

Gallbladder Perforation Secondary to *Salmonella* Typhi Infection in a Child: A Rare Case Report

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ABSTRACT

Acute Acalculous Cholecystitis (AAC) is an uncommon inflammatory disorder of the gallbladder occurring in the absence of gallstones and is typically seen in critically ill patients. In the paediatric population, AAC is rare but has been reported in association with systemic infections, dehydration, and inflammatory states. Enteric fever caused by *Salmonella* Typhi remains endemic in developing countries and may involve the hepatobiliary system, leading to complications such as cholecystitis and, rarely, gallbladder perforation. Due to nonspecific clinical features, diagnosis is often delayed, increasing the risk of morbidity. This report describes an unusual case of *Salmonella* Typhi-induced AAC complicated by concealed gallbladder perforation in an eight-year-old child, successfully managed with subtotal cholecystectomy. An eight-year-old girl presented with high grade fever, abdominal pain and non bilious vomiting. Investigative work-up revealed acalculous cholecystitis due to *Salmonella* Typhi, resulting in gallbladder perforation. The child recovered due to timely surgical intervention and appropriate antibiotic therapy. The present case highlights the importance of maintaining a high index of suspicion for hepatobiliary complications in children with enteric fever presenting with acute abdomen.

Keywords: Acalculous cholecystitis, Cholecystectomy, Hepatobiliary, Typhoid fever, Vaccination

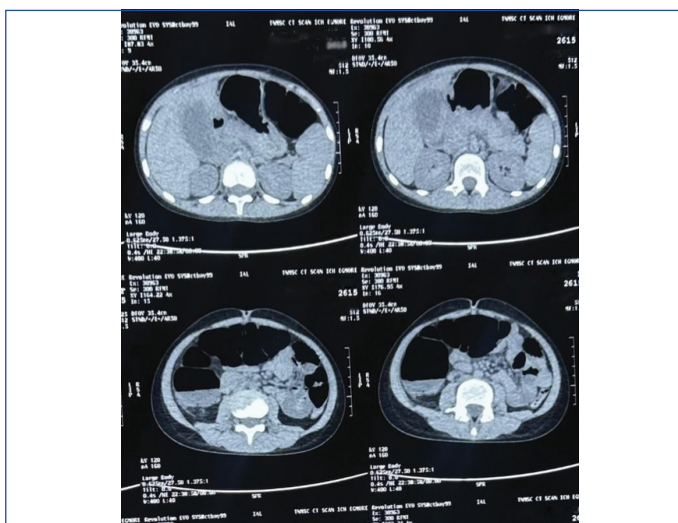
CASE REPORT

An eight-year-old girl presented to the Paediatric Emergency with abdominal pain for three days, associated with non bilious vomiting and high-grade fever with chills and rigors for two days. There was a history of poor oral intake for the past few weeks. There was no history of altered bowel habits. There was no history of cough, shortness of breath, burning micturition, rash, or recent travel. She had a history of frequent consumption of food from outside sources. There was no history of similar illness in family members. The child was developmentally normal for age and was immunised as per the National Immunisation Schedule; however, optional vaccines, including typhoid vaccination, had not been administered. On examination, the child was febrile with a temperature of 103°F (39.4°C) and mildly dehydrated. Abdominal examination revealed diffuse tenderness with guarding and sluggish bowel sounds without rigidity. There was no icterus, hepatosplenomegaly, or palpable mass. Other system examination was normal. Based on the history and clinical presentation, the possibilities of acute pancreatitis, acute cholecystitis, and sepsis with peritonitis were considered.

The child had been admitted three weeks earlier to another hospital with similar complaints and compensated shock, for which she was resuscitated. During that admission, investigations revealed a normal total leukocyte count 8,300 cells/mm³ with neutrophilic predominance 72% and elevated C-Reactive Protein (CRP) 14 mg/L and raised serum lipase 350 U/L. Widal test, dengue serology, scrub typhus serology, and microscopic agglutination test were negative. Blood and urine cultures showed no growth. Ultrasonography of the abdomen [Table/Fig-1] demonstrated a distended gallbladder with sludge and mild wall oedema. As shown in [Table/Fig-2], Contrast-Enhanced Computed Tomography (CECT) of the abdomen revealed a grossly distended gallbladder with diffuse wall oedema, periportal oedema, and fat stranding in the right subhepatic region. The provisional diagnosis considered was acute cholecystitis. She was managed conservatively with multiple intravenous antibiotics and discharged after one week of hospitalisation, despite persistent fever spikes.

