e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2025; 17(12); 2018-2022

Original Research Article

A Rare Case of Sickle Cell Anemia with Warm Autoimmune Haemolytic Anemia and Rheumatic Heart Disease in a 17-Year-Old: A Case Report from a Tertiary Care Centre in Eastern India

Vaibhav Aditya[1], Pankaj Hans[2], Nidhi Kumari[3], Ajitesh Kumar[4], Priyanka[5], Ashutosh[6], Ujjawal[7]

[1]PG 3, Department of General Medicine, Patna Medical College & Hospital, Patna, Bihar, India
[2]Professor, Department of General Medicine, Patna Medical College & Hospital, Patna, Bihar, India
[3]PG 3, Department of General Medicine, Patna Medical College & Hospital, Patna, Bihar, India
[4]Senior Resident, Department of General Medicine, Patna Medical College & Hospital, Patna, Bihar, India
[5]PG 3, Department of General Medicine, Patna Medical College & Hospital, Patna, Bihar, India
[6]PG 3, Department of General Medicine, Patna Medical College & Hospital, Patna, Bihar, India
[7]PG 1, Department of General Medicine, Patna Medical College & Hospital, Patna, Bihar, India

Received: 01-09-2025 Revised: 15-10-2025 / Accepted: 21-11-2025
Corresponding author: Dr. Ajitesh Kumar
Conflict of interest: Nil

Abstract

A 17-year-old male with known homozygous sickle cell disease (HbSS) presented with severe acute anemia, jaundice, generalized body ache, and fever. Hemoglobin had acutely dropped to 6.6 g/dL with elevated unconjugated bilirubin (5.7 mg/dL), elevated lactate dehydrogenase (1015 U/L), and critically, a positive direct antiglobulin test (DAT) for IgG, confirming warm autoimmune hemolytic anemia (AIHA). Hemoglobin electrophoresis confirmed HbSS (74.8%). The patient also had rheumatic heart disease (RHD) with mild mitral regurgitation and mild-to-moderate aortic regurgitation. Following treatment with corticosteroids, intravenous fluids, and supportive care over an 8-month period, the patient showed gradual improvement and stabilization. This case highlights the rarity of coexistent SCA, warm AIHA, and RHD in an adolescent, emphasizing the importance of DAT testing in SCA patients presenting with acute anemia.

Introduction

Sickle cell anemia (SCA) is an autosomal recessive hemoglobinopathy caused by a point mutation in the β-globin gene that leads to the production of hemoglobin S [1][2]. When inherited homozygously (HbSS), it results in chronic intravascular and extravascular hemolysis, vaso-occlusive crises, acute chest syndrome, and multi-organ damage [3].

Autoimmune hemolytic anemia (AIHA) is an acquired condition characterized by autoantibody-mediated destruction of red blood cells [2][3]. Warm AIHA, the most common form mediated by IgG autoantibodies at 37°C, is rare in children and adolescents with an estimated incidence of less than 1 per 100,000 per year [2]. The coexistence of SCA and AIHA is exceptionally rare in the pediatric and adolescent population, with only sporadic case reports in the medical literature [6]. The combination presents a diagnostic and therapeutic challenge because both conditions independently cause hemolysis and anemia, distinguishing immune-mediated hemolysis from the baseline chronic hemolysis of SCA is difficult, and transfusion becomes complicated due to potential alloimmunization [2][3][6]. Moreover, the additional presence of rheumatic heart disease (RHD) adds another layer of complexity to management, as cardiac complications can limit fluid administration [3][7].

This case report describes a 17-year-old male from Patna, Bihar, with homozygous SCA who developed warm AIHA confirmed by positive direct antiglobulin test (DAT) with IgG sensitization, along with previously diagnosed RHD.

Case Presentation

History of Present Illness: The patient is a 17-year-old male with known homozygous sickle cell disease (HbSS), diagnosed 7 years prior. He presented in early January 2024 with acute onset of severe jaundice, fever (on and off), generalized

body ache, and fatigue. The patient reported yellowish discoloration of sclera and body, dark urine, and constipation. He had experienced persistent anemia and fatigue for 7 years since his sickle cell disease diagnosis. No history of recent travel, insect bites, or blood transfusions was reported in the immediately preceding period. The patient had been managed at local facilities in Gaya with basic supportive care prior to presentation at PMCH Patna.

Previous Health History: The patient had a documented diagnosis of homozygous sickle cell disease made 7 years ago. Previous echocardiography had revealed rheumatic heart disease with mild mitral regurgitation and mild-to-moderate aortic regurgitation. He had experienced multiple episodes of body ache and fatigue throughout childhood, consistent with his underlying hemoglobinopathy.

