



Hydrocele in infants: surgical evaluation

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<https://doi.org/10.36557/2674-8169.2024v6n11p179-191>

Artigo recebido em 12 de Setembro e publicado em 02 de Novembro

LITERATURE REVIEW

RESUMO

Introdução: A hidrocele em lactentes é uma condição caracterizada pelo acúmulo de líquido no saco escrotal, muitas vezes observada em recém-nascidos. Este distúrbio, embora frequentemente benigno e autolimitado, pode demandar avaliação e, em alguns casos, intervenção cirúrgica. A compreensão dos fatores associados à hidrocele, sua apresentação clínica e a abordagem terapêutica são essenciais para garantir o manejo adequado. A literatura médica discute a prevalência e as implicações da hidrocele, bem como as diretrizes para avaliação cirúrgica em casos persistentes, destacando a importância da identificação precoce e da intervenção oportuna. **Metodologia:** A pesquisa seguiu as diretrizes do checklist PRISMA, utilizando bases de dados como PubMed, Scielo e Web of Science. Foram utilizados cinco descritores: "hidrocele", "lactentes", "avaliação cirúrgica", "tratamento" e "desfechos clínicos". Os critérios de inclusão abarcaram artigos publicados nos últimos dez anos, estudos focados em lactentes e que abordaram a avaliação cirúrgica da hidrocele. Em contrapartida, os critérios de exclusão englobaram revisões não sistemáticas, artigos que não tratavam especificamente da população pediátrica e estudos com dados incompletos. **Resultados:** A análise revelou que a maioria dos casos de hidrocele em lactentes apresenta resolução espontânea, mas a cirurgia é recomendada em situações de hidrocele persistente ou sintomática. A literatura destacou a importância de uma avaliação clínica cuidadosa e a consideração dos riscos e benefícios da cirurgia. Os principais desfechos observados incluíram taxas de complicações cirúrgicas e satisfação dos pais com os resultados. **Conclusão:** A hidrocele em lactentes requer uma abordagem cuidadosa, levando em consideração tanto a natureza frequentemente autolimitada da condição quanto as possíveis complicações associadas. A avaliação cirúrgica deve ser realizada de forma criteriosa, com base em diretrizes clínicas e na experiência da equipe médica. A revisão sistemática destacou a importância de uma abordagem individualizada para cada caso, garantindo melhores desfechos para os pacientes e suas famílias.



Palavras-chave: "hidrocele", "lactentes", "avaliação cirúrgica", "tratamento" e "desfechos clínicos".

ABSTRACT

Introduction: Hydrocele in infants is a condition characterized by fluid accumulation in the scrotum, often seen in newborns. This disorder, although often benign and self-limited, may require evaluation and, in some cases, surgical intervention. Understanding the factors associated with hydrocele, its clinical presentation, and therapeutic approach are essential to ensure appropriate management. The medical literature discusses the prevalence and implications of hydrocele, as well as guidelines for surgical evaluation in persistent cases, highlighting the importance of early identification and timely intervention. **Methodology:** The research followed the PRISMA checklist guidelines, using databases such as PubMed, Scielo, and Web of Science. Five descriptors were used: "hydrocele," "infants," "surgical evaluation," "treatment," and "clinical outcomes." Inclusion criteria included articles published in the last ten years, studies focused on infants, and that addressed the surgical evaluation of hydrocele. Conversely, exclusion criteria included non-systematic reviews, articles that did not specifically address the pediatric population, and studies with incomplete data. **Results:** The analysis revealed that most cases of hydrocele in infants resolve spontaneously, but surgery is recommended in cases of persistent or symptomatic hydrocele. The literature highlighted the importance of careful clinical evaluation and consideration of the risks and benefits of surgery. The main outcomes observed included surgical complication rates and parental satisfaction with the results. **Conclusion:** Hydrocele in infants requires a careful approach, taking into account both the often self-limiting nature of the condition and the potential associated complications. Surgical evaluation should be performed carefully, based on clinical guidelines and the experience of the medical team. The systematic review highlighted the importance of an individualized approach to each case, ensuring better outcomes for patients and their families.

Keywords: "hydrocele," "infants," "surgical evaluation," "treatment," and "clinical outcomes."

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INTRODUCTION:

Hydrocele in infants is a condition frequently observed in pediatric practice, characterized by the accumulation of fluid in the scrotum. This condition usually manifests itself painlessly and without significant symptoms, and may be noticed during routine examinations or when parents notice a change in the scrotum. Hydrocele occurs due to the failure of the reabsorption of the fluid that fills the peritoneal cavity, resulting in a fluid collection. It is important to note that, in many cases, this condition is self-limiting, which means that it can resolve spontaneously without the need for surgical intervention.

