Received: May 8, 2026
Accepted: May 30, 2026

Acad Med J 2026;6(2):126-130
UDC:616.155.194.17:576.314]-056.7-053.2
Case report

A CASE REPORT OF PEDIATRIC HEREDITARY SPHEROCYTOSIS: MANAGEMENT OF HEMOLYTIC DISEASE AND CHOLELITHIASIS

Jovanovska Aleksandra[1], Teov Bojan[1], Cvejoska-Cholakovska Valentina[2], Bojadzieva Sonja[3], Kocheva Svetlana[1]

[1]Department of Hematology and Oncology, University Children's Hospital, Faculty of Medicine, Ss. Cyril and Methodius University in Skopje, Republic of North Macedonia
[2]Department of Pulmonology, University Children's Hospital, Faculty of Medicine, Ss. Cyril and Methodius University in Skopje, Republic of North Macedonia
[3]Department of Gastroenterology and Hepatology, University Children's Hospital, Faculty of Medicine, Ss. Cyril and Methodius University in Skopje, Republic of North Macedonia
e-mail: jovanovska.a@gmail.com

Abstract

Introduction: Hereditary spherocytosis (HS) is a congenital hemolytic anemia caused by defects in erythrocyte membrane proteins, most commonly inherited in an autosomal dominant pattern. Clinical severity ranges from mild hemolysis to severe anemia with complications such as splenomegaly and pigment gallstones.

Case report: We report the case of a 10-year-old boy presenting with acute abdominal pain, jaundice, and dark urine. Physical examination revealed scleral icterus and splenomegaly. Laboratory investigations showed anemia (hemoglobin 7.9 g/dL), elevated mean corpuscular hemoglobin concentration (35.3 g/dL), reticulocytosis (9%), and indirect hyperbilirubinemia. Peripheral blood smear demonstrated numerous spherocytes. Abdominal ultrasonography confirmed splenomegaly and multiple gallstones. The patient had a history of recurrent hemolytic crises and a positive family history of HS. Based on clinical and laboratory findings, the diagnosis was established without further confirmatory testing. After appropriate vaccination, he underwent elective splenectomy with cholecystectomy. Postoperatively, clinical parameters improved significantly; however, moderate reactive thrombocytosis was observed. The patient remained asymptomatic during a 12-month follow-up period.

Conclusion: This case highlights the classic presentation and effective management of hereditary spherocytosis in a pediatric patient. Splenectomy combined with cholecystectomy resulted in significant clinical improvement and prevention of further hemolytic episodes.

Keywords: hereditary spherocytosis, children,

Introduction

Hereditary spherocytosis (HS) is the most common inherited hemolytic anemia among populations of Northern European descent, with an estimated prevalence of approximately 1 in 2,000 individuals[1]. It is caused by inherited defects in erythrocyte membrane and cytoskeletal proteins, including ankyrin, spectrin, band 3, and protein 4.2, which result in reduced membrane surface area and impaired red blood cell deformability. Consequently, erythrocytes acquire a spherical shape and become prematurely trapped and destroyed within the spleen, leading to chronic extravascular hemolysis[1,2].

The disease is inherited predominantly in an autosomal dominant manner, accounting for nearly 75% of cases, while the remaining cases arise from autosomal recessive inheritance or *de novo* mutations[3,4]. The clinical presentation is highly variable, ranging from asymptomatic disease to severe hemolytic anemia requiring regular transfusions. The classic clinical triad includes anemia, jaundice, and splenomegaly. Common complications include hemolytic crises, aplastic crises, growth retardation, and pigment gallstone formation secondary to chronic hyperbilirubinemia[2].

Splenectomy remains the standard therapeutic option for patients with moderate to severe disease, particularly in those with recurrent hemolytic episodes or symptomatic cholelithiasis. When gallstones are present, concomitant cholecystectomy is recommended[5].

We report the case of a 10-year-old boy with hereditary spherocytosis who presented with hemolytic crisis and symptomatic cholelithiasis and was successfully treated with splenectomy and cholecystectomy.

