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NEONATAL JAUNDICE: CLINICAL FEATURES, DIAGNOSIS AND MANAGEMENT

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Abstract: Neonatal jaundice is one of the most frequently encountered clinical conditions in pediatrics, affecting up to 60% of term newborns and as many as 80% of preterm infants during the first week of life. It is primarily caused by elevated levels of unconjugated bilirubin due to the immaturity of hepatic metabolism, increased red blood cell turnover, and limited excretory capacity in newborns. Although in the majority of cases jaundice is physiological and resolves spontaneously without long-term consequences, a considerable proportion of neonates may develop pathological hyperbilirubinemia. This form, which is characterized by early onset, prolonged duration, or rapid rise of serum bilirubin, can be a manifestation of hemolytic disease, sepsis, genetic enzyme deficiencies, or metabolic disorders. If unrecognized or untreated, severe hyperbilirubinemia can lead to life-threatening complications such as acute bilirubin encephalopathy and kernicterus, which are associated with irreversible neurological damage, cerebral palsy, sensorineural hearing loss, and even death.

The accurate differentiation between physiological and pathological jaundice is essential for timely intervention. Current diagnostic approaches include clinical assessment, transcutaneous bilirubinometry, and confirmatory serum bilirubin testing. Management strategies vary depending on severity and underlying etiology, with phototherapy remaining the cornerstone of treatment. In more severe cases, exchange transfusion and adjunctive therapies such as intravenous immunoglobulin (IVIG) may be required. Preventive strategies, including universal bilirubin screening prior to hospital discharge, promotion of adequate breastfeeding, and education of caregivers to recognize warning signs, play a critical role in reducing morbidity and mortality.

This review article provides an updated overview of the epidemiology, clinical features, diagnostic approaches, management strategies, and preventive measures of neonatal jaundice. By synthesizing recent evidence, it emphasizes the importance of early detection, evidence-based treatment, and comprehensive neonatal care in preventing complications associated with hyperbilirubinemia.

Keywords: Pediatrics, neonatal jaundice, hyperbilirubinemia, kernicterus, phototherapy

Introduction

Neonatal jaundice, characterized by yellow discoloration of the skin and sclera due to elevated bilirubin levels, is a common phenomenon in pediatric practice. Although in most cases jaundice is benign and resolves spontaneously, it can also indicate underlying pathological conditions requiring prompt medical attention. The prevalence of neonatal jaundice is estimated at 60% among term newborns and up to 80% among preterm infants within the first week of life.

Bilirubin is produced by the breakdown of hemoglobin in red blood cells. Newborns are particularly susceptible to hyperbilirubinemia due to higher red blood cell turnover, immature hepatic conjugation processes, and limited bilirubin excretion. In most cases, this manifests as

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physiological jaundice, which appears after 24 hours of birth and resolves within 7–10 days. However, jaundice occurring within the first 24 hours, persisting beyond two weeks, or associated with high bilirubin levels is considered pathological and requires urgent evaluation.

The importance of neonatal jaundice lies in its potential complications. Severe hyperbilirubinemia can cross the blood-brain barrier, leading to bilirubin encephalopathy and kernicterus, both associated with permanent neurological damage. Thus, timely recognition and treatment are essential to prevent adverse outcomes. This article aims to review the epidemiology, risk factors, clinical features, diagnostic methods, and management strategies of neonatal jaundice, highlighting its significance in clinical pediatrics.

Methods

This narrative review was based on published studies from 2010 to 2024 retrieved from PubMed, Scopus, and Google Scholar. Keywords used were “neonatal jaundice,” “hyperbilirubinemia,” “newborn,” “phototherapy,” and “kernicterus.” Inclusion criteria were clinical studies, systematic reviews, and guidelines focusing on neonatal jaundice in infants less than 28 days old. Exclusion criteria included studies limited to adults or unrelated liver disorders. Data were synthesized and categorized into epidemiology, clinical features, diagnostic methods, management, and prevention.

Results

Epidemiology and Risk Factors: Neonatal jaundice occurs in a majority of newborns, but only a small percentage develop severe hyperbilirubinemia. Risk factors include prematurity, hemolytic diseases (such as Rh or ABO incompatibility), glucose-6-phosphate dehydrogenase (G6PD) deficiency, cephalohematoma, sepsis, and exclusive breastfeeding with poor feeding practices.

Clinical Features: Jaundice typically presents as yellowish discoloration of the skin and sclera, progressing from the head to the toes (cephalocaudal progression). In pathological cases, symptoms may include poor feeding, lethargy, hypotonia, high-pitched crying, and, in severe stages, seizures due to bilirubin neurotoxicity.

