

(Case Report)

Anesthetic Management in Jehovah's Witness Patient Underwent Acetabular Fractures Surgery: Case Report

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Abstract

Acetabular fractures surgery is a complex procedure with a high risk of significant blood loss. Anesthetic management for Jehovah's Witness patients, who hold a core belief of refusing blood transfusion, presents a challenging task for anesthesiologists. The role of the anesthesiologist extends beyond just providing anesthesia; it also involves important responsibilities such as monitoring, controlling blood pressure, maintaining the function of vital organs, and addressing any complications that arise during the surgery. This case report aims to present a study highlighting the dilemma between healthcare professionals' concerns about patient safety and respecting the patient's rights, along with approaches to minimizing perioperative blood loss, which requires multidisciplinary collaboration from preoperative preparation, special techniques during the surgery, and postoperative care.

Keywords : acetabular fractures, anesthesia, Jehovah's Witness

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(รายงานผู้ป่วย)

การระงับความรู้สึกในผู้ป่วยพยานพระยะโฮวาห์ที่เข้ารับการผ่าตัดกระดูกเชิงกรานและเบ้าสะโพกหัก: รายงานผู้ป่วย

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นายแพทย์ชำนาญการ รพ.ป่าตอง จ.ภูเก็ต

บทคัดย่อ

การผ่าตัดผู้ป่วยกระดูกเชิงกรานและเบ้าสะโพกหัก เป็นการผ่าตัดที่มีความซับซ้อน มีโอกาสเสียเลือดมาก การดูแลให้การระงับความรู้สึกในผู้ป่วยพยานพระยะโฮวาห์ ซึ่งมีความเชื่อสำคัญคือ ปฏิเสธการรักษาโดยการถ่ายเลือด จึงเป็นงานที่ท้าทายบทบาทของวิสัญญีแพทย์ในการดูแลผู้ป่วย ซึ่งไม่ได้มีหน้าที่เพียงให้การระงับความรู้สึกเท่านั้น แต่ยังมีบทบาทสำคัญในการเฝ้าระวัง, ควบคุมความดันโลหิต, รักษาการทำงานของอวัยวะต่างๆ ให้เป็นปกติ และแก้ไขภาวะผิดปกติที่เกิดขึ้นกับผู้ป่วยในระหว่างผ่าตัด รายงานผู้ป่วยฉบับนี้มีวัตถุประสงค์เพื่อนำเสนอกรณีศึกษาที่มีความขัดแย้งระหว่างความรู้สึกของบุคลากรทางการแพทย์ในแง่ความปลอดภัยกับการเคารพสิทธิผู้ป่วย รวมถึงแนวทางลดการเสียเลือดในระหว่างผ่าตัด ซึ่งอาศัยการทำงานร่วมกันของสหสาขา ตั้งแต่การเตรียมผู้ป่วยก่อนผ่าตัด เทคนิคพิเศษระหว่างผ่าตัด และการดูแลหลังผ่าตัด

คำสำคัญ : กระดูกเชิงกรานและเบ้าสะโพกหัก, การระงับความรู้สึก, พยานพระยะโฮวาห์

Case report

A 59-year-old female Jehovah's Witness was referred to Orthopedics Department, Bhumibol Adulyadej Hospital with a closed fracture right acetabulum after a motorcycle accident for definitive surgery. Before referral, skeletal traction had been placed on the right leg. CT pelvis 3D reconstruction showed displaced fracture of right superior pubic ramus, comminuted fracture of right iliac wing, displaced fracture of anterior column, superior and posterior wall of right acetabulum and hematoma at right retroperitoneal and pelvic cavity. On arrival at the hospital, the patient had a good level of consciousness. Her blood pressure was 125/91 mmHg. and heart rate was 88/min. Preoperative investigation showed Hb of 11.5 g/dl. with normal coagulogram. The patient was scheduled for open reduction and internal fixation with low profile pelvic plate at right acetabulum with preliminary estimated blood loss of 1,500 ml.

A multidisciplinary team was consulted for preoperative evaluation and preparation four days before this time-sensitive surgery. The patient insisted on refusing all kinds of blood and blood products transfusion after the risks of bleeding and blood transfusion refusal were informed but accepted intraoperative blood salvage technique. She was given erythropoietin alfa 10,000 IU. subcutaneously daily for 3 days. On the day of surgery, her Hb raised to 12.4 g/dl.

Intra-operative period

General anesthesia with endotracheal tube was performed using fentanyl, propofol and succinylcholine. Two large bore (18G) intravenous lines access were done. Arterial line at left radial artery and central venous catheter at right subclavian vein were also placed uneventfully. Depth of anesthesia was maintained with Sevoflurane in

60 % Oxygen, atracurium and morphine to keep MAP 60-80 mmHg. Core temperature was monitored by nasal temperature probe. Active warming using forced air warmer to prevent hypothermia. Surgeon decided to use limited open reduction and internal fixation via iliofemoral approach with the purpose of minimizing blood loss. One gram of Tranexamic acid was given intravenously before the operation started and repeated once when the operation finished. Intraoperative cell salvage was set up and ready to use. The total operative time lasted 2 hours 12 minutes and overall estimated blood loss was 250 ml.