Case report

A 10-year-old boy was admitted to the Department of Hematology because of acute abdominal pain, jaundice, dark-colored urine, and generalized weakness. According to the medical history, the patient had experienced previous episodes of hemolytic crises, frequently precipitated by upper respiratory tract infections and febrile illnesses.

Physical examination revealed pallor, scleral icterus, and splenomegaly. The spleen was palpable 7 centimeters below the left costal margin, while the liver was not enlarged. No signs of active infection or lymphadenopathy were observed.

Laboratory investigations demonstrated significant hemolytic anemia with hemoglobin of 7.9 g/dL, red blood cell count of 2.95×10^{12}/L, and hematocrit of 22.4%. Mean corpuscular hemoglobin concentration (MCHC) was elevated at 35.3 g/dL. Reticulocyte count was markedly increased (9%), indicating compensatory erythropoiesis. Biochemical analysis revealed indirect hyperbilirubinemia with total bilirubin of 150.8 μmol/L. Peripheral blood smear demonstrated numerous spherocytes consistent with HS (Figure 1). Abdominal ultrasonography confirmed splenomegaly and revealed multiple gallstones (Figure 2). Based on the characteristic clinical presentation, positive family history, and laboratory findings, the diagnosis of HS was established.

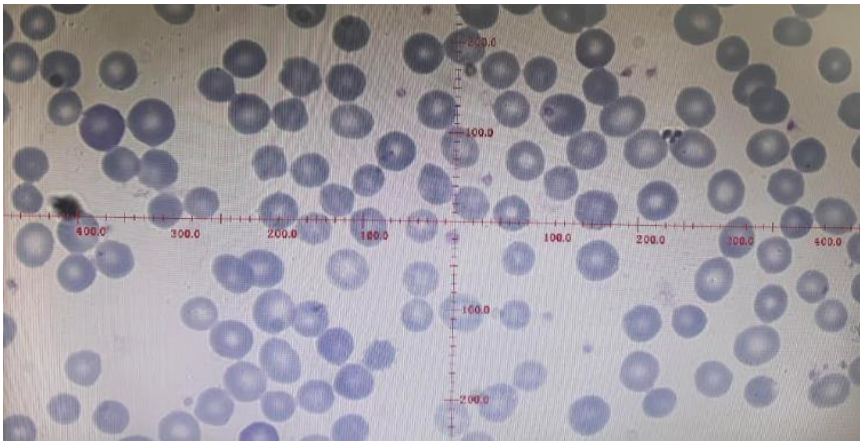

Fig. 1. Peripheral blood smear demonstrating spherocytes with reduced central pallor, characteristic of hereditary spherocytosis (Wright–Giemsa stain)

Initially, the patient received supportive treatment including leukoreduced red blood cell transfusion, hydration, and folic acid supplementation, resulting in clinical stabilization. Following vaccination against encapsulated organisms, including *Streptococcus pneumoniae*,

Haemophilus influenzae type b, and *Neisseria meningitidis*, elective splenectomy with concomitant cholecystectomy was performed.

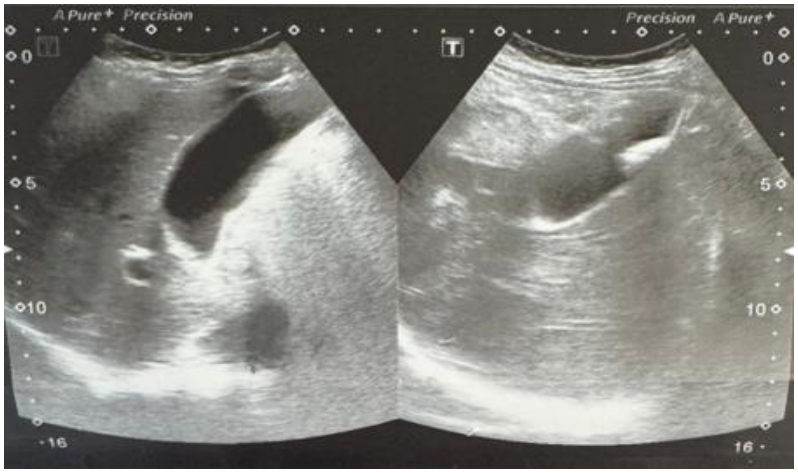

Fig. 2. Abdominal ultrasound scan: gallbladder with stones consistent with chronic hemolysis-associated cholelithiasis

