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ABDOMINOSCROTAL HYDROCELE : A SYSTEMATIC REVIEW

[*]Diana Utama Putri
[*]*Faculty of Medicine, Sriwijaya University, Indonesia*

Corresponding Author :
dr.dianautamaputri@gmail.com

ABSTRACT

Introduction: *In children, ASH was first described in the year 1861; however, the origin of this condition is still a topic of discussion. In most cases, juvenile children are the ones that experience the symptoms of acute ASH, which is a clinical syndrome that occurs only quite frequently.*

The aim: *This study review about abdominoscrotal hydrocele.*

Methods: *For this systematic review, publications that were published from 2012 to 2023 were taken into account during the search process. This was achieved through the utilization of numerous online reference sources, such as Pubmed and SagePub. The decision was made to exclude review articles, previously published works, and incomplete works.*

Result: *We found nine studies showed the diagnosis and management patient's with abdominoscrotal hydrocele. The dominant of the studies are case report and origin from United State.*

Conclusion: *This condition is commonly found due to failure in embryology. An ultrasound examination can quickly show the presence of ASH, while an MRI will show which location is affected. The initial action can be monitoring, then surgery is carried out.*

Keyword: *Abdominoscrotal hydrocele; Laparoscopy; Radiology*

INTRODUCTION

In most cases, hydroceles are defined by an accumulation of serous fluid within the tunica vaginalis, which results in scrotal enlargement that is painless. The abdominoscrotal hydrocele (ASH) represents the form of hydrocele that occurs the least frequently.[1] The pathogenesis of ASH is not fully understood, however numerous hypotheses have been offered. A huge scrotal hydrocele that has grown over time and spread past the internal inguinal ring into the extraperitoneal region is the notion that has received the most support from the medical community.[2,3]

Pathologies of the groin and scrotal region are frequently observed in children and rank among the most frequent causes of referrals to pediatric urologists. In infants, the descent of the testis to the scrotum and the function of the patent processus vaginalis (PPV) contribute to the development of inguinal hernias and hydroceles. Palpation of abdominal extension of the hydrocele with compression of the scrotal component, also known as the "spring back ball sign", is a diagnostic indicator that suggests the development of the condition.[3]

