement. Positron emission tomography-computed tomography (PET-CT) reported a high metabolic mass with possible large lumps in the right lower lobe lung 2.6 × 2.0 cm in size (SUV 5.5).

Once proposed for surgery, patient firmly deny the possibility to receive transfusions of whole blood, packed erythrocytes, platelets, white cells or plasma. She rejected auto transfusion with blood pre-deposit too. Surgeons, anesthesiologists and operating theatre staff discussed the cases and decide how to manage the patient: pre operative assessment provided spirometry test (FEV1 70%, DLCO 54%) and Cardio Pulmonary Exercise Test (VO2 max 13.7, Slope VE/VCO2 32). Arterial Blood Gas (ABG) showed: pH 7.39 pCO2 42 pO2 75 Lat 0.4HCO3 25.4 BE 0.4 SpO2 97.5. Cardiac status was rated as good by cardiologist that stated administration of biso-

* Corresponding author.
E-mail addresses: marco-rispoli@hotmail.it, sentimento_nuevo@hotmail.com (M. Rispoli), carlo.bergaminelli@libero.it (C. Bergaminelli), mrnespoli@hotmail.it (M.R. Nespoli), maesposito15@gmail.com (M. Esposito), dario.mattiacci@libero.it (D.M. Mattiacci), corcio.ant@libero.it (A. Corcione), salvatorebuono48@gmail.com (S. Buono).

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prolol to control hypertension and required a strict blood pression measurement to optimize therapy. Laboratory test showed a mild normocitic anemia (Hb 10.5 g/dl) with no B12 or iron-deficiency. Patient was extensively questioned for previous suspect bleeding episodes and underwent coagulation test screen (Plt 324000/ul; PT 27.2 s; PA 92%; INR 1.5). Also thromboelastography (TEG) was performed, with no report of abnormalities in platelet function, clot strength, and fibrinolysis (R: 6 min; K: 3 min; α-Angle: 63°; MA: 59 mm; LY 30%: 6%).

Informed consent was signed by the patient after having considered and discussed about the specific risks and benefits of any procedure including the added risk of blood refusal.

The day before surgery, patient was moved to post anesthesia intensive care unit (PACU): a center venous catheter was placed in right internal jugular vein with ultrasound guidance and left radial artery cannulation was performed. 24 h pre-surgery fluid administration was evaluated using a Vigileo™ monitor (Edwards Lifesciences; One Edwards Way Irvine, CA 92614) with FloTrac and PreSep sensor, to optimize Cardiac Index (CI), Stroke Volume (SV), Central Venous Oxygen Saturation ($ScVO_2$) and, consequentially, Delivery Oxygen (DO_2).

Surgeon decided to approach the lobectomy in Video Assisted Thoracic Surgery (VATS), to minimize blood loss. Operating room monitoring was: continuous ECG, invasive blood pressure (iBP), pulsoxymetry, INVOS cerebral/somatic oximetry (Covidien; 710 Medtronic Parkway Minneapolis, MN 55432-5604), Bispectral index (BIS), TOF-Watch and Vigileo™ (CI; SV; continuous $ScVO_2$). Target Controlled Infusion Total IntraVenous Anesthesia (TIVA-TCI) was performed with propofol and remifentanil, muscle relaxation was obtained with rocuronium and One Lung Ventilation (OLV) was achieved with Double Lumen Tube 37 Fr and checked with fiberoptic bronchoscopy. During surgery a controlled hypotension with a reduction of mean arterial pressure (MAP) to 50–65 mm Hg was performed with appropriate dose of propofol and remifentanil. Blood pressure is returned to normal prior to complete the operation to grant adequate hemostasis when the patient returns to a normotensive state.

Surgery lasted 153 min in VATS three portal approach. Dissection was carried out with endopeanuts and meticulous hemostasis was obtained with LigaSure™ (Covidien; 710 Medtronic Parkway Minneapoli, MN 55432-5604) blunt tip. Major vessels were cut between clips. Tabotamp™ fibrillar (Ethicon, Route 22 ovest Somerville, NJ 08876, USA) was used for hemostasis in mediastinal lymphadenectomy area. Perfect hemostasis was double checked with repeated saline solution washing. Overall blood loss was 140 ml. At end of surgery, two thoracic drainage tubes were placed. Post-operative analgesia was granted by levobupivacaine continuous infusion via thoracic epidural catheter, and PCA enodvenous morphine, no NSAIDs were used.

