

Severe Warm Autoimmune Haemolytic Anaemia with Concurrent Adnexal Cyst: A Case Report on Transfusion Strategy in a Complex Clinical Scenario

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ABSTRACT

Warm Autoimmune Haemolytic Anaemia (AIHA) is a rare immune-mediated disorder in which IgG autoantibodies destroy Red Blood Cells (RBCs) at body temperature. The presence of panreactive autoantibodies complicates compatibility testing and transfusion support. Coincidental gynaecologic pathology such as an adnexal cyst is rarely documented and may increase clinical complexity. A 43-year-old woman presented with severe anaemia (Hb 3.2 g/dL), tachycardia, and pallor. Laboratory evaluation revealed macrocytosis, reticulocytosis, elevated Lactate Dehydrogenase (LDH), indirect hyperbilirubinaemia, and a strongly positive direct Coombs test (4+). ABO grouping showed autoagglutination that required resolution by conventional tube testing. Antibody screening demonstrated panagglutinating warm autoantibodies with Coombs-phase incompatibility in all crossmatches. Two least-incompatible packed red cell units were transfused safely, with appropriate haematologic response. High-dose methylprednisolone followed by oral prednisolone achieved remission. Ultrasonography revealed a left adnexal cyst (O-RADS 3) with normal tumour markers. After one month of immunosuppressive therapy, antibody reactivity subsided and all crossmatches became compatible. The patient underwent laparoscopic cystectomy with minimal blood loss; histopathology confirmed a benign serous cyst with a paratubal cyst. This case underscores the effectiveness of judicious transfusion using least-incompatible units and early corticosteroid therapy in warm AIHA. The incidental adnexal cyst highlights the need for multidisciplinary coordination between transfusion medicine and gynaecology teams in complex perioperative scenarios.

Keywords: Corticosteroids, Direct antiglobulin test, Least-incompatible blood transfusion, Panagglutinating autoantibody, Perioperative transfusion management

CASE REPORT

A 43-year-old woman with systemic hypertension not on any regular medication presented with one week of progressive breathlessness and fatigue. There was no history of bleeding, fever, prior transfusion or organ/stem cell transplantation. The patient had no known history of autoimmune disease, lymphoproliferative disorder, chronic infection, malignancy, or recent drug exposure. There was no prior diagnosis of systemic illness. Examination showed marked pallor, tachycardia (106/min), hypotension (90/50 mmHg), and elevated jugular venous pressure. Haemoglobin was 3.2 g/dL, Mean Corpuscular Volume (MCV) 137 fL, and the uncorrected reticulocyte count was 36.4%. In view of the profound anaemia (haematocrit 11.3%), the corrected reticulocyte count was approximately 9.8%, with an estimated Reticulocyte Production Index (RPI) of 3.3-3.9. Peripheral smear revealed anisopoikilocytosis, polychromasia, and nucleated RBCs. Liver enzymes were normal except for mild indirect hyperbilirubinaemia (total 1.45 mg/dL, indirect 1.0 mg/dL), and LDH was elevated at 598 U/L (reference range, 135-214 U/L). ANA was negative. The patient had two prior full-term vaginal deliveries more than two decades ago. Both children are healthy. There was no history of obstetric complications, blood transfusion, or neonatal haemolytic disease.

Initial immunohematologic testing using Column Agglutination Technology (CAT) showed strong autoagglutination, causing ABO discrepancy. As shown in [Table/Fig-1], forward grouping displayed strong reactivity with Anti-B and Anti-D (4+), weak reactivity with Anti-A (1+) and a positive control (3+), while reverse grouping showed 4+ reaction with A1 cells and B cells (2+). The positive control indicated spontaneous agglutination, rendering the gel-based forward typing unreliable.

[Table/Fig-1]: Gel card-based ABO and Rh(D) grouping showing discrepant results. Blood grouping and typing was performed using the column agglutination technique (gel cards) following standard manufacturer protocol. Forward typing shows Anti-A (1+), Anti-B (4+), and Anti-D (4+) agglutination, with a 3+ positive control reaction, indicating possible autoagglutination. Reverse typing shows strong agglutination with A1 cells (4+) and moderate reaction with B cells (2+), suggesting an ABO discrepancy, likely Group B with serological interference

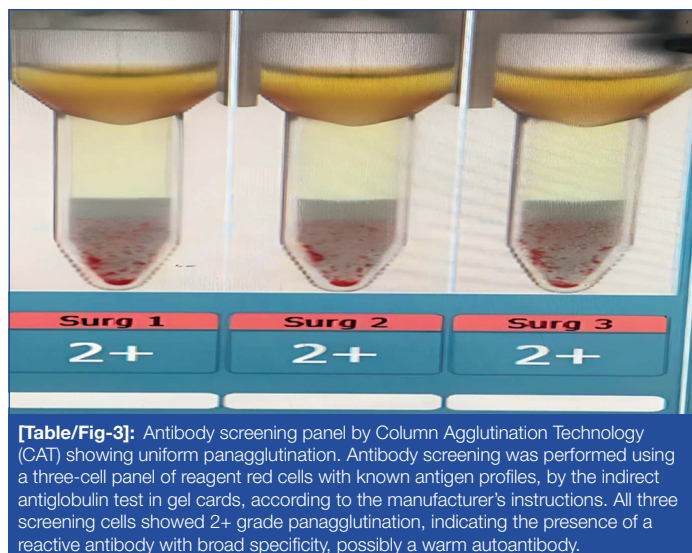
Manual tube testing resolved the group as B Rh(D) positive, as shown in [Table/Fig-2].