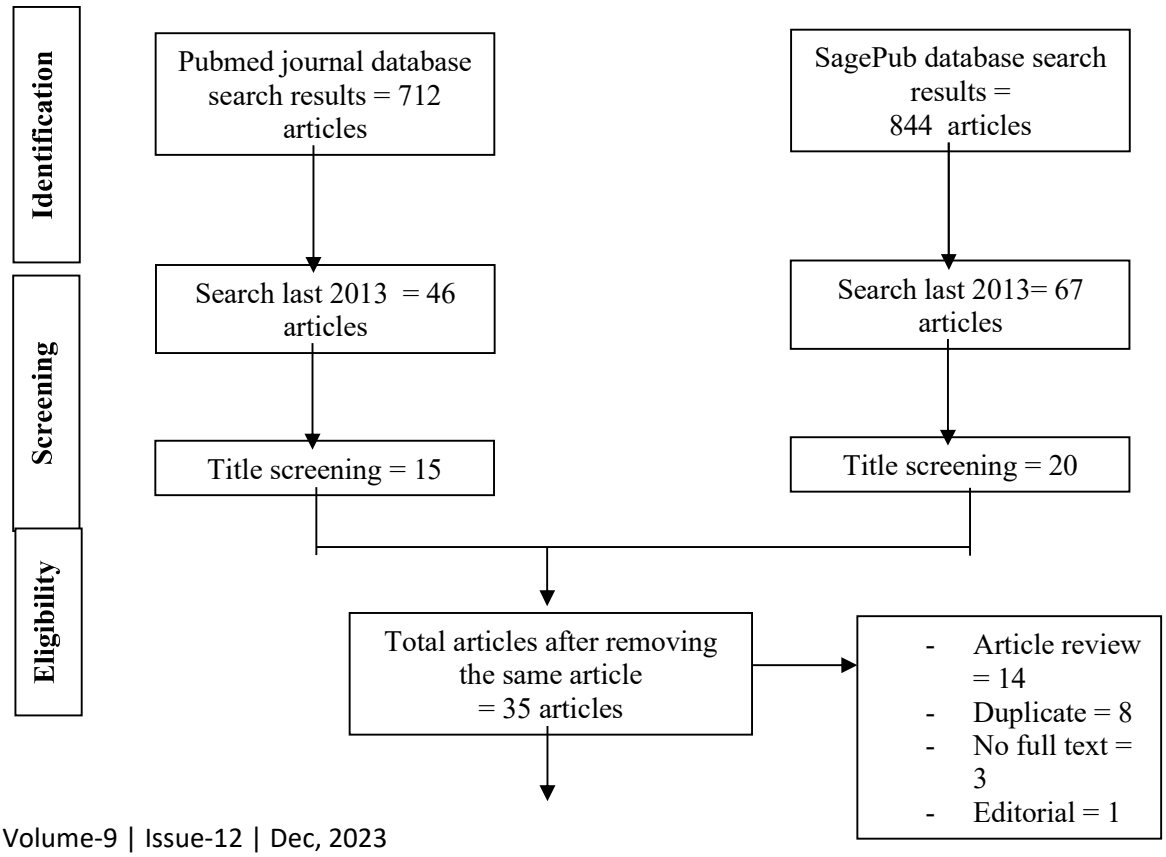
A characteristic hourglass-like structure is seen on contrast-enhanced computed tomography (CECT) when a hydrocele that is located within the scrotum expands into the abdominal cavity through the inguinal canal. This is the diagnostic manifestation of ASH. The acute ASH is a clinical condition that is relatively infrequent and usually manifests in pediatric patients.[2] Management of varicocele in adults continues to be a subject of controversy. Paediatric urologists are increasingly being consulted and tasked with its care. The functional long-term effects of the condition remain debatable. Hydrocele of the abdomen and scrotum is a recognized congenital anomaly. Spermatoceles and other uncommon conditions may present diagnostic challenges.[4]

Abdominoscrotal hydrocele: etiology, diagnosis, and treatment are covered in this article.

METHODS

All of the standards for collecting, processing, and reporting data set out in PRISMA 2020 were met. The addition of more restrictions was affected by a number of different causes. This review talks about what causes abdominoscrotal hydrocele, how to diagnose it, and how to treat it. According to the main results of the study, all written information about what causes abdominoscrotal hydrocele, how to diagnose it, and how to treat it must be written in English. The current systematic review looked at scholarly works that came out after 2013 and met the established criteria for being included in the study. Editorials, entries that don't have a DOI, book reviews that have already been published, duplicate journal articles that are too long, and other similar items will not be included in the collection.

The search for studies to be included in the systematic review was carried out from December, 19th 2023 using the PubMed and SagePub databases by inputting the words: “abdominoscrotal” and “hydrocele”. Where *("abdominoscrotal"[All Fields] AND ("hydroceles"[All Fields] OR "hydrocoele"[All Fields] OR "testicular hydrocele"[MeSH Terms] OR ("testicular"[All Fields] AND "hydrocele"[All Fields]) OR "testicular hydrocele"[All Fields] OR "hydrocele"[All Fields] OR "hydrocoeles"[All Fields])) AND (y_10[Filter])* is used as search keywords.



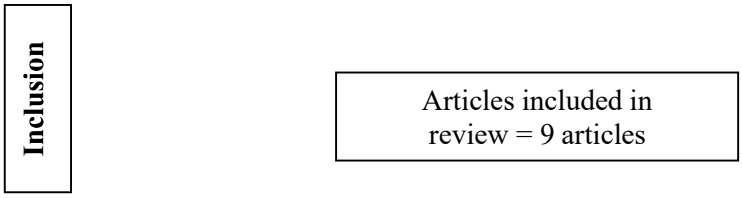


Figure 1. Article search flowchart

The names and abstracts of the studies also had an effect on how acceptable they were. In order to get information, they have to rely on past records. Because study results are usually the same, you have to send in English papers that have not been published before. The selection of works for the systematic review was based on strict adherence to the inclusion criteria. By doing this, the search is limited to only those findings that meet the criteria that were already set. The next parts explain how the assessment will be done. An in-depth analysis of many factors was carried out, including authors, release dates, locations, activities, and motivations.