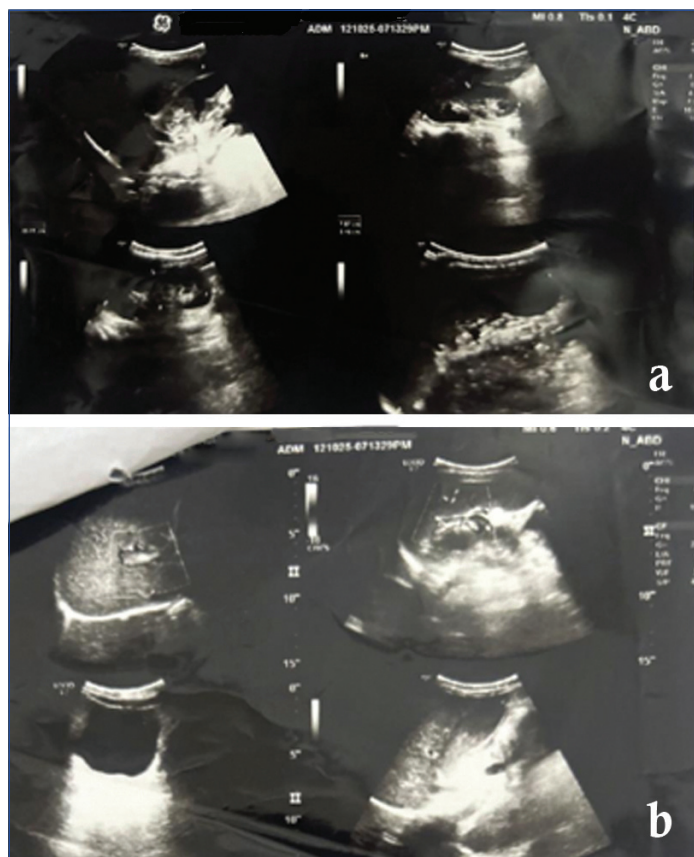


[Table/Fig-1]: Red arrow shows Ultrasonography (USG) Abdomen showing gallbladder sludge.



[Table/Fig-2]: CECT abdomen showing grossly distended gallbladder with diffuse wall oedema, periportal oedema, and fat stranding in the right subhepatic region.

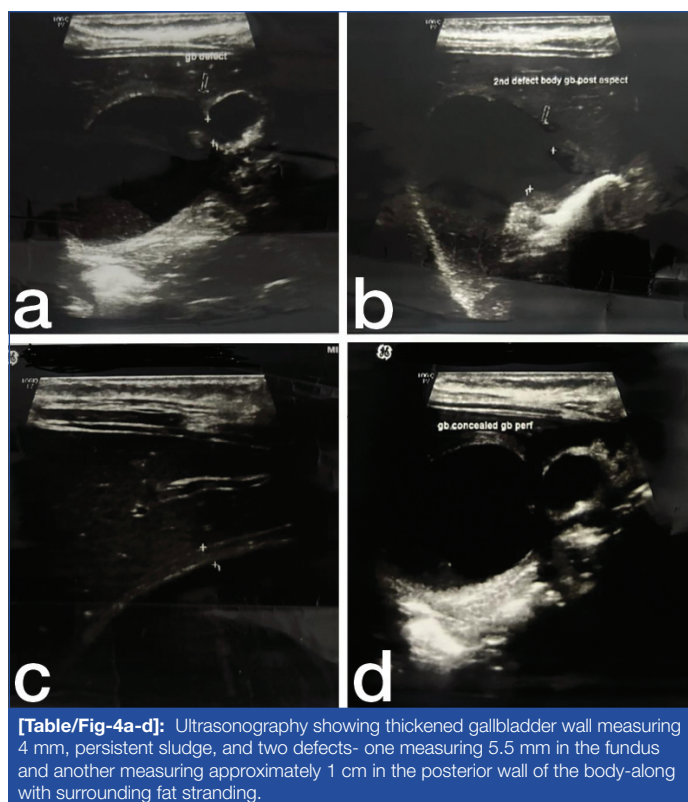
On presentation to the hospital, laboratory investigations showed a normal total leukocyte count $10,720 \text{ cells/mm}^3$ with neutrophilic predominance 78%, elevated CRP 20 mg/L, and mildly raised liver enzymes Serum Glutamic Pyruvic Transaminase (SGPT) 108 U/L, Alkaline Phosphatase (ALP) 345 U/L, Gamma-glutamyl Transferase (GGT) 161 U/L. TyphiDot IgM was positive, suggestive of acute *Salmonella* Typhi infection. Initial abdominal ultrasonography [Table/Fig-3a,b] revealed a distended gallbladder with intraluminal sludge and no calculi. Serum amylase and lipase were normal, indicating resolution of the previously elevated lipase and excluding ongoing pancreatitis. The child was managed conservatively with nil per oral status, Intravenous Ceftriaxone 100 mg/kg/day and supportive care. In view of TyphiDot IgM being positive the antibiotics were planned to continue for a course of two weeks.