The postoperative course was uneventful. Significant clinical and hematological improvement was observed after surgery, with resolution of jaundice and cessation of hemolytic crises (Table 1). Moderate secondary thrombocytosis developed postoperatively, and antiplatelet therapy was initiated as thromboprophylaxis. During the 12-month follow-up period, the patient remained asymptomatic without thrombotic or infectious complications.

Table 1. Comparison of laboratory results before and after patient's surgical treatment

	1 month before operation	1 month postoperative	3 months postoperative	12 months postoperative
Hemoglobin	96 g/L	133g/L	150g/L	153g/L
Red blood cells	3.70 x 10^{12}/L	4.94 x 10^{12}/L	5.61 x 10^{12}/L	5.81 x 10^{12}/L
Reticulocytes	14.89%	2.41%	2.17%	2.02%
Platelets	237 x10^{9}/L	718 x10^{9}/L	897 x10^{9}/L	527 x10^{9}/L
Total bilirubin	123.3 µmol/L	25.3 µmol/L	21.4 µmol/L	21.8 µmol/L

Discussion

Hereditary spherocytosis (HS) is characterized by marked clinical heterogeneity, ranging from mild compensated hemolysis to severe disease requiring surgical intervention. The present case reflects a moderate-to-severe phenotype, manifested by recurrent hemolytic crises, anemia, jaundice, splenomegaly, and pigment gallstones.

Laboratory evaluation in this patient demonstrated a pattern consistent with ongoing hemolysis, including anemia, elevated MCHC, reticulocytosis, and indirect hyperbilirubinemia. Among these, increased MCHC is a well-recognized and relatively specific hematological indicator in HS. Several studies have highlighted its diagnostic utility in screening for the disease. Tao *et al.* reported that an MCHC threshold >35.5 g/dL provides high specificity (94.47%) for HS, although with limited sensitivity[6]. Similarly, Liao *et al*. demonstrated that lowering the threshold to ≥33.49 g/dL increases diagnostic sensitivity while maintaining high specificity, supporting its role as an accessible screening parameter in routine hematological analysis[7]. In the present case, the elevated MCHC of 35.3 g/dL, in combination with other hemolytic indices and a positive family history, strongly supported the diagnosis of HS.

According to the British Committee for Standards in Hematology (BCSH) guidelines, HS can be diagnosed without further confirmatory testing when classical clinical features are present, alongside characteristic laboratory findings and a positive family history[5]. In cases

where diagnostic uncertainty exists, confirmatory assays such as eosin-5′-maleimide (EMA) binding or cryohemolysis testing are recommended due to their high diagnostic accuracy[5]. In this patient, these additional tests were not required as diagnostic criteria were clearly fulfilled.

Chronic hemolysis in HS frequently leads to pigment gallstone formation due to sustained bilirubin overproduction[8]. The presence of symptomatic cholelithiasis in this patient is consistent with the known complication profile of moderate-to-severe disease and justified concomitant cholecystectomy at the time of definitive surgical management.

Splenectomy remains the most effective therapeutic intervention for reducing hemolysis in moderate and severe HS, although it does not correct the underlying membrane defect. In accordance with BCSH recommendations, splenectomy should ideally be delayed until after the age of 6 years to minimize the risk of overwhelming post-splenectomy infection (OPSI) (Table 2)[5,9,10]. The timing of surgery in this case adhered to these guidelines, and appropriate immunization against encapsulated organisms was ensured preoperatively.