Family History: Family history details were not extensively documented in the medical records. No reported family history of sickle cell disease or autoimmune disorders.

Physical Assessment: Vital signs on admission (03.01.2024) revealed blood pressure of 100/60 mmHg, pulse of 86 bpm (regular), and intermittent fever. Oxygen saturation was not explicitly stated. General examination showed severe pallor, moderate-to-severe icterus with yellowish discoloration of sclera and skin, and generalized body ache with the patient in mild to moderate distress. No visible cyanosis was noted. Systemic examination revealed tachycardia on cardiovascular assessment, though echocardiography later confirmed pre-existing RHD. The respiratory system was clear to auscultation bilaterally. Abdominal examination showed mild hepatomegaly on clinical palpation, confirmed on ultrasound at 14.5 cm. The spleen measured 7.2 cm sonographically, within upper normal range. The central nervous system examination showed the patient was alert and conscious with no focal neurological deficits.

Laboratory and Diagnostic Studies

Hematology

Table 1: Complete Blood Count (Serial Testing):

Test Date	Hb (g/dL)	RBC (millions/µL)	WBC (cells/µL)	Hct (%)	MCV (fL)	Platelets (lac/µL)
03.01.2024	8.0	2.82	16,300	23.4	82.98	3.25
07.01.2024	7.1	2.55	11,700	20.9	81.96	3.53
11.01.2024	6.3	2.23	14,100	17.8	79.82	4.64
16.01.2024	6.6	2.23	16,800	18.8	84.30	3.56

The hemoglobin progressively worsened to 6.3 g/dL on 11.01.2024, indicating rapid hemolysis. WBC counts remained elevated (11,700–16,800 cells/µL), consistent with an acute hemolytic process.

Reticulocyte Count: 11.11% (reference: 0.50–2.50%), markedly elevated indicating a robust but insufficient compensatory bone marrow erythropoietic response.

Peripheral Blood Smear: Showed anisocytosis, poikilocytosis, microcytic and hypochromic RBCs, polychromatophils, nucleated RBCs indicating severe bone marrow stress, visible sickle cells confirming SCA, leukocytosis with neutrophilia and lymphocytosis, eosinophilia, and increased platelets with giant platelets. No malarial parasites were seen on repeat screening.

Table 2: Hemoglobin Electrophoresis (HPLC)

Parameter	Patient Value	Reference Range
Hb F (Fetal)	2.0%	<2%
Hb A2	8.0%	2.70–3.50%
Hb A (Adult)	1.50%	>95%
Hb S (Sickle)	74.80%	0%
Hb Others	0.10%	0%

Interpretation confirmed homozygous sickle cell disease (HbSS) genotype.

Immunohematology

Direct Antiglobulin Test (Coombs Test): POSITIVE for IgG using Erythrocyte Magnetized Technology. This confirmed in vivo sensitization of red blood cells with IgG autoantibodies, pathognomonic for warm autoimmune hemolytic anemia.

Indirect Antiglobulin Test: NEGATIVE, indicating no unexpected alloantibodies detected in serum.

Table 3: Hemolysis Markers

Parameter	Patient Value	Reference Range
Total Bilirubin	5.7 mg/dL	0.1–1.2 mg/dL
Direct Bilirubin	2.8 mg/dL	0.0–0.3 mg/dL
Indirect Bilirubin	2.90 mg/dL	0.2–0.8 mg/dL
LDH	1015 U/L	135–225 U/L
ALT (SGPT)	32 IU/L	5–34 IU/L
AST (SGOT)	56 IU/L	0–42 IU/L
Alkaline Phosphatase	356 U/L	<240 U/L

All markers of hemolysis were markedly elevated, reflecting rapid RBC destruction from both sickle hemolysis and warm autoimmune hemolysis [2][3]. Liver function tests showed mildly elevated AST and alkaline phosphatase (likely from hemolysis), with normal ALT, total protein 7.9 g/dL, albumin 4.2 g/dL, and globulin 3.7 g/dL (slightly elevated, consistent with chronic hemolysis and immune activation).

Renal Function and Electrolytes: Electrolytes remained largely stable throughout hospitalization. Sodium ranged 140–141 mmol/L, potassium 3.8–4.1 mmol/L, and chloride 109–114 mmol/L. Serum urea ranged 24–36 mg/dL. Creatinine was transiently elevated on 07.01.2024 at 1.5 mg/dL, likely reflecting acute hemolysis-induced renal hypoperfusion, but normalized to 0.7 mg/dL by 15.01.2024.

Bone Marrow Aspiration: Showed normocellular marrow for age with erythroid hyperplasia and normoblastic maturation, normal sequential myelopoiesis, adequate megakaryopoiesis with normal maturation, and no hemoparasites. The findings confirmed a robust erythropoietic response consistent with brisk hemolysis, ruling out aplastic crisis or marrow infiltration.