As soon as EndNote finished writing down the search results, the database started looking for and getting rid of similar articles. The titles and abstracts of each paper were looked over by two people before this piece was written. Before making decisions about coverage, each author reads all important abstracts and article titles very carefully. Every paper that meets the standards that have already been set will be carefully and thoroughly looked over. Once the investigation is over, we will look over any applicable scientific papers again that we may have missed the first time around. It was okay to leave out irrelevant research in favor of relevant study.

RESULT

Prasad, et al (2023)[5] present a 44-year-old patient with right scrotal and abdominal edema. Examination revealed a positive cross-fluctuation between right scrotal swelling and abdominal swelling, suggesting ASH, which was confirmed radiologically. Right-sided sac excision and sac ligation at the deep ring through the right inguinal channel were performed on the patient, and the patient made a full recovery. As a result of the lower risk of anatomical structural damage that is associated with inguinal surgery, conservative therapy is utilized less frequently than surgical repair options.

Siracusano, et al (2022)[6] showed case of ASH treated with minimally invasive surgery is presented in which perforation of the ASH with a mono-J stent was performed through a right inguinotomy. This approach circumvented the need for spermatic cord dissection and the potential for testis devascularization. By sclerotizing the hydrocelic sac with iodopovidone using a mono-J stent, testicular vascularization was preserved and healing from ASH was achieved. Two months later, magnetic resonance imaging revealed that the previous ASH cavity had been replaced by scar tissue.

Hosoda, et al (2021)[7] made the decision to undergo early surgical surgery taking into consideration the size of the ASH and the negative implications on the development of the testicles. In addition to assisting in the identification of the status and position of the ASH, LPEC made it possible to operate the big intrapelvic hydrocele in a secure and dependable manner. In cases when there is no PV patency, it is advisable to consider switching from a low-pressure endoluminal catheter (LPEC) approach to an open anterior approach, even if LPEC is viable.

Khalili, et al (2020)[8] present a case of abdominoscrotal hydrocele in a one-year-old child who had a history of right-sided herniorrhaphy one month previously at another center. The boy was treated at the Mofid Children's hospital in Tehran, Iran. Parents observed a gradual increase in the size of the bulge in the lower abdomen. Both an ultrasound and a CT scan were carried out in order to improve the diagnosis. A significant abdominal scrotal hydrocele that had been missed during the operation was confirmed.

Xu, et al (2020)[9] was to evaluate two techniques in large number. We hypothesized a simplified scrotal technique with eversion, Jaboulay procedure, would demonstrate less complications and equivalent efficacy to standard excision. Although the rate of problems was greater in patients who were part of Group 1 (excision and/or ligation of the hydrocele sac) (18% compared to 0%), there was no statistically significant association between the kind of operation or age and the complication rate or the length of time spent in surgery either. There was not a single instance of a recurrence of hydrocele in either of the two collections of patients.

Funatsu, et al (2020)[10] conduected a study with ten cases. The average age of 10 patients was 3.5 years (7 months–7 years). Three patients were preoperatively diagnosed with ASH. The other 7 individuals had ASH found following laparoscopic scrotal hydrocele surgery. Monolocular cysts (n = 6) and multilocular cysts (n = 4) were abdominal hydroceles. Laparoscopy always found patent processus vaginalis (PPV). Contralateral diseases included PPV (4 patients), inguinal hernia (1 patient), and scrotal hydrocele (1 patient). A patient had ipsilateral undescended testis. Four instances had preoperative ultrasonography showing testicular dysmorphism on the afflicted side. All patients were treated by closing

the PPV at the internal inguinal ring with LPEC. No patients developed recurrent ASH or hydrocele following ASH surgery (mean follow-up, 2.6 years).

