

SCROTAL HYDROCELE IN A PRETERM NEONATE WITH SEVERE SEPSIS: A CASE REPORT

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ABSTRACT

Hydrocele is a common cause of scrotal enlargement in neonates; however, its assessment becomes more complex in critically ill preterm infants because scrotal swelling may also indicate inguinal hernia, testicular torsion, hematoma, infection, or generalized edema. This case report describes a preterm neonate with very low birth weight, severe neonatal sepsis, respiratory distress, hypoalbuminemia, and ultrasonography-confirmed right scrotal hydrocele. A male infant was delivered by cesarean section at 31 weeks and one day of gestation because of severe maternal preeclampsia. His birth weight was 1,435 g. The infant experienced perinatal asphyxia, respiratory distress requiring continuous positive airway pressure, bronchopneumonia, severe sepsis, anemia, thrombocytopenia, hypoalbuminemia, and systemic edema. Right scrotal edema was observed during hospitalization, and ultrasonography subsequently confirmed right hydrocele. The infant received intensive supportive care, respiratory support, antimicrobial therapy, nutritional support, and albumin transfusion but died following cardiorespiratory arrest. This case highlights the need for systematic assessment of scrotal swelling in critically ill preterm neonates and careful differentiation between hydrocele and urgent inguinoscrotal disorders.

KEYWORDS

Hydrocele; preterm infant; neonatal sepsis; scrotal swelling; very low birth weight.



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INTRODUCTION

Hydrocele is an abnormal accumulation of serous fluid between the visceral and parietal layers of the tunica vaginalis surrounding the testis. It is one of the most frequent causes of scrotal enlargement in neonates and young children (Verit et al., 2026). In the

neonatal period, hydrocele is commonly congenital and associated with persistence of the processus vaginalis, a peritoneal extension that accompanies the testis during its descent from the abdomen to the scrotum (Brainwood et al., 2020). Normally, the processus vaginalis obliterates after testicular descent. Failure of obliteration can allow peritoneal fluid to pass through the inguinal canal and accumulate around the testis, resulting in a communicating hydrocele (Tanyel, 2024) .

Hydrocele is generally classified into communicating and non-communicating forms. A communicating hydrocele is associated with a patent processus vaginalis and may fluctuate in size due to movement of peritoneal fluid between the abdominal cavity and scrotum (Li et al., 2026). The swelling may become more evident during crying, straining, or increased intra-abdominal pressure. In contrast, a non-communicating hydrocele occurs when the processus vaginalis has closed, but fluid remains trapped within the tunica vaginalis or when there is an imbalance between fluid production and reabsorption (Dagur et al., 2017) .

Although hydrocele is frequently benign and may resolve spontaneously in infancy, scrotal swelling in neonates must not be interpreted as hydrocele without appropriate assessment. Differential diagnoses include inguinal hernia, testicular torsion, epididymo-orchitis, scrotal hematoma, testicular tumor, and generalized scrotal edema (Basta et al., 2015) . These conditions have different levels of urgency. Inguinal hernia may lead to incarceration and bowel compromise, while testicular torsion may threaten testicular viability and require urgent surgical evaluation. Therefore, a systematic physical examination and ultrasonographic assessment are important when the diagnosis is uncertain (Sosnowska-Sienkiewicz et al., 2023).

Premature infants with very low birth weight have high susceptibility to respiratory distress, infection, feeding difficulties, metabolic instability, anemia, hypoalbuminemia, and edema. Severe sepsis may further induce systemic inflammation, vascular permeability, fluid shifts, and capillary leak (Sosnowska-Sienkiewicz et al., 2023). These conditions can complicate the assessment of scrotal swelling, especially when generalized edema is present. However, hydrocele should be differentiated from dependent scrotal edema because hydrocele specifically refers to fluid collected within the tunica vaginalis (Tanyel, 2024). This case report describes right scrotal hydrocele in a critically ill very-low-birth-weight preterm neonate with severe sepsis and hypoalbuminemia. The report emphasizes the clinical context, diagnostic challenges, importance of ultrasonography, differential diagnosis, and evidence-based implications for managing scrotal swelling in premature neonates.

RESEARCH METHOD

This study employed a descriptive qualitative case-report design. The case report was conducted through a retrospective review of the medical record of a male preterm neonate with very low birth weight, severe neonatal sepsis, and right scrotal hydrocele treated at RSUD Tidar Magelang, Central Java, Indonesia. This design was selected to provide an in-depth description of the patient's clinical course, diagnostic process, management, and outcome.

Data were collected from available maternal and neonatal medical records, including antenatal history, delivery information, birth anthropometry, physical examinations, daily clinical progress notes, laboratory results, respiratory-support records, medication and transfusion records, and scrotal ultrasonography findings. The primary focus of analysis was the occurrence of scrotal hydrocele within the context of prematurity,

very low birth weight, severe neonatal sepsis, hypoalbuminemia, systemic edema, and respiratory distress.

The data were analyzed descriptively and qualitatively by arranging clinical information chronologically, identifying major clinical changes, and interpreting findings in relation to current evidence on neonatal hydrocele, scrotal swelling, prematurity, and neonatal sepsis. The clinical course was then compared with relevant scientific literature and current pediatric urology guidance. The reporting process was guided by the CARE case-report principles, including patient information, clinical findings, diagnostic assessment, intervention, outcome, and discussion.

To maintain confidentiality, the patient's name and all direct identifiers were removed from the manuscript. Because the study was based on a retrospective case report, the interpretation was limited by incomplete documentation in the medical record, including the absence of detailed Doppler ultrasonography findings, hydrocele measurements, documentation of inguinal communication, and microbiological culture results.