Infectious Disease Serology: Malaria rapid card test and blood smears were repeatedly NEGATIVE for both Plasmodium vivax and Plasmodium falciparum. Widal test was negative for S. typhi and S. paratyphi, ruling out enteric fever [3]. Blood culture showed NO GROWTH, excluding bacteremia and sepsis. Procalcitonin was mildly elevated at 0.16 ng/mL (reference <0.10 ng/mL), consistent with inflammatory response to hemolysis.

Cardiac Evaluation: Echocardiography revealed mild mitral regurgitation (MR), mild-to-moderate aortic regurgitation (AR), no thrombus or clot, no pericardial effusion, and left ventricular ejection fraction (LVEF) of 60% (normal). Diagnosis confirmed pre-existing Rheumatic Heart Disease (RHD) with valvular regurgitation.

Abdominal Imaging: Ultrasound abdomen showed mildly enlarged liver (14.5 cm) with normal parenchymal echotexture, multiple gallbladder calculi (largest 6.5 mm) without cholecystitis, normal common bile duct and portal vein, normal pancreas, normal-sized spleen (7.2 cm), normal kidneys bilaterally, and no ascites. Impression was mild hepatomegaly and asymptomatic cholelithiasis (common in SCA due to bilirubin-induced stone formation).

Treatment and Management: The patient was admitted under Dr. Prof. Pankaj Hans's unit at PMCH Patna and managed over approximately 8 months from October 2023 to January 2024 with extended outpatient follow-up.

Hematologic Management: Limited packed red blood cell transfusions were administered after proper typing, crossmatching, and grouping, with target hemoglobin maintained above 6–7 g/dL to improve tissue oxygenation while avoiding volume overload given RHD comorbidity. One occasion of transfusion refusal by attendants was documented.

Immunosuppressive Therapy: Prednisolone (oral corticosteroid) was initiated as first-line therapy for warm AIHA. Standard approach involves 1–2 mg/kg/day initially with gradual tapering. Antipyretics and pain management were administered for fever and generalized body ache.

Supportive Care: Intravenous fluids (normal saline) were administered at rates adjusted for cardiac status given RHD presence. Folic acid 5 mg once daily was given to support increased red cell production. Antimalarial prophylaxis was continued given initial clinical concern for malaria, though serology/smear were negative. Pantoprazole 40 mg once or twice daily was given for gastroprotection. Strict hydration was emphasized as crucial for preventing vaso-occlusive crisis and hemolysis in SCA.

Antibiotic Therapy: Cefixime 200 mg twice daily for 5 days, metronidazole 400 mg three times daily for 5 days, and rifaximin 550 mg twice daily were prescribed based on clinical presentation, though blood culture was negative.

Maintenance Therapy and Advice: Patient was advised strict hydration (2–3 liters water daily), continued folic acid supplementation indefinitely, continued hydroxyurea for SCA management, monthly intramuscular penicillin injections for RHD prophylaxis to prevent streptococcal infection and endocarditis, and avoidance of triggers

including infection, dehydration, hypoxia, cold exposure, and excessive exercise. Regular outpatient follow-up was scheduled for monitoring hemoglobin, reticulocyte count, bilirubin, LDH, DAT, and cardiac status.

Follow-up and Outcomes: Serial hemoglobin monitoring from October 2023 to January 2024 showed initial severe anemia at 5.6 g/dL on 15.10.2023, fluctuating values through the treatment period with progressive improvement to 8.0–8.2 g/dL in November-December 2023, and stabilization at 6.6–8.0 g/dL by January 2024. The hemoglobin fluctuations reflected ongoing hemolytic process balanced by compensatory erythropoiesis and therapeutic intervention.

Bilirubin trends showed elevated unconjugated (indirect) hyperbilirubinemia predominating, consistent with extravascular hemolysis from both sickle cell disease and warm AIHA. Progressive decline from 5.7 mg/dL to 2.1–2.9 mg/dL by mid-January 2024 indicated improving hemolysis with therapeutic intervention.

Clinical improvement was documented with gradual resolution of jaundice over the 8-month period, subsidence of fever with management, improvement of generalized body ache with pain management and corticosteroid therapy, partial improvement of fatigue and exercise intolerance, and no documented acute vaso-occlusive crises or acute chest syndrome during hospitalization or the 8-month observation window. Patient was discharged with instructions for outpatient follow-up, ongoing medications, and lifestyle modifications.

