

Neonatal Congenital Biliary Atresia with Cirrhosis: Reversal After Kasai Procedure and Combined Chinese-Western Medicine – A Case Report with 7-Year Follow-up

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Case Report

Keywords: Congenital biliary atresia, Kasai procedure, cirrhosis reversal, Chinese-Western medicine, FibroScan, pediatric hepatology, case report

Posted Date: September 29th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-11185662/v1>

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Additional Declarations: The authors declare no competing interests.

Abstract

Background: Congenital biliary atresia (CBA) is a progressive obstructive cholangiopathy that begins during mid-to-late embryonic development. Hepatic injury and cholestatic cirrhosis are already present at birth. Even after Kasai portoenterostomy, many patients develop progressive cirrhosis and eventually require liver transplantation. We report a case of cirrhosis reversal in a male neonate with CBA following combined Chinese-Western medicine treatment, with 77 consecutive 30-day treatment cycles (approximately 6 years and 4 months) and a 7-year follow-up.

Case Presentation: A male infant was diagnosed with CBA at 25 days of age and underwent Kasai portoenterostomy. Intraoperative findings revealed a nodular liver surface, confirming cirrhosis that had already formed in utero. Postoperatively, liver stiffness progressively increased (9.1 kPa, then 14.2 kPa during an episode of respiratory infection and ibuprofen exposure), further confirming progressive cirrhosis. Combined Chinese-Western medicine was initiated on March 28, 2019. Serial FibroScan examinations showed a stepwise regression of liver stiffness to 6.9 kPa (2021), 4.4 kPa (February 2026, independent examination at another tertiary hospital), and 5.44 kPa (August 2026, Beijing Children's Hospital). Liver function tests normalized, with only mild residual elevations of ALT and GGT that are clinically insignificant. The child is now attending primary school with normal growth and development.

Conclusion: This case demonstrates that cirrhosis, already present at birth in a patient with CBA, can be reversed by combined Chinese-Western medicine following Kasai surgery, with sustained normalization of liver stiffness and function over a 7-year follow-up. This finding challenges the conventional view that cirrhosis in this population is irreversible.

1. Introduction

Congenital biliary atresia (CBA) is a progressive obstructive cholangiopathy of infancy, characterized by inflammatory destruction of the extrahepatic biliary tree. The disease process begins during mid-to-late embryonic development, and hepatic injury with cholestatic cirrhosis is often already present at birth. Without timely surgical intervention, most patients die of liver failure within the first two years of life. Kasai portoenterostomy, first described in 1959, remains the first-line surgical treatment and can restore bile flow in approximately 50%-60% of cases when performed within the first 60 days of life. However, even after successful Kasai surgery, many patients still develop progressive cirrhosis, portal hypertension, and eventual liver failure, ultimately requiring liver transplantation [1–3].

Currently, liver transplantation is the only definitive treatment for end-stage cirrhosis secondary to CBA. However, it is limited by donor organ shortage, the need for lifelong immunosuppression, surgical risks, and substantial economic burden. Non-surgical strategies to reverse established cirrhosis in this population are lacking, and the prevailing view holds that cirrhosis, once formed, is irreversible.

Here, we report a male neonate with CBA who presented with white stool at birth and was diagnosed at 25 days of age. He underwent Kasai portoenterostomy at 31 days of age. Intraoperative findings

revealed a nodular liver surface, confirming that cirrhosis was already present at birth—a finding consistent with the natural history of CBA, in which progressive hepatic injury begins during mid-to-late embryonic development (approximately 24–26 weeks of gestation), and cirrhosis is already established at birth. After surgery, liver stiffness progressively increased, reaching 14.2 kPa. Combined Chinese-Western medicine was then initiated. Over a 7-year follow-up, serial FibroScan examinations demonstrated a stepwise and sustained regression of liver stiffness, with liver function tests normalizing. This case challenges the conventional view that cirrhosis in CBA is irreversible and suggests a potential role for combined Chinese-Western medicine in this population.

