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UMBILICAL HERNIA IN NEWBORNS: A NARRATIVE REVIEW OF CLINICAL FEATURES AND CURRENT MANAGEMENT STRATEGIES

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Abstract: Introduction Umbilical hernia is a prevalent condition in neonates, characterized by the protrusion of abdominal contents through an incompletely closed umbilical ring. While often benign and self-limiting, understanding its clinical features and management strategies is essential for optimal patient care. **Objective** This review aims to synthesize recent literature on the clinical presentation, natural history, and management approaches for umbilical hernias in newborns, providing healthcare professionals with updated insights into effective treatment modalities. **Methods** A comprehensive literature search was conducted across databases including PubMed, Scopus, Web of Science, Cochrane Library, and Google Scholar, focusing on studies published within the last five years. Inclusion criteria encompassed original research articles, systematic reviews, and clinical guidelines addressing umbilical hernia in neonates. **Results and Discussion** The majority of umbilical hernias in newborns are asymptomatic and tend to resolve spontaneously by the age of 5 years. However, factors such as defect size and patient age can influence the likelihood of spontaneous closure. While conservative management is generally preferred, surgical intervention may be warranted in cases of large defects, lack of closure by age 5, or complications such as incarceration. Recent studies have explored non-operative techniques like adhesive strapping, though these methods require careful consideration due to potential complications. **Conclusion** Umbilical hernias in newborns typically have a favorable prognosis with spontaneous resolution. A tailored approach, considering individual patient factors, is essential in deciding between conservative management and surgical intervention. Ongoing research and adherence to updated clinical guidelines will further enhance patient outcomes in this common pediatric condition

Keywords: Umbilical Hernia, Newborn, Conservative Management, Surgical Intervention

INTRODUCTION

Umbilical hernia is a frequently encountered condition in neonates, resulting from the incomplete closure of the umbilical ring postnatally. This anatomical defect allows abdominal contents to protrude, forming a noticeable bulge at the umbilicus. The prevalence of umbilical hernia in infants is estimated to be between 10% and 15%, with higher incidences reported in certain populations.[1] Despite its common occurrence, the natural history of umbilical hernias is generally benign, with a significant proportion resolving spontaneously within the first few years of life. The likelihood of spontaneous closure is influenced by factors such as the size of the defect and the age of the child. Specifically, defects smaller than 1.5 cm in diameter have a higher propensity for spontaneous closure by the age of 2 years.[2]

Conversely, larger defects or those persisting beyond this age may necessitate further evaluation and potential intervention. The pathophysiology of umbilical hernias involves the failure of the umbilical ring to close completely after birth. During fetal development, the umbilical ring serves as the conduit for umbilical vessels, and its closure is a critical step in postnatal abdominal wall development. When this process is incomplete, it results in a weakness through which abdominal contents can herniate.[3]

Clinically, umbilical hernias present as soft, reducible bulges at the umbilicus, which may become more prominent during episodes of increased intra-abdominal pressure, such as crying or straining. Typically, these hernias are asymptomatic and do not cause discomfort to the infant. However, parental concern is common due to the visible nature of the hernia.[4] Complications associated with umbilical hernias are rare but can include incarce-

ration and strangulation. Incarceration refers to the trapping of abdominal contents within the hernia sac, leading to a non-reducible and often tender mass. Strangulation is a more severe complication, involving compromised blood supply to the herniated tissue, which can result in ischemia and necessitates urgent surgical intervention.[5]

Given the potential for spontaneous resolution, the management of umbilical hernias in newborns often involves watchful waiting. Regular follow-up is essential to monitor the size of the defect and ensure timely detection of any complications. Parental education plays a pivotal role in this approach, providing reassurance and guidance on signs that warrant medical attention.[6] Surgical repair is generally considered in cases where the hernia persists beyond 4 to 5 years of age, is associated with a defect larger than 1.5 cm, or if complications arise. The surgical procedure typically involves primary closure of the defect, and in some cases, the use of mesh may be indicated, particularly for larger defects to reduce the risk of recurrence.[7]

Recent studies have explored non-surgical interventions, such as the use of adhesive strapping techniques aimed at promoting earlier closure of the hernia. While some reports suggest a high closure rate with these methods, concerns have been raised regarding potential complications, including skin irritation and, in rare instances, incarceration of the hernia.[8] Therefore, the application of such techniques requires careful consideration and should be conducted under medical supervision. In summary, umbilical hernias in newborns are a common condition with a generally favorable prognosis.