Anti-A	Anti-B	Anti-AB	Anti-D	Anti-H	A1 cells	B cells	O cells
0	4+	4+	4+	3+	4+	0	0

[Table/Fig-2]: Blood grouping results by conventional tube technique.

Antibody screening using a 3-cell panel showed uniform 2+ positivity with a 3+ autocontrol, indicating panagglutinating warm autoantibodies [Table/Fig-3].

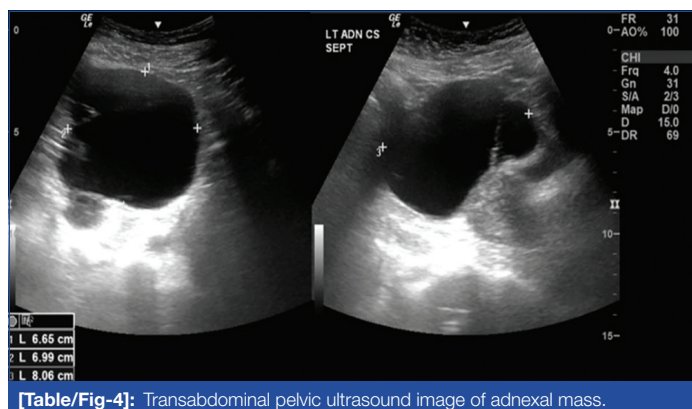
Direct Antiglobulin Test (DAT) was strongly positive (4+), confirming AIHA. Crossmatching of four PRBC units showed incompatibility (2+) in Coombs phase but compatible in saline phase, consistent



with IgG-mediated autoantibody and making a mixed-type autoimmune haemolytic process unlikely. In the acute setting, extended immunohaematologic work-up such as autoadsorption or alloadsorption studies could not be performed due to resource limitations and the need for urgent transfusion support. Given the uniform reaction strength across tested units and the known behaviour of warm autoantibodies, further crossmatching with additional units was not expected to yield lower reactivity. All four Packed Red Blood Cell (PRBC) units tested showed uniform 2+ antiglobulin-phase incompatibility compared with a stronger 3+ autocontrol and were compatible in the saline phase; therefore, all tested units were selected for transfusion as least-incompatible units.

Written informed consent was obtained from the patient and the treating physician concurred with transfusion of least incompatible red cell units after explanation of serologic incompatibility, indications, and risks. Given critical anaemia, one unit was transfused on admission, resulting in haemoglobin increase to 6.2 g/dL. A second unit was transfused the following day, raising Hb to 9.3 g/dL. Transfusion was performed under close clinical monitoring. No haemolytic or febrile reaction occurred. The patient was managed with pulse methylprednisolone (750 mg/day for three days) followed by oral prednisolone 30 mg twice daily.

Pelvic ultrasonography revealed a left adnexal cyst (volume 190 cc) with internal septations, likely ovarian in origin (O-RADS US 3) [Table/Fig-4].

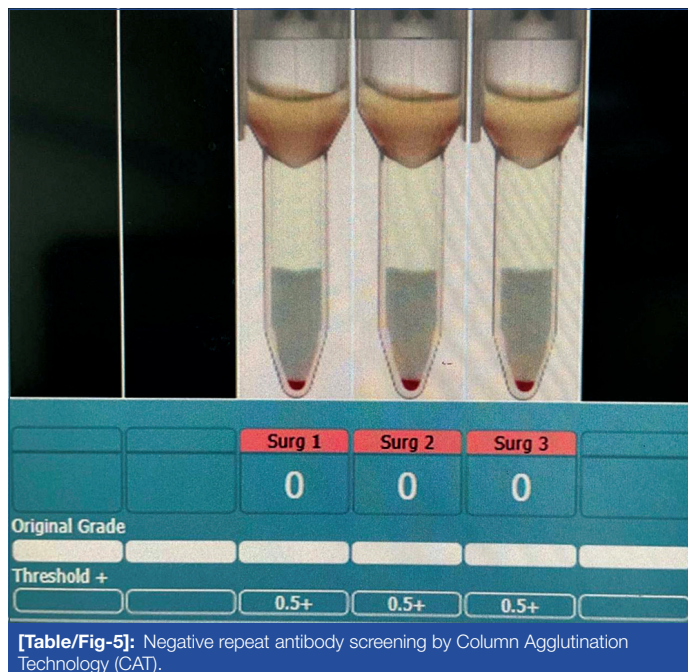


Transabdominal pelvic ultrasound image demonstrates a multiloculated cystic adnexal lesion with smooth walls and no solid components or papillary projections, measuring less than 10 cm in maximal dimension. Thin internal septations are noted. These features correspond to an ORADS 3 score, indicating a low risk of malignancy (1% to <10%).

