

Blood Transfusion for a Primary Total Hip Arthroplasty in a Patient with Autoimmune Hemolytic Anemia: A Case Report

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Introduction

Autoimmune hemolytic anemia (AIHA) is a rare condition in which the body’s red blood cells (RBCs) are destroyed by RBC autoantibodies and complement. The diagnosis is characterized by markers of hemolysis and a positive direct antiglobulin test, which identifies antibodies or complement on the patient’s RBCs. When these patients require blood transfusion, selection of blood can be difficult, as autoantibodies complicate pretransfusion testing [1]. We present a case of a patient with AIHA undergoing primary joint arthroplasty complicated by bleeding. The institutional review board at Thomas Jefferson University Hospital does not require formal approval for de-identified case reports. A signed informed consent form was obtained from the patient allowing use of pertinent medical history.

Case Description

The patient was a 67-year-old, 43-kilogram female with systemic lupus erythematosus complicated by AIHA, mechanical mitral valve replacement on warfarin, severe pulmonary hypertension (pHTN), and osteoarthritis of the right hip who presented for a right primary total hip arthroplasty. Given her history and anticoagulation use, her hematological status was a primary anesthetic concern. Preoperatively, she was bridged to enoxaparin and INR was 1.10. The patient’s starting hemoglobin (Hgb) was 9.9 g/dL. Type and screen showed rare autoantibodies in her blood. Because the expected blood loss for the procedure was low, 2 units of packed RBCs (pRBCs) were initially crossmatched.

Intraoperative Course:

- Placed under **general endotracheal anesthesia**. Spinal anesthesia deferred (last dose of therapeutic enoxaparin 40 mg twice daily < 24 hours prior).
- Arterial line placed- history of severe pHTN with decreased right ventricular function.
- Hemorrhage noted during placement of retractors**. Vascular surgery consulted. Arterial line blood pressure- MAP 59-61 mmHg; IV fluids and vasopressin administered with good response.
- Hgb 6.1 g/dL; transfused with 2 units of crossmatched pRBCs**. 2 additional units crossmatched but not administered (repeat Hgb 8.4 g/dL).
- No additional bleeding or obvious vessel injury found**, area packed and case proceeded. Total blood loss ~500 milliliters. Pt **extubated and brought to the recovery room**.

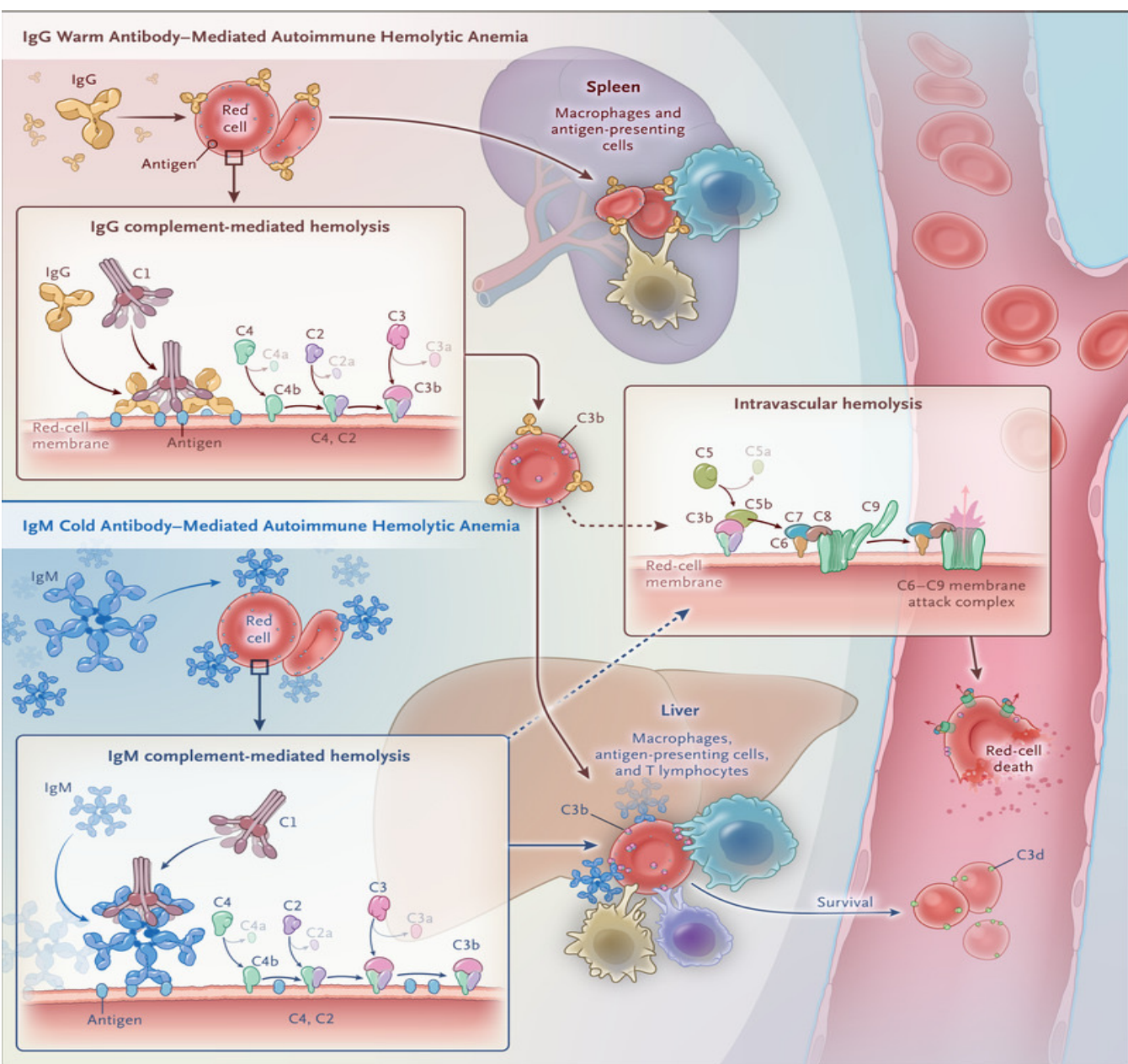
Case Description (cont.)