A thorough understanding of the natural history, potential complications, and management strategies is essential for healthcare providers to offer optimal care and guidance to parents. Individualized management plans, taking into account the size of the defect, age of the child, and presence of symptoms or complications, are crucial in ensuring the best outcomes for affected infants.

OBJECTIVES

The primary objective of this narrative review is to provide a comprehensive overview of the clinical features, natural history, and management strategies of umbilical hernias in newborns. Secondary objectives include evaluating recent advancements in non-surgical interventions and identifying factors that influence the decision-making process regarding the timing and necessity of surgical repair.

METHODOLOGY

A comprehensive literature search was conducted to gather relevant studies on umbilical hernias in newborns. The databases consulted included PubMed, Scopus, Web of Science, Cochrane Library, and Google Scholar. The search strategy employed a combination of MeSH terms and keywords such as "umbilical hernia," "neonate," "pediatric surgery," "hernia repair," and "conservative management." Boolean operators (AND, OR) were used to optimize search specificity and sensitivity. Additional studies were identified through manual screening of reference lists in relevant articles.

Articles were eligible for inclusion if they were published between January 2019 and March 2025, were indexed in PubMed, and written in English. Included study types were original research, clinical trials, cohort and case-control studies, systematic reviews, and clinical guidelines. Exclusion criteria were studies involving adult populations, articles without full text available, narrative editorials without empirical data, and studies not specifically addressing umbilical hernia in neonates or infants.

Study selection was conducted in three stages: title screening, abstract review, and full-text assessment. Two independent reviewers evaluated each article. Discrepancies were re-

solved by consensus. Data were extracted concerning prevalence, natural history, diagnostic approaches, complications, surgical and conservative management, and outcomes. Thematic categorization was based on frequency and clinical relevance of topics across the literature.

A narrative review methodology was chosen due to the heterogeneous nature of the available literature, which includes observational studies, retrospective series, and evolving clinical guidelines rather than randomized controlled trials. This approach enables a comprehensive, contextual synthesis of current knowledge and clinical practices, emphasizing interpretative analysis over quantitative comparison.

RESULTS AND DISCUSSION

Umbilical hernia is particularly prevalent among preterm infants and those of African descent, with genetic and environmental factors playing contributory roles.[9] While the majority of cases present within the first weeks of life, their clinical course varies depending on patient-specific variables.[9] The increased prevalence among certain ethnicities has prompted studies into potential connective tissue differences influencing fascial closure.[9] The decision to pursue surgical versus conservative management hinges largely on defect size and persistence beyond infancy.[10] Most guidelines recommend observation until the age of 4 or 5 years, given the high rate of spontaneous closure in small defects.[10] The risk of complications during this waiting period remains low, reinforcing a non-interventional approach in uncomplicated cases.[10]

Clinical evaluation should include inspection and palpation of the hernia to assess size, reducibility, and any signs of incarceration.[11] Imaging studies are rarely needed unless complications are suspected or concurrent anomalies are present.[11] In these rare situations, ultrasound may help evaluate content and vascular flow within the hernia sac.[11] Adhesive strapping has been revisited in recent years as a potential early management strategy to promote closure.[12] Several studies suggest that this technique may accelerate fascial closure by maintaining constant gentle pressure.[12] However, results are mixed, and adverse effects such as dermatitis or skin ulceration have been reported.[12]