Post-splenectomy, the patient developed reactive thrombocytosis, a common and usually transient phenomenon in pediatric patients. Although generally benign, marked thrombocytosis may be associated with thromboembolic risk, warranting clinical monitoring and individualized consideration of antiplatelet therapy. This remains an area where pediatric evidence is still evolving.

Overall, this case demonstrates the value of integrating classical clinical findings, routine hematological parameters and guideline-based decision-making in the effective diagnosis and management of HS.

Table 2. Classification of spherocytosis and indications for splenectomy (Bolton-Maggs *et al.* 2011 [5]; Eber *et al.*, 1990 [10] (copyright 1990 Elsevier)

Classification	Trait	Mild	Moderate	Severe
Hemoglobin (g/l)	Normal	110-150	80-120	60-80
Reticulocyte count, %	Normal (<3%)	3-6	>6	>10
Bilirubin (μmol/l)	<17	17-34	>34	>51
Spectrin molecules per erythrocyte (% of normal)	100	80-100	50-80	40-60
Splenectomy	Not required	Usually not necessary during childhood and adolescence	Necessary during school age, before puberty	Necessary - delay until 6 years, if possible

Conclusion

Hereditary spherocytosis should be considered in pediatric patients presenting with hemolytic anemia, jaundice, and splenomegaly, particularly in those with a positive family history. Early recognition and guideline-based management, including splenectomy with cholecystectomy when indicated, can result in excellent clinical outcomes and prevent recurrent hemolytic complications.

Conflict of interest statement. None declared.

References

1. Ciepiela O. Old and new insights into the diagnosis of hereditary spherocytosis. *Ann Transl Med* 2018; 6(17): 339. doi: 10.21037/atm.2018.07.35.
2. Perrotta S, Gallagher PG, Mohandas N. Hereditary spherocytosis. *Lancet* 2008; 372(9647): 1411-1426. doi: 10.1016/S0140-6736(08)61588-3.
3. Narla J, Mohandas N. Red cell membrane disorders. *Int J Lab Hematol* 2017; 39(Suppl 1): 47-52. doi: 10.1111/ijlh.12657.

4. Iolascon A, Avvisati RA, Piscopo C. Hereditary spherocytosis. *Transfus Clin Biol* 2010; 17(3): 138-142. doi: 10.1016/j.tracli.2010.05.006.
5. Bolton-Maggs PH, Langer JC, Iolascon A, Tittensor P, King MJ; General Haematology Task Force of the British Committee for Standards in Haematology. Guidelines for the diagnosis and management of hereditary spherocytosis--2011 update. *Br J Haematol* 2012; 156(1): 37-49. doi: 10.1111/j.1365-2141.2011.08921.x.
6. Tao YF, Deng ZF, Liao L, Qiu YL, Chen WQ, Lin FQ. Comparison and evaluation of three screening tests of hereditary spherocytosis in Chinese patients. *Ann Hematol* 2015; 94(5): 747-51. doi: 10.1007/s00277-014-2270-2.
7. Liao L, Xu Y, Wei H, Qiu Y, Chen W, Huang J, *et al*. Blood cell parameters for screening and diagnosis of hereditary spherocytosis. *J Clin Lab Anal* 2019; 33(4): e22844. doi: 10.1002/jcla.22844.
8. Cong S, Wang YN, Wang JR, Duan RH. Association between hereditary spherocytosis and gallstone disease: Pathophysiology, diagnosis, and management. *World J Gastrointest Surg* 2025; 17(7): 105033. doi: 10.4240/wjgs.v17.i7.105033.
9. Segel GB. Hereditary spherocytosis. In: Behrman RE, Kliegman RM, Jenson HB, editors. Nelson's Textbook of pediatrics. *Philadelphia, PA: Saunders* 2004; 1620-1621. 17th ed.
10. Eber SW, Armbrust R, Schröter W. Variable clinical severity of hereditary spherocytosis: relation to erythrocytic spectrin concentration, osmotic fragility, and autohemolysis. *J Pediatr* 1990; 117(3): 409-416. doi: 10.1016/s0022-3476(05)81081-9.