Recovery Room Course:

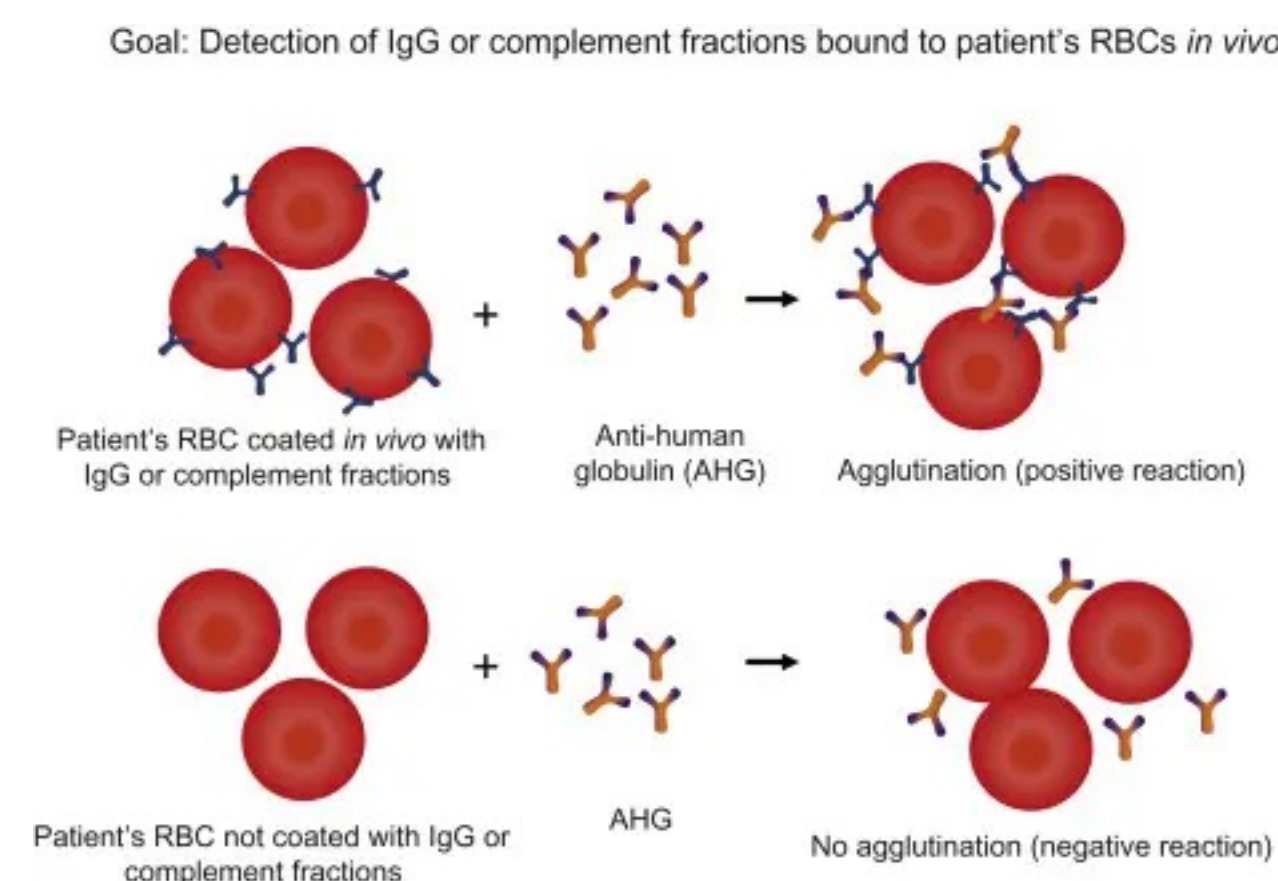
- Acutely hypotensive, started epinephrine infusion. **Repeat hemoglobin 6.0 g/dL; remaining 2 units of crossmatched pRBCs transfused**.
- Bedside transthoracic echocardiogram: hyperdynamic left ventricle with small cavity**.
- Reintubated**, central venous catheter placed. Exam showed **increased fullness in her right groin**
- All compatible units used**; awaiting additional products from Red Cross.
- Pt urgently taken for **right groin exploration**. A massive transfusion protocol (MTP) cooler containing 4 units crossmatched type O negative pRBCs, 4 units fresh frozen plasma, and 1 unit platelets was sent to the OR.