[Table/Fig-3a,b]: Ultrasonography showing distended gallbladder with intraluminal sludge and no calculi.

Due to persistent fever and abdominal pain, repeat ultrasonography [Table/Fig-4a-d] was performed after three days. This revealed gallbladder wall thickening measuring 4 mm, persistent sludge, and two defects-one measuring 5.5 mm in the fundus and another measuring approximately 1 cm in the posterior wall of the body-along with surrounding fat stranding. The common bile duct was normal in calibre. These findings were consistent with AAC complicated by concealed gallbladder perforation type II (subacute localised perforation).

In view of perforated acalculous cholecystitis due to *Salmonella* Typhi infection, with worsening clinical status and imaging findings, surgical intervention was planned. An anaesthesia consultation was obtained. Pre-anaesthetic evaluation including airway assessment, blood grouping, and Electrocardiography (ECG), chest X-ray, Echocardiography (ECHO), cardiologist opinion were obtained. The patient was classified as American Society of Anaesthesiologists (ASA) Physical Status IIIIE and underwent diagnostic laparoscopy. Intraoperatively, grossly dilated bowel loops with dense adhesions involving the stomach, colon, and omentum around the gallbladder fossa were noted, without free intraperitoneal fluid. The procedure was converted to an open approach. A mass was identified in the



[Table/Fig-4a-d]: Ultrasonography showing thickened gallbladder wall measuring 4 mm, persistent sludge, and two defects- one measuring 5.5 mm in the fundus and another measuring approximately 1 cm in the posterior wall of the body-along with surrounding fat stranding.

gallbladder fossa with omental caking and approximately 20 mL of localised collection comprising pus, mucus, white bile, and sludge. A large perforation measuring approximately 4×3 cm was identified on the posterior surface of the gallbladder (in all probability the rents in the gallbladder which were two in number and in mm size in the USG would have progressed/merged and become a larger rent in cm size). Subtotal cholecystectomy was performed.

Postoperatively, the child was managed with intravenous antibiotics (piperacillin-tazobactam at 100 mg/kg/dose three times a day and amikacin 15 mg/kg/day once a day) for two weeks, intravenous fluids, analgesics, and supportive care. She showed gradual clinical improvement, tolerated oral feeds, and was discharged in stable condition. The child is on regular monthly follow-up, and the last follow-up was in February 2026, the child is doing well with good weight gain and age-appropriate growth parameters.

DISCUSSION

Enteric fever remains a significant public health problem in low- and middle-income countries, particularly in South Asia. Although *Salmonella* Typhi primarily affects the gastrointestinal tract, hepatobiliary manifestations such as Acute Acalculous Cholecystitis (AAC) are well recognised but uncommon in children [1,2].

AAC constitutes approximately 5-10% of all acute cholecystitis cases and is associated with a higher risk of gangrene and perforation than calculous disease [3]. In paediatric patients, it is usually secondary to systemic infections, including viral illnesses, dengue, Epstein-Barr virus, and *Salmonella* infection. Gallbladder perforation is an exceedingly rare complication of paediatric enteric fever, with only isolated case reports available [3,4].

The pathogenesis involves bacterial invasion of the biliary epithelium, resulting in inflammation, oedema, ischaemia, and endothelial injury that may progress to necrosis and perforation, particularly in acalculous disease [5,6]. Although well described in adults with gallstone disease, gallbladder perforation due to *Salmonella* Typhi remains exceptionally uncommon in children [6,7].

According to the Niemeier classification, gallbladder perforation is classified into Type I (acute free perforation), Type II (subacute localised perforation), and Type III (chronic perforation with fistula

formation) [8]. Our patient had a Type II perforation, characterised by a localised collection without diffuse biliary peritonitis.

Clinical diagnosis is difficult because fever, abdominal pain, and vomiting mimic uncomplicated enteric fever. Persistent fever despite appropriate antibiotics, worsening abdominal pain, or localised tenderness should prompt repeat imaging. Ultrasonography remains the initial investigation, while contrast-enhanced CT is useful for confirming perforation and associated inflammatory changes [9,10].