Tumour markers (CA-125, CA19-9, CEA) were normal, and Pap smear was negative. The patient was therefore diagnosed as severe

warm AIHA with a concurrent left adnexal cyst. She was discharged after one week with Hb 9.3 g/dL and advised elective surgical management once stable.

One month later, she was readmitted for laparoscopic cystectomy. She remained asymptomatic, and Hb was 11.4 g/dL. Coagulation and biochemical parameters were normal. Repeat grouping by CAT confirmed B Rh(D) positive with no autoagglutination. Antibody screen was negative [Table/Fig-5], and all seven PRBC crossmatches were compatible in both Coombs and saline phases. Two units were reserved for perioperative use.



Repeat antibody screening was performed using a three-cell panel of reagent red cells with known antigen profiles, by the indirect antiglobulin test in gel cards, according to the manufacturer's instructions. All three screening cells were non-reactive (no agglutination), indicating the absence of detectable allo- or autoantibodies under test conditions.

The patient underwent laparoscopic left ovarian cystectomy with minimal blood loss (~100 mL). Postoperative Hb was 9.9 g/dL, and no transfusion was required. Histopathology revealed a benign serous cyst with an associated paratubal cyst. She remained stable and was discharged on tapering oral prednisolone (initially administered at approximately 1 mg/kg/day equivalent dose, subsequently reduced to 20 mg daily based on haematologic response).

DISCUSSION

Warm AIHA is an uncommon, immune-mediated condition caused by IgG autoantibodies directed against RBC antigens at body temperature, leading to premature RBC destruction [1]. The incidence is approximately one to three per 100,000 persons annually [2]. Severe presentations may require urgent transfusion, yet pretransfusion testing is often complicated by panreactive autoantibodies. Concurrent gynaecologic pathologies such as adnexal cysts are rarely described in this setting and may further complicate clinical management [3].

Warm AIHA is characterised by IgG antibodies that react optimally at 37°C and lead to extravascular haemolysis. The diagnosis is typically supported by laboratory features of haemolysis, including decreased haemoglobin, elevated Lactate Dehydrogenase (LDH), increased reticulocyte count, a strongly positive direct Coombs test and exclusion of other causes of anaemia [4]. In this patient, significant autoagglutination interfered with blood grouping and antibody screening, a well-known challenge in warm AIHA. Resolution

by conventional tube testing provided reliable grouping without specialised reagents. Similar serologic difficulties have been documented, where warm AIHA causes panagglutination and necessitates advanced methods like chloroquine or EDTA-glycine-HCl treatment to remove cell-bound IgG for phenotyping [5]; however, these are often impractical in emergencies.

The use of least incompatible PRBCs is an accepted approach in warm AIHA when fully compatible units cannot be identified [6]. Studies have shown that transfusing such units, under close clinical and haemolytic monitoring, is both safe and effective. Sahoo D et al., emphasised that transfusion should not be withheld solely because of serologic incompatibility, as most warm AIHA cases show autoantibody reactivity with all donor cells [7]. Our patient tolerated two transfusions well, achieving rapid haematologic improvement without evidence of haemolysis.

No relevant sensitising events were identified, as the patient (G2P2L2) had two uncomplicated full-term deliveries over two decades ago, making persistence of any pregnancy-induced alloantibodies unlikely. The disappearance of autoagglutination and panagglutination on readmission indicates suppression of autoantibody activity by corticosteroid therapy. This aligns with prior evidence demonstrating that early corticosteroid initiation reduces transfusion dependence and serologic reactivity [8]. Extended antibody identification using an 11-cell panel and adsorption techniques could not be performed due to resource limitations; however, the panreactive pattern, positive autocontrol, and subsequent serologic resolution after therapy made clinically significant alloantibodies unlikely.

The co-existence of a benign adnexal cyst in this patient added diagnostic and management complexity. Previously reported cases, including that of Agarwal V et al., described suboptimal response to corticosteroids and immunosuppressive therapy, with complete remission of haemolysis only after ovarian cystectomy [9]. In contrast, our patient demonstrated rapid hematologic improvement following corticosteroid therapy alone, with disappearance of autoantibody reactivity prior to surgical intervention. Payne D et al., reported persistent haemolysis despite corticosteroids, with complete remission only after dermoid cystectomy, suggesting a causal role [10]. In contrast, our patient improved with steroids before surgery, and the cyst's benign nature excluded a direct pathogenic link. Nevertheless, the temporal association raises the possibility of an underlying immune trigger that warrants further exploration. This case, therefore, provides valuable insights into the transfusion

management of AIHA and highlights the need for additional studies to better understand potential links between gynaecological pathologies and autoimmune haemolytic processes.

CONCLUSION(S)

In conclusion, this case demonstrates that even in the presence of panagglutinating warm autoantibodies, transfusion can be safely administered when guided by compatibility testing, clinical monitoring, and early immunosuppressive therapy. This case highlights the rare coexistence of severe warm AIHA with a benign adnexal cyst, raising the possibility of an immune-mediated association rather than establishing a causal relationship.

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