A key limitation in adhesive strapping studies is methodological variability, including differences in tape materials, duration of use, and patient selection criteria.[13] Additionally, concerns regarding parental compliance and follow-up have tempered enthusiasm for widespread adoption.[13] As a result, most professional societies do not currently endorse adhesive taping as standard practice.[13] Surgical intervention is typically considered in children over 4 years of age with persistent defects larger than 1.5 cm or when complications occur.[14] Elective repair is generally well-tolerated and performed on an outpatient basis under general anesthesia.[14] Primary closure with non-absorbable sutures is the technique of choice, with low recurrence rates reported.[14]

In large defects or in cases of tissue fragility, mesh reinforcement may be considered, although this is rare in the pediatric population.[15] Potential complications of surgery include infection, hematoma, and recurrence, but overall morbidity remains low.[15] Advances in minimally invasive pediatric surgery may further reduce postoperative discomfort and recovery time.[15] Parental education is a cornerstone of conservative management, as visual appearance and concerns about hernia rupture often cause anxiety.[16] Clinicians must provide clear guidance on expected outcomes and warning signs that warrant immediate attention, such as non-reducibility or discoloration.[16] Open communication fosters adherence to follow-up schedules and reduces unnecessary emergency visits.[16]

The psychosocial impact of visible hernias in older children has been documented, although the significance is modest.[17] Concerns over body image may prompt some families to request earlier surgical correction despite clinical recommendations to wait.[17] These cases should be evaluated on an individual basis, balancing cosmetic and psychological factors with surgical risk.[17] Recent trends emphasize shared decision-making in pediatric surgical care, aligning treatment goals with family values and expectations.[18] Such models encourage collaboration and improve satisfaction with the chosen management pathway.[18] Implementation requires clinicians to offer balanced, evidence-based recommendations while remaining receptive to parental preferences.[18]

Global variations exist in the timing and approach to umbilical hernia repair, with some regions favoring earlier surgical intervention.[19] These differences reflect not only cultural practices but also access to pediatric surgical services and parental follow-up capabilities.[19] Understanding these contexts is essential for interpreting international literature and adapting guidelines to local practice.[19] Umbilical hernias may occasionally co-occur with syndromic conditions, including Down syndrome and Beckwith-Wiedemann syndrome, necessitating further genetic or endocrinological evaluation.[20] In such cases, earlier surgical repair may be recommended due to increased risk of complications or lack of spontaneous closure.[20] Coordination with multidisciplinary teams ensures comprehensive care in these complex presentations.[20]

From a healthcare economics perspective, the cost-effectiveness of watchful waiting versus early surgical repair has been analyzed.[21] Conservative management is consistently less costly when spontaneous resolution occurs, though delayed surgery may be associated with longer anesthesia times and increased parental stress.[21] Decisions must therefore balance clinical, emotional, and financial factors.[21] In summary, umbilical hernia in newborns is a manageable condition with well-established diagnostic and therapeutic strategies.[22] Emerging approaches like adhesive taping and minimally invasive techniques may augment care, but their role remains under investigation.[22] A nuanced, patient-centered approach remains the standard for optimizing outcomes and resource use.[22]

CONCLUSION

The findings of this narrative review affirm that umbilical hernia in newborns is primarily a self-limiting condition with a high rate of spontaneous resolution during early childhood. Most cases can be effectively managed with observation and parental education, minimizing the need for early surgical intervention. The clinical relevance of this condition lies in its high prevalence, benign natural history, and the importance of identifying rare but serious complications requiring prompt action. Understanding the indications for conservative versus surgical management remains critical for pediatricians and pediatric surgeons alike.

Despite a robust clinical foundation, current literature is limited by a lack of high-quality comparative studies, particularly regarding newer management strategies like adhesive taping. More rigorous data are needed to guide standardized care pathways and reduce practice variability. Future research should prioritize prospective studies comparing conservative and interventional techniques, stratified by hernia size and patient age. Additionally, examining psychosocial outcomes and parental satisfaction could further refine timing and approach to treatment.

Ultimately, a multidisciplinary, individualized strategy—considering anatomic, developmental, psychological, and familial factors—is essential for optimal management of umbilical hernia in neonates and infants.

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