Table 1. The litelature include in this study

Author	Origin	Method	Sample	Topic	Conclusion
Prasad, 2023[5]	India	Case report	1 patient	Diagnosis and management	Surgical repair is the most common management approach rather than conservative management, and the use of an inguinal method over other surgical methods facilitates a lower risk of inadvertent injury to adjacent anatomical structures.
Siracusano, 2022[6]	Italy	Case report	1 patient	Diagnosis and management	By sclerotizing the hydrocelic sac with iodopovidone using a mono-J stent, testicular vascularization was preserved and healing from ASH was achieved. Two months later, magnetic resonance imaging revealed that the previous ASH cavity had been replaced by scar tissue.
Hooada, 2021[7]	Japan	Case report	1 patient	Diagnosis and management	The necessity of clarifying the morphological mechanisms and obtaining an accurate diagnosis, as well as the hurdles that are involved with these processes, is brought to light by this case, which offers great insight into the successful LPEC of a massive ASH without any problems.
Khalili, 2020[8]	Iran	Case report	1 patient	Diagnosis and management	Both an ultrasound and a CT scan were carried out in order to improve the diagnosis. A significant abdominal scrotal hydrocele that had been missed during the operation was confirmed.
Xu, 2020[9]	Canada, United State	Retrospective study	68 patients	Therapy	The rate of complications was higher in Group 1 (excision and/or ligation of the hydrocele sac) patients (18% compared to 0%), but there was no statistically significant association between the kind of operation or age

					and the complication rate or the amount of time spent in surgery. In neither of the two groups of patients did a recurrence of hydrocele occur.
Funatsu, 2020[10]	Japan	Case series	10 patients ASH	Management	Laparoscopic percutaneous extraperitoneal closure (LPEC) has the potential to be an effective and minimally intrusive technique for the treatment of acute serous hepatitis in children.
Rassam, 2018[11]	United Kingdom	Case report	1 patient	Diagnosis and management	A later MRI scan revealed a sizable intra-abdominal component that was connected to the scrotum. The intra-abdominal component was effectively removed using laparoscopic excision, however, the hydrocele remained unchanged. The hydrocele was successfully treated with two bouts of image intensifier guided sclerotherapy performed by the interventional radiology team, without any complications.
Constantino, 2017[12]	United State	Case report	1 patient	Diagnosis and management	The testis was not compromised in any way during the process of correctly identifying and preserving the vessels and vas deferens.
Khorasani, 2016[13]	United State	Retrospective study	29 patients with AHS	Therapy	ASH was diagnosed in thirty patients, of which 29 were included in the analysis. With a complication rate of 80%, operative management was utilized on nine patients (30%). 70 percent were managed initially with anticipation. A total of sixteen patients (80%) experienced resolution of their abdominal component, with twelve of them (60%) achieving complete resolution of ASH. Four patients (20%) in this cohort necessitated surgical intervention for ASH.

Rassam, et al (2018)[11] discuss a case of a 4-year-old child who had a congenital hydrocele that did not go away even after the ligation of a patent processus vaginalis and a Jaboulay surgery, which were expected to resolve the condition. A later MRI scan revealed a sizable intra-abdominal component that was connected to the scrotum. The intra-abdominal component was effectively removed using laparoscopic excision, however, the hydrocele remained unchanged. The hydrocele was successfully treated with two instances of image intensifier guided sclerotherapy performed by the interventional radiology team, with no complications.

Constantino, et al (2017)[12] conducted a case report with ASH infant. Due to the rarity of spontaneous resolution and the potential for complications associated with chronic ASH, early surgical intervention is advised. Despite the description of various techniques, dissection continues to be difficult on account of the adhesion of the tunica vaginalis to the testis and the distal cord. A male infant who underwent inguinal repair for ASH is presented. The undertaking was facilitated through the decompression of the bulk using a needle. Successful identification and preservation of the vessels and vas deferens were achieved while ensuring that the testis remained undamaged.

Khorasani, et al (2016)[13] conducted a study with 29 AHS patients. When considering the differential diagnosis of pediatric scrotal enlargement, ASH should be included. As a screening instrument, the "Springing Back Ball Sign" should be implemented. A dynamic ultrasound should be conducted to confirm the diagnosis if it is positive. Observation is advised as the initial course of action in the management of uncomplicated ASH. It can result in the avoidance of surgery or, if surgery is necessary, substantially reduce the risk of complications.