2. Case Presentation

A male infant was born at full term. At birth, his parents noted white, acholic stool. The family's trust in the corresponding author had been established through prior successful treatment of another family member, and they contacted the corresponding author immediately for consultation. Based on this single clinical sign, the corresponding author suspected cholestatic cirrhosis due to biliary obstruction and advised the family to seek immediate evaluation at Beijing Children's Hospital. The subsequent diagnostic workup confirmed this preliminary judgment. On day 22 after birth, his family noted progressive abdominal distension. He was evaluated at a tertiary children's hospital and diagnosed with neonatal high direct hyperbilirubinemia and neonatal infection. Further diagnostic workup, including abdominal ultrasound and hepatobiliary scintigraphy, suggested biliary atresia.

At 25 days of age, he was transferred to Beijing Children's Hospital for definitive management. On February 26, 2019 (31 days of age), he underwent laparoscopic biliary exploration and Kasai portoenterostomy under general anesthesia.

Intraoperative Findings:

The liver was enlarged, brownish, and had a nodular surface, confirming cirrhosis. The gallbladder fossa was empty, with no extrahepatic bile duct identified at the porta hepatis; only a fibrous block connected to the gallbladder by a fibrous cord was present. Approximately 50 mL of pale yellow ascites was noted. The fibrous block was excised, and a standard Kasai portoenterostomy was performed with a Roux-en-Y jejunal loop. The procedure was uneventful, with minimal intraoperative blood loss. The excised fibrous tissue was sent for pathological examination.

Pathological Diagnosis:

1. Gallbladder hypoplasia with mild pericholecystitis.
2. Fibrous tissue at one end of the gallbladder containing small ductules lined by cuboidal epithelium, proliferated nerve fiber bundles, dilated blood vessels, scattered lymphocytic infiltration, and cartilage tissue.

Postoperative Course:

The patient was discharged after a 22-day hospitalization. Following discharge, he was readmitted shortly thereafter due to recurrent illness. On March 28, 2019, combined Chinese-Western medicine was formally initiated. The patient received 77 consecutive treatment cycles, each cycle lasting 30 days (total 2310 days), corresponding to approximately 6 years and 4 months.

Pre-treatment Laboratory and FibroScan Findings:

On February 19, 2019, baseline liver function tests showed severe impairment: total bilirubin 139.47 $\mu\text{mol/L}$, direct bilirubin 105.05 $\mu\text{mol/L}$, ALT 93.2 U/L, AST 140.7 U/L, and GGT 1431.4 U/L. Serum albumin was 34.8 g/L.

Serial FibroScan examinations documented progressive liver stiffness:

- March 27, 2019: 9.1 kPa (postoperative period)
- September 30, 2019: 14.2 kPa (during an episode of respiratory infection with ibuprofen exposure)
- January 6, 2020: 8.8 kPa

Treatment and Clinical Reversal:

Subsequent FibroScan examinations showed a stepwise regression of liver stiffness:

- October 12, 2021: 6.9 kPa
- February 4, 2026: 4.4 kPa (independent examination at another tertiary hospital)
- August 12, 2026: 5.44 kPa (Beijing Children's Hospital)

At the independent evaluation on February 4, 2026, laboratory tests showed normal total bilirubin (4.7 $\mu\text{mol/L}$), normal albumin (44.5 g/L), and normal prealbumin (212 mg/L), with only mild elevation of ALT (38 U/L) and GGT (27 U/L).

The slight variation between 4.4 kPa and 5.44 kPa is consistent with the normal physiological increase in liver stiffness associated with rapid somatic growth in children, and both values remain within the normal range for age-matched children.

Long-term Follow-up:

At the most recent follow-up in August 2026, the child is attending primary school with normal growth and development. Liver function tests showed normal albumin (42.5 g/L), normal total bilirubin (9.85 $\mu\text{mol/L}$), normal prealbumin (213 mg/L), and only mild elevation of ALT (48.3 U/L) with an AST/ALT ratio of 0.7. The mild elevations in ALT and GGT are considered clinically insignificant, consistent with the prolonged metabolic recovery following cirrhosis resolution and the physiological fluctuations of rapid growth.

3. Discussion

3.1 The Irreversibility of Cirrhosis in CBA: A Reconsidered Premise

Cirrhosis in congenital biliary atresia has long been regarded as an irreversible consequence of progressive biliary obstruction. In this case, however, cirrhosis was already present at birth—confirmed by the intraoperative finding of a nodular liver surface at 31 days of age—yet it was subsequently reversed by combined Chinese-Western medicine. This observation challenges the traditional premise that cirrhosis, once established, represents a permanent structural endpoint. The natural history of CBA indicates that hepatic injury begins during mid-to-late embryonic development, with cirrhosis already established by birth. Therefore, the reversal observed in this patient cannot be attributed to the prevention of cirrhosis; it represents a genuine reversal of pre-existing cirrhotic changes [3, 4].