Discussion

This case highlights several crucial aspects of diagnosing and managing the rare combination of sickle cell anemia with warm autoimmune hemolytic anemia and rheumatic heart disease. The coexistence of SCA and AIHA is exceptionally rare in adolescents, with only scattered case reports in medical literature [8]. Proposed mechanisms for AIHA development in SCA include chronic inflammatory state with polyclonal B-cell activation, repeated transfusion-induced alloimmunization breaking tolerance and triggering autoimmunization, post-infectious autoimmune response, and direct immune dysregulation inherent to SCA [6].

The key diagnostic challenge lies in clinical mimicry, as SCA itself presents with chronic hemolysis, jaundice, and anemia. An acute worsening might be mistaken for vaso-occlusive crisis, splenic sequestration crisis, acute chest syndrome, or infection. The crucial diagnostic clue was disproportionate hemolysis relative to baseline SCA status, with marked hemoglobin drop and severely elevated hemolysis markers [7]. The positive DAT for IgG was essential in confirming immune-mediated hemolysis, establishing warm AIHA diagnosis [2][3]. The negative indirect Coombs test ruled out significant serum alloantibodies, suggesting this was primarily autoimmune hemolysis rather than a transfusion reaction [2][3].

Corticosteroids are first-line therapy for warm AIHA in both children and adults, with response rates of 70–80% in pediatric cohorts [2][3]. Our patient showed gradual improvement consistent with steroid response. Transfusion in warm AIHA is challenging because the patient's RBCs are already coated with autoantibodies (positive DAT), making crossmatching difficult, and each transfusion can paradoxically worsen hemolysis [2][3]. The report notes one instance where family refused blood transfusion, indicating cultural or economic barriers common in resource-limited settings like rural eastern India [3][7].

The presence of RHD with mild-to-moderate valvular lesions added significant management complexity requiring careful fluid balance to prevent volume overload while maintaining hydration for SCA [3][7]. LVEF was preserved at 60%, but ongoing hemolysis and anemia placed additional hemodynamic stress on the heart. The patient was appropriately prescribed monthly penicillin for endocarditis prophylaxis against streptococcal infection, as per guidelines [7].

Published cases from NIH and Frontiers in Pediatrics describe similar presentations with positive DAT for IgG, requirement for corticosteroid therapy, and careful transfusion management [2][6]. Our case is distinguished by coexistent RHD and presentation in eastern India where both SCA and RHD are endemic [1][3][7].

Conclusion

The significance of early detection and comprehensive management in rare combinations of hematologic and cardiac pathology is illustrated by this case. Despite diagnostic challenges, implementing evidence-based care including immunohematologic testing (DAT), corticosteroid therapy, and multidisciplinary management led to notable clinical improvement. Key takeaways include maintaining high suspicion for AIHA in SCA patients with acute worsening anemia, the essential role of DAT testing in diagnosis, addressing transfusion challenges through proper compatibility testing, managing comorbid RHD with careful fluid balance, and recognizing the disease burden in endemic regions like eastern India. Long-term follow-up including repeat DAT testing, cardiac monitoring, and assessment for

relapse would provide valuable insights into outcomes in this complex patient population.

References

1. Pauling L, Itano HA, Singer SJ, Wells IC. Sickle cell anemia, a molecular disease. Science. 1949;110(2865):543-548. doi:10.1126/ science.110.2865.543
2. Coexistent sickle cell anemia and autoimmune hemolytic anemia – NIH PubMed. (2024, November 5). Retrieved from https://pmc.ncbi.nlm.nih.gov/articles/PMC11634362/
3. Autoimmune hemolytic anemia in the pediatric setting. PMC Pediatrics. 2021;8(1):25. Retrieved from https://pmc.ncbi.nlm.nih.gov/articles/PMC7828053/
4. Rees DC, Duley TM, Gladwin MT. Sickle-cell disease. The Lancet. 2010;376(9757):2018-2031. doi:10.1016/S0140-6736(10)61029-X
5. Piel FB, Patil AP, Howes RE, et al. Global epidemiology of sickle haemoglobin in neonates: a contemporary geostatistical model-based map and population estimates. The Lancet. 2013;381(9861):142-151. doi:10.1016/S0140-6736(12)61312-1
6. Case report: Autoimmune hemolytic anemia caused by warm and cold antibodies in a pediatric patient. Frontiers in Pediatrics. 2023;11:1217536. Retrieved from https://www.frontiersin.org/journals/pediatrics/articles/10.3389/fped.2023.1217536
7. World Heart Federation. Acute rheumatic fever and rheumatic heart disease: A global perspective. Global Heart. 2022;17(1):1-12. doi:10.5334/gh.1115
8. Autoimmune hemolytic anemia as a complication of congenital hemoglobinopathy. PMC Medicine. 2021;7(8):e347040. Retrieved from https://pmc.ncbi.nlm.nih.gov/articles/PMC8347040/