The patient was extubated smoothly in the operating room and transferred to PACU. Her immediate post operative Hb was 10.1 g/dl and decreased to 9.3 g/dl on the next day. She has been taking oral iron and folic acid continuously. The patient could go home four days after surgery without any complication. Her Hb before discharged was 10.0 g/dl.

Discussion

There are over 9 million Jehovah's Witness worldwide which is increasing all over the world. Jehovah's Witness in Thailand is currently 5,526 which the population ratio is 1 to 13,153⁽¹⁾. Although the number in Thailand is small, there is a chance that this group of people will need surgery. Medical professionals should understand that Jehovah's Witnesses deeply value life and take reasonable measures to preserve it. They actively pursue quality healthcare and accept most medical treatments. Jehovah's Witness don't accept the transfusion of whole blood and primary blood components (red cell, white cell, plasma and platelet) according to religious issue⁽²⁾. Autologous pre-donation is also unacceptable. They avoid

taking blood not only in obedience to God but also out of respect for him as the Giver of life. The willing acceptance of blood transfusions by Jehovah's Witnesses has in some cases led to expulsion from and ostracisation by their religious community. This refusal brings anesthesiologists into a dilemma of choices between preserving the patient's wellbeing or respect their decision.

Jehovah's Witnesses maintain a global network of over 1,700 Hospital Liaison Committees (HLC) across more than 110 countries, including Thailand. These committees consist of community-based ministers who engage effectively with hospital staff, social workers, and members of the judiciary. In this instance, the local HLC supplied clinical papers and information on strategies to avoid blood transfusions while also addressing ethical considerations relevant to the patient's medical care and the clinicians involved.

Anesthetic management in these patients should be considered the following issues comprehensively.

1. Preoperative evaluation

Medical history and physical examination are still an important foundation. Clinician should pay attention on history of anemia and abnormal bleeding including family history and coexisting diseases that may affect hematological status. Identify current medications and dietary which may adversely affect hemostasis. Previous surgical history and amount of blood loss including factors that may increase risk of bleeding (re-operation, significant adhesion, radiation therapy) should be obtained⁽³⁾. Complete blood count and coagulogram help diagnosis of anemia and coagulopathy respectively. Phlebotomy should be limited to necessary diagnostic testing and decrease volume drawn by pediatric-size tubes should be considered⁽²⁻⁴⁾.

2. Preoperative preparation

Discontinue antiplatelet and anticoagulant properly before surgery. Postpone non-urgent surgery for patients who do not stop anticoagulant/antiplatelet. For urgent surgery, consider normalize coagulation with appropriate agents (vitamin K, concentrated clotting factors). If the patient is anemic, identify the possible causes of anemia (such as gynecological hemorrhage, iron deficiency) and provide treatment⁽³⁾. Intravenous iron may replenish iron stores more quickly and efficiency than oral iron therapy. However, intravenous iron should be considered for patients with low iron stores, intolerance to oral iron, inadequate absorption or noncompliance or for patients with chronic or severe blood loss.

If Hb levels is less than 13 g/dl, optimize preoperative red blood cell production by using Recombinant erythropoietin (r-HuEPO) at least 6 weeks prior elective surgery^(2,4) and administer supplementary iron to support erythropoiesis. Consider supplementary folate and vitamin B12, especially in the elderly and patients who have had gastric surgery. In case of time sensitive surgery, the first dose of r-HuEPO should be given at least 2-3 weeks before operation⁽⁵⁾ and the last dose on the day of surgery. The response to r-HuEPO is dose dependent and varies among patients. If a sufficient response is seen after the second or third dose, then subsequent doses should be omitted. Raksamani⁽⁶⁾ reported a case of Jehovah's Witness with concealed ruptured of gastrointestinal stomach tumor. After receiving EPO 10,000 units subcutaneously every other day for 2 weeks, the patient's Hct raised from 12.5 % to 29.4 %. However, in our urgent case, after weigh the risk and benefits we decided to go on surgery. Even though r-HuEPO was given to our patient only three days prior to surgery, it has been

shown to be beneficial in increasing red blood cell concentration.

3. Consent form^(2,4)

For a competent adult Jehovah's Witness, the refusal of blood is lawful and must be respected. Discussion of the surgical procedure including risk associated with refusal of blood transfusion should be part of the informed consent. The absolute refusal of whole blood and major blood components is a core value of Jehovah's Witness. However, some Jehovah's Witnesses accept derivatives of primary blood components such as albumin solutions, cryoprecipitate, clotting factor concentrates and blood conservation techniques. Physician should ask to clarify their own personal decision prior surgery. This discussion should be in the presence of a witness, be documented in detail and signed.