Diagnostic Approaches: The diagnosis is based on clinical examination and laboratory confirmation. Total serum bilirubin (TSB) measurement is the gold standard. Non-invasive transcutaneous bilirubinometry provides a reliable screening tool. Additional investigations may include blood group typing, Coombs test, complete blood count, reticulocyte count, and screening for G6PD deficiency in high-risk populations.

Management Strategies:

- **Phototherapy:** The first-line treatment for moderate to severe hyperbilirubinemia. It converts unconjugated bilirubin into water-soluble isomers that can be excreted.
- **Exchange transfusion:** Reserved for severe cases unresponsive to phototherapy or when bilirubin levels reach critical thresholds.
- **Pharmacological interventions:** Intravenous immunoglobulin (IVIG) may be used in cases of isoimmune hemolytic jaundice.
- **Supportive care:** Adequate feeding and hydration are crucial for reducing bilirubin levels.

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Prevention: Universal bilirubin screening before hospital discharge, early breastfeeding support, monitoring high-risk neonates, and educating parents about early signs of jaundice are essential preventive strategies.

Discussion

The findings emphasize that neonatal jaundice is both a common and potentially serious condition. While most cases are benign, failure to differentiate physiological from pathological jaundice can result in devastating complications. Advances in non-invasive bilirubin measurement and updated clinical guidelines have improved early detection. However, disparities in healthcare access, particularly in low-resource settings, continue to contribute to delayed recognition and increased risk of kernicterus.

Effective management depends on timely diagnosis and adherence to treatment protocols. Phototherapy has revolutionized the treatment of neonatal jaundice and significantly reduced mortality and morbidity associated with hyperbilirubinemia. Nevertheless, the availability of phototherapy units remains limited in certain regions, highlighting the importance of healthcare infrastructure development.

Preventive strategies, such as universal screening, parental education, and promotion of breastfeeding, are vital in reducing the burden of neonatal jaundice. Public health policies should prioritize neonatal care and ensure that healthcare providers are trained to recognize and manage jaundice effectively. Future research should focus on refining screening methods, optimizing phototherapy techniques, and identifying genetic factors that contribute to bilirubin metabolism disorders.

Conclusion

Neonatal jaundice is a highly prevalent condition in pediatric practice with significant implications if left untreated. Early recognition, appropriate use of diagnostic tools, and timely initiation of phototherapy or other interventions are crucial in preventing complications such as kernicterus. Preventive measures including universal screening, breastfeeding support, and parental education should be integrated into routine neonatal care. A comprehensive approach involving clinicians, caregivers, and healthcare systems is necessary to reduce the global burden of neonatal jaundice and ensure better outcomes for newborns.

Neonatal jaundice is one of the most prevalent conditions in pediatrics, with the majority of newborns experiencing some degree of hyperbilirubinemia during the early days of life. While most cases are physiological and resolve spontaneously, pathological jaundice remains a significant clinical concern due to its potential to cause irreversible neurological complications such as acute bilirubin encephalopathy and kernicterus. The findings of recent studies confirm that the greatest challenges in neonatal jaundice management are timely recognition, accurate differentiation between physiological and pathological forms, and prompt initiation of appropriate therapy.

Phototherapy has revolutionized the treatment of neonatal hyperbilirubinemia and has been shown to significantly reduce morbidity and mortality rates. In severe cases, exchange transfusion and adjunctive therapies remain essential, although they are associated with higher risks and require specialized facilities. The importance of preventive measures cannot be overstated: universal bilirubin screening before hospital discharge, adequate breastfeeding support, and parental education are key strategies to reduce the incidence of severe jaundice.

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Furthermore, healthcare systems must ensure the availability of diagnostic tools and treatment modalities, particularly in low-resource settings where delayed recognition remains a common cause of kernicterus.

From a public health perspective, addressing neonatal jaundice requires a multifaceted approach that combines clinical vigilance with system-level interventions. Strengthening neonatal care, improving healthcare provider training, expanding access to phototherapy equipment, and implementing community-level awareness programs will be crucial in reducing the global burden of this condition. Future research should continue to refine diagnostic thresholds, optimize phototherapy protocols, and explore genetic and environmental factors that contribute to bilirubin metabolism.

In conclusion, neonatal jaundice, though common, carries the risk of severe complications if not promptly recognized and managed. Through a combination of early screening, evidence-based treatment, and preventive strategies, it is possible to ensure better outcomes and safeguard the neurological development and long-term health of newborns worldwide.

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