The diagnostic evaluation of hydrocele involves a meticulous clinical approach. Initially, the physician performs a detailed anamnesis, asking about the infant's medical history and possible associated symptoms. The physical examination is crucial, as it allows the professional to observe specific characteristics of the scrotum and determine the nature of the hydrocele. In some cases, ultrasound is used to confirm the diagnosis and rule out other conditions that may mimic hydrocele, such as inguinal hernias or tumors. This careful assessment is essential to guide appropriate management and determine whether surgery is necessary, considering that most cases of hydrocele resolve naturally over time.

Surgical management of hydrocele in infants is an essential consideration, especially when the condition persists beyond the first year of life or causes discomfort to the patient. The indication for intervention is usually based on symptoms or the duration of the hydrocele. Although many cases resolve spontaneously, surgery is recommended when there is a risk of complications, such as severe pain or infections, ensuring that the child's development is not compromised.

Surgical outcomes related to hydrocele correction are, for the most part, quite positive. Studies show that most interventions have low complication rates, which brings peace of mind to caregivers. After the procedure, parents often express satisfaction with the resolution of the problem, highlighting the improvement in the child's quality of life. This highlights the importance of an informed decision about the need for surgery.



Postoperative follow-up is a crucial step in the management of hydrocele. This monitoring is necessary to verify the effectiveness of the surgery and identify possible recurrences. Furthermore, it is an opportunity to ensure that the infant's growth and development are adequate. Careful monitoring allows for rapid interventions if complications arise, reinforcing the importance of a holistic approach in managing this condition.

METHODOLOGY

The methodology of the systematic review was based on the PRISMA checklist guidelines, which guided the selection and analysis of relevant studies on hydrocele in infants. The PubMed, Scielo and Web of Science databases, recognized for their relevance and comprehensiveness in the medical literature, were used to search for articles. The search was conducted using five descriptors: "hydrocele", "infants", "surgical evaluation", "treatment" and "clinical outcomes". These terms were combined to maximize the relevance of the results obtained.

The selection of studies followed strict inclusion criteria. The studies considered appropriate were those published in the last ten years, focusing on the pediatric population, specifically on infants diagnosed with hydrocele. Only studies that addressed surgical evaluation and associated clinical outcomes were included, ensuring that the review was relevant and informative. In addition, only articles in English and Portuguese were accepted, in order to maintain the accessibility of the reviewed literature.

The exclusion criteria were equally relevant to the quality of the review. Studies that did not present complete data or that lacked essential information for the analysis were discarded. Non-systematic reviews or reports of isolated cases were excluded, since they did not contribute to a comprehensive view of the topic. Studies that focused on adult populations or on pathologies unrelated to hydrocele were also disregarded, ensuring that the research remained within the desired scope. Finally, articles that did not directly address the surgical evaluation or clinical results of hydrocele were eliminated, ensuring that only pertinent information was considered. This methodological approach, aligned with the PRISMA checklist, allowed for a rigorous and



systematic analysis of the literature, ensuring the quality and relevance of the data presented.

RESULTS

Hydrocele is a condition characterized by the accumulation of fluid in the scrotum, frequently observed in infants. This accumulation results from the failure of reabsorption of peritoneal fluid, which, under normal circumstances, should be eliminated after the closure of the inguinal canal. Hydrocele typically manifests as a painless mass and is often identified during routine examinations, when caregivers notice a change in the child's scrotum. The condition can be classified as communicating or non-communicating, depending on the presence of a connection with the abdominal cavity.

A communicating hydrocele occurs when the inguinal canal remains open, allowing the passage of fluid between the abdominal cavity and the scrotum. On the other hand, a non-communicating hydrocele results from the accumulation of fluid in a delimited area, without this connection. Most cases of hydrocele in infants are considered benign and self-limiting, and can resolve spontaneously in the first months of life. However, it is essential to carry out adequate clinical monitoring to ensure that there are no associated complications, such as pain or infection.

The causes of hydrocele are multifactorial, encompassing both anatomical and physiological factors. One of the main causes is the persistence of the inguinal canal, which can allow fluid to pass from the abdomen to the scrotum. This persistence may occur due to incomplete development of the lymphatic system and associated structures. In addition, genetic and environmental factors may also influence the development of hydrocele, although research is still seeking to elucidate the complex interactions that lead to this condition.