RESULT AND DISCUSSION

The patient was a male neonate delivered by cesarean section at 31 weeks and one day of gestation. The indication for delivery was severe maternal preeclampsia. The mother was 31 years old, gravida 4, para 2, abortus 1, with a previous history of preeclampsia. At admission, maternal blood pressure was 210/130 mmHg and urine protein was 3+. Maternal preeclampsia may impair uteroplacental perfusion, thereby increasing the risk of fetal growth disturbance, preterm delivery, low birth weight, and neonatal complications.

At birth, the neonate weighed 1,435 g, indicating very low birth weight. The infant had cyanosis, weak muscle tone, apnea, and bradycardia, requiring positive-pressure ventilation. He was admitted to the perinatology unit with diagnoses of prematurity, very low birth weight, post-asphyxia condition, and respiratory distress. Respiratory distress progressively worsened, as indicated by tachypnea, chest retractions, grunting, and decreased activity. Continuous positive airway pressure with positive end-expiratory pressure of 6 cmH₂O and fraction of inspired oxygen of 40% was instituted.

During hospitalization, the neonate developed bronchopneumonia and clinical features consistent with severe neonatal sepsis. The record showed leukocytosis, hyperthermia, hyperglycemia, anemia, thrombocytopenia, jaundice, hypoalbuminemia, and clinical deterioration. The infant received antimicrobial therapy, including cefotaxime, gentamicin, amikacin, meropenem, metronidazole, and fluconazole at different stages of hospitalization. He also received albumin transfusion due to hypoalbuminemia and edema.

Right scrotal edema was first recorded on day 22 of life. Scrotal ultrasonography on day 31 confirmed right hydrocele. Hydrocele refers to the presence of fluid surrounding the testis within the tunica vaginalis. In the present case, the diagnosis was made using ultrasonography, which is the preferred imaging modality for evaluating neonatal scrotal swelling because it can identify fluid collections, examine testicular morphology, assess blood flow using Doppler imaging, and identify possible bowel loops within an inguinoscrotal hernia (Chen et al., 2022).

The available clinical documentation did not provide sufficient information to classify the hydrocele as communicating or non-communicating. Specifically, no data were available regarding temporal variation in scrotal volume, transillumination findings, reducibility, the presence of an inguinal mass or herniated bowel loops, or testicular perfusion on Doppler ultrasonography. These parameters are clinically relevant for differentiating hydrocele from concurrent inguinal hernia and other intrascrotal

pathologies, including testicular torsion. Accordingly, the available evidence does not support a definitive causal attribution between severe neonatal sepsis and hydrocele development. The most scientifically appropriate interpretation is that right-sided hydrocele was identified in a critically ill preterm neonate with severe sepsis, hypoalbuminemia, and systemic edema, all of which may have complicated the clinical assessment of scrotal swelling.

Table 1. Summary of the Patient's Clinical Course

Period	Main clinical findings	Management
Birth	Preterm birth, 1,435 g, apnea, cyanosis, poor tone, bradycardia	Positive-pressure ventilation, oxygen, thermal care
Early hospitalization	Tachypnea, chest retractions, grunting, poor activity	Oxygen therapy, CPAP, enteral feeding support
Subsequent course	Bronchopneumonia, suspected severe sepsis, metabolic instability	Antibiotics, monitoring, supportive management
Day 22	Right scrotal edema, systemic edema, hypoalbuminemia	Albumin transfusion, intensive monitoring
Day 31	Persistent scrotal swelling; ultrasound-confirmed right hydrocele	Conservative observation and critical care
Day 33	Cardiorespiratory arrest	Cardiopulmonary resuscitation; patient died

Systemic inflammation caused by sepsis may produce endothelial dysfunction and capillary leakage. Together with low serum albumin, this may reduce intravascular oncotic pressure and promote interstitial fluid accumulation. These processes can cause generalized edema, including scrotal edema. However, generalized scrotal edema differs from hydrocele because hydrocele is a loculated fluid collection within the tunica vaginalis. In clinical practice, both conditions may coexist or make each other difficult to distinguish without imaging (Sayed et al., 2023).

The major concern in a neonate with scrotal swelling is exclusion of urgent surgical conditions. Inguinal hernia may present with a scrotal mass, may be associated with a patent processus vaginalis, and can result in incarceration. Testicular torsion must also be considered, particularly if the swelling is firm, discolored, non-transilluminating, or associated with reduced testicular blood flow. In this case, no evidence of torsion or incarcerated hernia was described. Nevertheless, the absence of complete Doppler and inguinal assessment limits diagnostic certainty.

Most hydroceles in infancy can be managed conservatively because spontaneous resolution is common during the first year of life. The EAU guideline recommends observation for most hydroceles in infants and early surgical intervention only when there is suspicion of concomitant inguinal hernia, testicular pathology, or another complication requiring operative treatment (Bonomi et al., 2026). In this patient, conservative management was clinically reasonable because he was severely unstable and there was no documented evidence of incarceration, torsion, or testicular compromise. However, the patient's outcome was determined by progressive severe sepsis, respiratory failure, and multisystem deterioration rather than hydrocele itself.

CONCLUSION

Right scrotal hydrocele was identified by ultrasonography in a very-low-birth-weight preterm neonate with severe sepsis, respiratory distress, hypoalbuminemia, and systemic edema. Hydrocele in critically ill premature infants should not be presumed to be a direct complication of sepsis. Instead, it should be considered an intrascrotal fluid

collection that may coexist with systemic edema and may be associated with persistent processus vaginalis.

Neonatal scrotal swelling requires structured clinical assessment and ultrasonography to differentiate hydrocele from inguinal hernia, testicular torsion, hematoma, infection, and generalized edema. Comprehensive documentation of physical examination findings and Doppler ultrasonography is essential to identify cases requiring urgent surgical referral.

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