Intraoperative Course (take-back surgery):

- Right external iliac artery damage discovered**; rapid repair and hemostasis achieved. **Intraoperative hemoglobin 4.8 g/dL**.
- Due to patient’s specific antibodies, joint decision made to **defer transfusion with MTP blood** (patient **very high risk for a hemolytic transfusion reaction**). Pt maintained on pressors.
- 1 unit crossmatched blood eventually obtained, administered with 1 unit of platelets per surgeon’s request.
- Remained **intubated and sedated post-operatively, later resuscitated with additional compatible units** once obtained. Hgb 9.0-10.0 g/dL. Pressors weaned off evening of post-operative day (POD) 0, **extubated on POD 1**.



Left: Pathophysiology of Autoimmune Hemolytic Anemia. Right: Illustration of positive and negative Direct antiglobulin test



Discussion

Blood loss is an important consideration for certain procedures and patient populations. Many factors affect blood loss and the need to transfuse. One important consideration is whether anesthetic technique affects blood loss. One study by Maurer and colleagues compared blood loss in patients undergoing primary total hip arthroplasty under either general anesthesia (GA) or spinal anesthesia (SA). They found that patients who received SA had lower intraoperative blood loss than those receiving GA. Moreover, the GA group had twice as many intraoperative transfusions and more postoperative and total transfusions. One theory to explain the difference in blood loss is that SA results in sympathetic blockade which lowers mean arterial pressure, redistributes blood away from muscle and bone, and dilates the arteries and veins, causing less arterial and venous bleeding and better hemostasis [2]. For overall outcomes, however, many studies show conflicting results [3]. In our patient, we were precluded from performing a spinal anesthetic due to last therapeutic enoxaparin dose being within 24 hours of her procedure. Also, SA is less preferable in a patient with history of severe pulmonary hypertension, as the sympathetic blockade would cause rapid systemic hypotension [4].

Blood transfusion in the setting of AIHA poses unique challenges. Our patient’s hemoglobin level reached a nadir of 4.8 g/dL; all of her crossmatched units were exhausted, and the blood bank was attempting to secure more. The risks and benefits of transfusing MTP blood had to be weighed; one must consider the patient’s comorbidities, symptoms, and clinical picture. Transfusion is indicated when signs of significant hypoxia, angina, confusion, or hemodynamic instability are present [5]. These symptoms generally occur when hemoglobin drops below 5 g/dL [1]. Importantly, when making the decision to transfuse or not to transfuse, there should be frequent communication between the clinical teams and blood bank, as transfusion may be urgent and testing can take hours [5].

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