Another relevant factor is the nature of the fluid that accumulates. Peritoneal fluid, which is clear and limpid, usually does not present inflammatory characteristics. However, in rare cases, hydrocele can become complicated and evolve into an infection,



requiring additional interventions. It is important that health professionals perform a careful evaluation, considering not only the clinical appearance of the hydrocele, but also the patient's medical history, in order to determine the best approach for managing this condition.

The clinical diagnosis of hydrocele in infants involves a meticulous process, which usually begins with a detailed anamnesis. During this stage, the physician seeks relevant information about the child's medical history, including any associated symptoms, such as pain, irritability or changes in behavior. In addition, guardians are asked about the duration of the condition and whether there has been any episode of trauma in the region. Physical evaluation is crucial, allowing the professional to observe the presence of fluid in the scrotum and assess specific characteristics, such as the size and consistency of the mass.

After the initial clinical observation, ultrasound becomes an important resource to confirm the diagnosis of hydrocele and exclude other conditions that may mimic the pathology, such as inguinal hernias or tumors. This imaging test provides additional information about the nature of the accumulated fluid, enabling the distinction between communicating and non-communicating hydrocele. Interpretation of the ultrasound results is essential for the physician to establish an appropriate management plan, ensuring that unnecessary interventions are avoided and that clinical follow-up is directed efficiently.

The decision to perform surgery to treat hydrocele in infants is based on well-defined criteria. Initially, a conservative approach is often adopted, especially in cases where the hydrocele is asymptomatic and the child is less than one year old. However, surgery becomes necessary when the hydrocele persists beyond this period or when symptoms that compromise the infant's well-being arise, such as severe pain or significant discomfort. The surgical procedure aims to correct the condition, eliminate accumulated fluid and prevent future complications.

The success of the surgery is assessed not only by the resolution of the hydrocele, but also by the observation of positive clinical outcomes and the satisfaction of the caregivers. Studies show that complication rates are generally low, which reinforces the safety of the procedure. In addition, postoperative follow-up is essential to monitor the



infant's recovery and quickly identify any signs of recurrence or complications. This proactive approach ensures that the patient's health is prioritized, ensuring that the child's development occurs without interference.

Surgical correction of hydrocele in infants is a frequently performed procedure that is recognized for its efficacy and safety. The most common surgical techniques include orchidocoele, which consists of excising the hydrocele sac and performing an appropriate repair. During the procedure, the surgeon may choose different approaches, such as inguinal or scrotal incision, depending on the specific clinical situation and the preference of the professional. The choice of surgical technique is usually guided by anatomical considerations and the surgeon's experience, with the aim of minimizing tissue trauma and promoting faster recovery.

After surgery, most infants recover quickly, with a low incidence of complications. Caregivers often report that postoperative pain is moderate and manageable, allowing the child to return to normal activities in a short period of time. Postoperative follow-up is crucial to ensure the effectiveness of the treatment and the early detection of possible recurrences. In addition, continuous assessment of the operated area ensures that there are no complications, such as infections or hematomas. Parental satisfaction and the well-being of the infant are therefore directly correlated with the quality of the surgical intervention and the follow-up performed after the procedure.

Analyzing the complication rates associated with hydrocele surgery in infants is a crucial aspect of assessing the safety of the procedure. Although most interventions result in positive outcomes, it is important that health professionals are aware of the possible complications that may arise. Among the most frequently reported complications are infections, hematomas and, in rare cases, recurrence of the hydrocele. The occurrence of these complications is usually related to factors such as the surgical technique used, the surgeon's experience, and the patient's clinical condition prior to surgery.

To mitigate risks, the medical team must follow strict pre- and post-operative care protocols. This includes the appropriate administration of prophylactic antibiotics and careful monitoring of the operated area. In addition, caregivers should be educated



about warning signs, such as increased pain, fever, or changes in the appearance of the scrotum, so that they can seek immediate care if necessary. This proactive approach contributes significantly to reducing complication rates and promoting a smooth recovery process.

Post-operative outcomes are a reflection not only of the effectiveness of the surgery, but also of the quality of the follow-up provided. After hydrocele correction, most infants experience a significant improvement in their quality of life, evidenced by the absence of discomfort and resolution of the condition. Caregivers often report satisfaction with the results, highlighting the importance of the procedure for the health and well-being of the child. This satisfaction is reinforced by the fact that, in general, the intervention does not have a negative impact on the normal development of the infant.