3.2 The "Wave-like" Clinical Course and the Impact of Intercurrent Events

The treatment course was characterized by a "wave-like" pattern. Serial FibroScan examinations documented a stepwise regression of liver stiffness, but this regression was punctuated by episodes of transient deterioration. During an episode of respiratory infection with ibuprofen exposure, liver stiffness acutely rose to 14.2 kPa, consistent with drug-induced hepatic injury superimposed on cirrhosis. This episode underscores two important points: first, the post-Kasai liver is highly vulnerable to hepatotoxic agents; second, intercurrent infections can transiently worsen liver stiffness. However, despite these fluctuations, the overall trend remained downward, ultimately achieving sustained normalization. This pattern suggests that the underlying regenerative process, once activated, is robust enough to withstand transient insults.

3.3 The Role of Combined Chinese-Western Medicine

The fundamental therapeutic strategy in this case was not merely symptomatic management, but the restoration of the liver's intrinsic regenerative capacity. Based on our clinical observations, effective reversal of cirrhosis requires a two-pronged approach: first, halting the inflammatory cascade and repairing reversibly damaged hepatocytes; and second, potentially clearing necrotic and fibrous debris to create a favorable microenvironment for endogenous hepatocyte regeneration. Chinese herbal medicine, guided by syndrome differentiation, was combined with standard supportive care to achieve this goal. The stepwise reduction in liver stiffness from 14.2 kPa to 4.4–5.44 kPa, accompanied by normalization of hepatic synthetic function, provides objective evidence for the efficacy of this integrated approach [5, 6].

3.4 Physiological Considerations in Pediatric Liver Stiffness Assessment

An important consideration in pediatric hepatology is that liver stiffness values are not static. Normal liver stiffness increases with age due to somatic growth, increased hepatic volume, and enhanced vascular perfusion. In this case, the slight numerical difference between the independent examinations (4.4 kPa and 5.44 kPa) should be interpreted in this physiological context, rather than as evidence of disease progression. Both values remain well within the normal range for age-matched children, and liver function tests remained normal [2, 7].

3.5 Limitations and Future Directions

This is a single-case report, and the findings require validation in larger, prospective studies. The mechanisms underlying the observed reversal remain to be fully elucidated at the molecular and histological levels. Future research should incorporate imaging modalities such as magnetic resonance elastography and histological assessment where feasible, to further characterize the reversal process. Additionally, the role of combined Chinese-Western medicine in preventing the progression of cirrhosis in CBA patients after Kasai surgery warrants systematic investigation.

4. Conclusion

This case demonstrates that cirrhosis, already present at birth in a patient with congenital biliary atresia, can be reversed by combined Chinese-Western medicine following Kasai surgery. Over a 7-year follow-up, liver stiffness progressively decreased from 14.2 kPa to within the normal range (4.4-5.44 kPa), accompanied by normalization of hepatic synthetic function and normal growth and development. This finding challenges the conventional view that cirrhosis in CBA is irreversible and supports further investigation of integrated therapeutic strategies in this population.

Declarations

Ethics Statement

This study is a retrospective case report conducted in accordance with the Declaration of Helsinki. Written informed consent for publication was obtained from the patient's legal guardians. All clinical data have been thoroughly anonymized to protect patient privacy. The Chinese herbal medicines used are derived from traditional Chinese medicinal materials that have been used for thousands of years. All physical therapies use medical devices approved by the National Medical Products Administration.

Use of AI-assisted tools

The authors used AI-assisted tools for language editing and translation only. All clinical data, analysis, and conclusions are the original work of the authors.

Conflicts of Interest

The author declares no conflicts of interest.

Data Availability Statement

The clinical data supporting this case report are stored in the medical records archive of Beijing Pingshantang Institute of Refractory Diseases. Due to patient privacy and intellectual property considerations, the raw data are not publicly available but can be made available to qualified researchers upon reasonable request, subject to ethical approval.

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