Patient was moved to PACU still under general anesthesia, CI, and SV was evaluated again to optimize cardiac output and grant adequate DO2. Postoperative blood test samples were sent in pediatric tubes (Hb: 8.3 g/dl; Plt 297000/ul; PT 33 s; PA 79%; INR 1.5) and Continuous Noninvasive Hemoglobin Monitoring (CNHM) was performed with Radical-7 Pulse CO-Oximeter (Masimo®, Irvine, CA, USA), to minimize blood loss from laboratory testing. Patient awake quiet and painless.

No bleeding signs were recorded during the 48 h PACU stay: the overall chest drainage was 400 ml sierohematic fluid, Hb was never lower than 8.1 g/dl according to CNHM, and there were not any hemodynamic alterations. Patient was moved to thoracic surgery ward and after four days she was dismissed.

3. Discussion

Jehovah's witnesses have been in Italy since 1903. With 248′783 observant, they represent the second religion of the country according to Italian New Religion Study Center (CESNUR) [1]. The beliefs of Jehovah's Witnesses are based on the Bible teachings of Charles Taze Russell: transfusion of whole blood, packed red cells, platelets, white cells or plasma are unacceptable health treatments [2]; even predonation of blood for the purposes of later autotransfusion (predeposit) is unacceptable [3] although many Jehovah's witnesses will accept peri and postoperative autologous procedures such as acute normovolaemic hemodilution or cell salvage machines [4,5].

In this case, the patient received a meticulous pre-operative evaluation to investigate bleeding disorders or coagulation defects. Accurate anamnesis and coagulation screen test can point out the most of clotting disorder, but TEG can evaluate the dynamic interaction of clotting factors and platelets, indicating an overall clot quality, becoming popular monitoring for hemostasis and transfusion management in major surgery [6]. Patient was asked for any medications that may increase blood loss. After clinical investigations, clinicians reported no increase in standard surgery bleeding risk.

Laboratory test, moreover, showed a mild normocitic anemia (Hb 10.5 g/dl) with no B12 or iron-deficiency. One of the most used method to improve haemopoiesis in Jehovah's witnesses is the use of erythropoietin [7], but in Italy there is no indications to this use according to Italian Drug Agency (AIFA) [8]. Pre-existing cardiac or respiratory disease must be investigated, and optimized. Our patient had hypertension in non pharmacological treatment, and poor blood pression control in surgery is of major clinical importance resulting in possible aggravation of bleeding [9]. To improve tissue oxygenation, although the mild anemia, patient was monitored with Vigileo™. Optimizing fluid administration using CI, SV and ScVO2 parameters, will help to maximize cardiac output and, therefore, oxygen delivery [10,11].

The surgeon mini-invasive video-assisted approach causes minor blood loss [12–15] and, even in case of emergency thoracotomy conversion, rate of life-threatening perioperative complications or perioperative mortality did not increase [16]. No intraoperative blood salvage device was arranged because, although it has been demonstrated that a high percentage of patients presenting for cancer surgery actually have already circulating tumor cells, is a question yet left unanswered if adding tumor cells into the circulation could worsen prognosis [17,18]. During surgery, one of the best and safest way to prevent excessive bleeding, is hypotensive anesthesia (MAP to 50–65 mmHg) using propofol and remifentanil, to reduce the extent of intraoperative blood loss [18,19].

To reduce iatrogenic blood loss due to intensive post-operative laboratory tests, highly associated to anemia, blood test samples were sent in pediatric tubes (Hb: 8.3 g/dl; Plt 297000/ul; PT 33 s; PA 79%; INR 1.5) [20]. Another way to reduce need for blood samples, without losing accuracy and continuous control, is to monitor hemoglobin with noninvasive device: the use of CNHM has strong merits in monitoring trend and is an useful alternative to serial in vitro testing, especially when reducing iatrogenic blood loss, conserving patient blood volume [21–23].

A bloodless surgery can be desirable also for non Jehovah's witnesses patients, but requires a team approach from the very first assessment to ensure adequate planning. Before surgery, we investigated any possible details leading to increasing bleeding risk and optimized the patient hemodynamic to obtain the maximum oxygen delivery, even with mild anemia. During surgery, the controlled hypotension and a very conscientious hemostasis are mandatory, especially if you can't use a cell salvage system. After surgery, clinicians have to individuate any possible active bleeding, using non invasive but accurate monitoring, limiting the iatrogenic blood loss due to serial in vitro testing. The optimization of CI and DO2 have to be continued to grant a fast recovery, especially in anemic state.