In addition, the results are evaluated through follow-up consultations, which allow for the observation of any signs of recurrence or complications. The success rates of surgery are high, and most patients do not experience significant problems after the procedure. This positive experience, both for the child and for those responsible, highlights the relevance of surgery as a viable and safe option for the treatment of hydrocele in infants. The combination of effective surgical techniques with rigorous monitoring results in highly satisfactory outcomes, promoting the long-term health of patients.

Postoperative monitoring of hydrocele in infants plays a fundamental role in evaluating the effectiveness of the treatment and in the early identification of possible complications. This follow-up involves regular consultations with the pediatrician or surgeon, where the operated area is examined and the progress of the patient's recovery is assessed. It is essential that health professionals take a methodical approach, checking for signs of infection, excessive pain or any changes in the appearance of the scrotum. Proper monitoring not only ensures the health of the infant, but also provides reassurance to caregivers who may be concerned about their child's recovery.

In addition, during follow-up visits, physicians have the opportunity to reinforce parental education about home care. This includes instructions on how to watch for warning signs, such as fever or changes in the child's behavior, which may indicate complications. Clear and frequent communication between healthcare providers and



caregivers is crucial to ensuring that the infant receives the necessary attention if any concerns arise. This strategy not only improves clinical outcomes, but also increases parental confidence in the recovery process.

Hydrocele in infants can cause emotional and psychological concerns for caregivers, especially given the visible nature of the condition and the need for surgical intervention. It is critical that healthcare providers address these concerns in a sensitive and informative manner. Clear communication about the benign nature of hydrocele, its causes, and the implications of treatment can help reduce parental anxiety. In addition, ongoing emotional support during diagnosis and treatment can make it easier for families to adjust to the situation, providing a more supportive environment for the child.

The psychological implications are not limited to the moment of diagnosis, but also extend to the recovery process. Parents may feel relief after surgery, but they may also experience concerns about the future development of the child. In this sense, it is essential that the medical team remains accessible to answer questions and offer support. Strengthening the relationship between the health team and caregivers can contribute significantly to the emotional well-being of all involved, creating an environment that favors not only the physical health, but also the emotional stability of the family.

Clinical guidelines for the management of hydrocele in infants are essential to ensure consistent and evidence-based care. These guidelines are developed by experts and medical organizations, who are dedicated to reviewing the existing literature and compiling best practices. The goal of these guidelines is to provide a clear roadmap for health professionals, from diagnosis to treatment, ensuring that all interventions are appropriate and safe. In addition, regular updating of these guidelines allows new scientific evidence and technological advances to be incorporated, promoting practices that reflect the best available knowledge. Adherence to these guidelines is essential to standardize care and reduce variability in hydrocele treatment. Implementing clear protocols not only improves clinical outcomes but also increases caregiver confidence in medical decisions. This is particularly important in pediatric settings, where parental involvement and understanding of treatment are crucial. With continued education of



healthcare professionals and dissemination of best practices, it is hoped that outcomes for infants with hydrocele will continue to improve, resulting in a more positive experience for families and long-term health for children.

CONCLUSION

Hydrocele in infants is a frequently diagnosed condition in pediatric practice, characterized by the accumulation of fluid in the scrotum. Studies have shown that most cases are self-limiting and resolve spontaneously within the first few months of life. However, persistence of hydrocele beyond the first year of life or the presence of associated symptoms often requires surgical intervention. The literature reviewed indicated that, when surgery is performed, complication rates are low, reflecting the safety and efficacy of the available procedures.

In addition, surgical correction has shown positive results in terms of caregiver satisfaction and improved infant quality of life. Clinical outcomes, as evidenced in several studies, have revealed that most children undergoing surgery do not present significant complications and quickly return to their normal activities. Postoperative follow-up is vital, allowing monitoring of recovery and early identification of any signs of recurrence. Research has emphasized that educating parents about care and warning signs is an essential component of effective management.

Careful diagnostic evaluation, combined with careful decision-making regarding surgery, plays a crucial role in the treatment of hydrocele. Ultrasonography has emerged as an important tool in differentiating communicating from non-communicating hydroceles, facilitating informed treatment decisions. Furthermore, current clinical guidelines, based on robust evidence, have been instrumental in guiding healthcare professionals in the management of this condition, ensuring that best practices are followed.

Finally, hydroceles, although commonly benign, require appropriate care and a well-structured management plan. Involvement of healthcare professionals and effective communication with caregivers are essential to ensure that treatment is understood and accepted. Thus, research has shown that, with appropriate management, the outlook for infants with hydroceles is predominantly positive,



providing a pathway to long-term health and well-being for children.

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