DISCUSSION

Through the deep inguinal ring, an embryological segment of the peritoneum known as the "processus vaginalis" precedes the testis. Following birth, the peritoneum-scrotum communication should cease to exist and infrequently persist in an open state. Comparable to abdominal subacromial hydrocele, the scrotal hydrocele may thus extend into the abdomen via the deep inguinal ring and inguinal canal.[14] While it is more commonly observed in neonates and children, abdominaloscrotal hydrocele can also manifest in adults. It has been reported that the incidence of ASH ranges from 0.4% to 3.1% of all hydrocele cases.[10]

The pathophysiology of ASH is debated. The cause of ASH in children is unknown, however it was first reported in 1861. ASH may be caused by the three ideas below. i) The check-valve mechanism of PV connecting a normal scrotal hydrocele to the abdominal cavity causes the swollen scrotum to spread into the aberrant cavity. ii) Oversecretion or reduced absorption of cyst contents causes a noncommunicating scrotal hydrocele to grow and extend into the anomalous cavity. III) A congenitally developed peritoneal diverticulum or profound inguinal defect causes ASH.[10]

Palpating abdominal extension of the hydrocele with scrotal compression, known as the "spring back ball sign", indicates the condition's progression.[3] On contrast-enhanced computed tomography (CECT), an hourglass-shaped outline is discernible when a hydrocele situated in the scrotum protrudes via the inguinal canal into the abdominal cavity. This represents the diagnostic indicator of ASH. Acute ASH is a relatively rare clinical condition that predominantly affects pediatric patients.[2]

ASH can be detected by ultrasonography when the SBB sign is positive. Furthermore, the utilization of abdominal computed tomography and MRI aids in the distinction of ASH from various pathological conditions, including hydronephrosis, bladder diverticulum, intrapelvic neuroblastoma, and malignant mesothelioma. ASH was diagnosed in the current instance by utilizing MRI and ultrasonography. It was hypothesized that the check-valve mechanism was responsible for inducing the ASH, as laparoscopic observations revealed a connection between the ASH and the peritoneum and unambiguous indications of PV patency.[12,15]

Numerous therapeutic interventions for the treatment of ASH have been documented. Rare studies have documented spontaneous remission of scrotal hydrocele; therefore, open surgical intervention is the norm for the management of normal scrotal hydrocele. Furthermore, prompt surgical intervention is advised in order to minimize the extent of testicular injury.[16] Previously, in order to prevent recurrence, we mandated that complete resection of the hydrocele be performed. However, similar to typical scrotal hydroceles, there has been a recent surge in the utilization of surgical techniques that obstruct the flow of ascites through elevated ligation of the PV in patients diagnosed with ASH.[17]

Numerous surgical techniques, including laparoscopic, inguinal, and scrotal approaches, have been documented; however, in patients with a massive hydrocele, an inguinal or scrotal approach might not be sufficient to extricate the severe adhesion between the spermatic cord and testis. In the current instance, early surgical intervention was chosen due to the adverse effects on testicular development and the extent of the ASH (8 cm). The LPEC assisted in determining the location and condition of the ASH and enabled the large intrapelvic hydrocele to be operated upon in a secure and dependable manner.[7,10]

LPEC is a safe and effective surgical procedure for individuals afflicted with ASH. Nevertheless, a technical issue persists in which confirmation of an internal inguinal ring is impeded when it is obscured by a distended hydrocele that protrudes from the abdominal cavity.[7,10] To detect the internal inguinal ring, an ultrasound-guided incision from the scrotum or inguinal region to the hydrocele may be performed in such instances. However, in cases where the ultrasound-guided puncture proves inadequate, laparoscopic puncture via dissector or needle may be employed. Subsequently, LPEC can be executed without difficulty in accordance with the standard procedure. A prevalent finding in patients diagnosed with ASH is the presence of profound adhesion between the ASH wall and the peritoneum encircling the internal inguinal ring.[16,18]

CONCLUSION

This condition is commonly found due to failure in embryology. An ultrasound examination can quickly show the presence of ASH, while an MRI will show which location is affected. The initial action can be monitoring, then surgery is carried out.

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