4. Intraoperative management

All relevant issues including products or procedures which the patient will or will not accept should be mentioned during the time of surgical safety checklist⁽²⁾. Minimizing blood loss is a key in these patients and there are several ways to minimize blood loss during surgery.

Surgical techniques^(3,7): surgical techniques play an important role. Minimal invasive surgery, least traumatic surgical approach, minimize duration of surgery and good patient positioning can reduce blood loss. In complex procedures, staged surgery and prophylactic angiographic embolization should be considered. Using appropriate combination of techniques and hemostatic surgical instruments has a synergistic effect on reduction of blood loss. In this case, surgeon has changed technique to limited open reduction and internal fixation. Although this surgery did not perfectly fix the fractures, it could restore function and significantly reduce blood loss than traditional surgery.

Pharmacological enhancement of hemostasis:

Antifibrinolytics may be administered prophylactically in patients at high risk of bleeding. Tranexamic acid is widely used in orthopedic surgery with various doses and has been found to reduce blood loss without increasing the risk of thrombosis⁽⁶⁾.

Maintain normothermia: hypothermia may increase blood loss due to platelet dysfunction and impairment of coagulation protein function. Anesthesia team should employ active warming during preinduction, intraoperative and postoperative period. Keeping the patient covered as much as possible. Warm all intravenous fluids and monitor patient's core temperature during the procedure.

Controlled hypotensive anesthesia: deliberate hypotension is one of the blood conservation techniques. A mean arterial blood pressure (MAP) reduction by 30 % from the patient's baseline MAP is recommended. The systolic blood pressure (SBP) is reduced to 80-90 mmHg and MAP is reduced to 50-65 mmHg. in patients with ASA PS class I. Modified hypotensive anesthesia techniques by keeping SBP 85-90 mmHg and MAP 60-70 mmHg is applied for ASA II patients. Mortality due to controlled hypotension and consequent ischemic organ failure was 0.02-0.06 %. Contraindications to controlled hypotension include uncontrolled hypertension, coronary artery disease, cerebral vascular disease, severe pulmonary disease, renal disease, hepatic disease, pregnancy and hypovolemia. Regional anesthesia is considered to be the first line to implement deliberate hypotension during surgery. Total intravenous anesthesia (TIVA) using fentanyl with propofol or inhalation anesthesia is also used to achieve permissive hypotension. If MAP is still above 65 mmHg, then vasodilators (sodium nitroprusside, hydralazine, nitroglycerine, Calcium channel blocker and beta blocker) can be used. Hypotensive anes-

thetia should start at time of skin incision and return to normal prior to skin closure.

Acute normovolemic hemodilution (ANH): venous blood will be drained from patient by gravity into a collecting bag containing anticoagulant after induction of anesthesia and replaced with crystalloid or colloid solution to maintain intravascular volume. When surgical blood loss makes patient has low hematocrit, this blood is re-infused to the patient. Patients with low ejection fraction (<45 %), renal failure with oliguria and low baseline hemoglobin (<11 g/dl) are contraindications for ANH⁽¹⁰⁾. Jehovah's Witness patients who concern about the interruption of blood in circulation may accept this technique if anesthesiologist can ensure the continuity of circulation⁽¹¹⁾.

Surgical blood salvage technique: cell salvage is a relatively simple and effective blood conservation technique which should be considered in all patients undergoing orthopedic surgery when blood loss is expected to be more than 500 ml.⁽¹²⁾ The cell saver collects blood that has been suctioned from the surgical field. The blood is mixed with an anticoagulant then passes through filters to remove debris. Red cells are separated by centrifuge technology, washed and then pumped into a bag for re-infusion to the patient. The blood processing system is set up during surgery only if enough blood has been collected for processing to be worthwhile, usually more than 500 ml. Most Jehovah's Witness patients accept cell salvage, however this still should be discussed individually and documented before surgery. In this case which estimate blood loss was only 250 ml. did not receive the salvaged blood.

5. Postoperative management^(2,7)

Monitor patient frequently to identify and quantify any bleedings to facilitate prompt diagnosis and treatment. Consider monitoring coagulation and

platelet function using point of care viscoelastic analysis. Maintain normovolemia, normothermia. Avoid patient's hypertension and give adequate pain control. Optimize oxygen delivery and consumption. Prevent sepsis and adequately supplement nutrition, iron, vitamin B12 and folate.

Conclusion

Although the surgery of this patient was uneventful, a good understanding of Jehovah's Witness need to be discussed. Correct knowledge and good communication between the multidisciplinary team, especially communication with patients, lead to good planning and are the keys to success.

Blood conservation techniques are not limited to intra-operative period but also starts from pre-operative evaluation and preparation. There are several ways in minimizing intraoperative blood loss strategy. Assess patients and select the most appropriate choices for each individual patient and hospital.

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