Only a few reports have described typhoidal AAC progressing to gallbladder perforation [11,12]. Once perforation develops, surgical management is the treatment of choice. In the presence of dense adhesions and severe inflammation, subtotal cholecystectomy is a safe alternative to total cholecystectomy, reducing the risk of bile duct injury. Early surgery combined with targeted antimicrobial therapy has been associated with favourable outcomes, as observed in the present case [13,14].

This case emphasises that gallbladder perforation should be considered in children with enteric fever who have persistent abdominal symptoms despite appropriate medical therapy. Early recognition, repeat imaging, and timely surgical intervention are essential to reduce morbidity.

CONCLUSION(S)

The AAC with gallbladder perforation is a rare but serious complication of *Salmonella* Typhi infection in children. Persistent abdominal pain and fever in enteric fever should prompt early imaging to evaluate hepatobiliary involvement. Timely surgical management and appropriate antibiotic therapy are essential for favourable outcomes.

REFERENCES

- [1] Crump JA, Mintz ED. Global trends in typhoid and paratyphoid fever. Clin Infect Dis. 2010;50(2):241-46. Doi: 10.1086/649541.
- [2] Levine MM, Simon R. The gathering storm: Is untreatable typhoid fever on the way? mBio. 2018;9(2):e00482-18. Doi: 10.1128/mBio.00482-18.
- [3] Obasi AA, Igboanugo AA. Gall bladder complications resulting from typhoid fever in children: Challenges of management and lessons learned. J West Afr Coll Surg. 2020;10(1):35-38. Doi: 10.4103/jwas.jwas_31_21.
- [4] Singh M, Kumar L, Singh R, Jain AK, Karande SK, Saradna A, et al. Gallbladder perforation: A rare complication of enteric fever. Int J Surg Case Rep. 2014;5(2):73-75. Doi: 10.1016/j.ijscr.2013.12.004. Epub 2013 Dec 12. PMID: 24441441; PMCID: PMC3921641.
- [5] Gonzalez-Escobedo G, La Perle KM, Gunn JS. Histopathological analysis of *Salmonella* chronic carriage in the mouse hepatopancreatobiliary system. PLoS One. 2013;8(12):e84058. Available from: <https://doi.org/10.1371/journal.pone.0084058>.
- [6] Abou Merhi B, Daoud N, Assaf A, Kamel R, Rajab M. Acute acalculous cholecystitis due to *Salmonella* Typhi: A case of a 12-year-old child. J Mol Pathophysiol. 2014;3(1):20-25. Doi: 10.5455/jmp.20131216011207.
- [7] Tahir A, Tabassum M, Anum W, Khilji S, Niazi M, Shabrani M. Gallbladder perforation as a complication of enteric fever: An intriguing case of acute abdomen. J Islamabad Med Dental Coll. 2024;13(2):393-96.
- [8] Niemeier OW. Acute free perforation of the gallbladder. Ann Surg. 1934;99(6):922-24. Doi: 10.1097/00000658-193406000-00007.
- [9] Malik MN, Mahmood T, Tameez Ud Din A, Aslam S, Imtiaz M. Gallbladder perforation secondary to enteric fever: An interesting case of acute abdomen. Cureus. 2019;11(4):e4516. Doi: 10.7759/cureus.4516. PMID: 31259125; PMCID: PMC6590853.
- [10] Bhandari TR, Khan SA, Jha JL, Sah JK. A rare case report of enteric fever causing gallbladder perforation. Int J Surg Case Rep. 2021;88:106553. Available from: <https://doi.org/10.1016/j.ijscr.2021.106553>. ISSN 2210-2612.
- [11] Ghio M, Billiot A, Zagory JA, Brandt ML. Cholecystitis secondary to *Salmonella* Typhi: A rare pathology with an unreported management option-a case report and literature review. Ann Pediatr Surg. 2022;18:67. Available from: <https://doi.org/10.1186/s43159-022-00199-8>.
- [12] Pasquale A, Brolese M, Marinelli L, Valcanover S, Marcucci S, Beltempo P, et al. Case report: Acute acalculous cholecystitis due to *Salmonella* Typhi: A case of conservative treatment failure and review of the literature. Front Surg. 2026;13:1787846. Doi: 10.3389/fsurg.2026.1787846.
- [13] Pandey A, Gangopadhyay AN, Kumar V. Gall bladder perforation as a complication of typhoid fever. Saudi J Gastroenterol. 2008;14(4):213. Doi: 10.4103/1319-3767.43282. PMID: 19568544; PMCID: PMC2702929.
- [14] Budiananti A, Prihartono S. Rare case of gallbladder perforation in pediatric patient: A pitfall in generalized peritonitis in late presented typhoid fever. Clin Surg. 2021;6:3205.

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