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Management of pediatric pyocele using percutaneous imaging-guided aspiration

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ABSTRACT

INTRODUCTION: Pyocele of the scrotum is a rare clinical entity not well-described in the pediatric literature. With the exception of those patients who cannot undergo surgery, all published cases have been treated definitely with surgical drainage with severe cases leading to orchiectomy.
PRESENTATION OF CASE: A 12 day-old full-term boy with no significant medical history presented to the emergency department with a two-day history of fever, right hemiscrotal redness, swelling and discomfort. Scrotal ultrasound revealed findings consistent with an acute pyocele of the tunica vaginalis also known as an infected hydrocele. The infection was successfully managed with ultrasound-guided transcutaneous aspiration under local anesthesia.
DISCUSSION: To the best of our knowledge, this is the first description of percutaneous aspiration of infant pyocele Pediatric patients diagnosed with acute pyocele require immediate urologic evaluation, with a consideration for surgical exploration and drainage. Unfortunately, orchiectomy may be required at the time of surgical exploration in severe cases. Percutaneous drainage is a non-operative, minimally invasive treatment modality that avoids orchiectomy and the risks of general anesthesia.
CONCLUSION: Percutaneous drainage avoids open surgical exploration, expedites recovery, and is performed in the absence of general anesthesia in select cases.

1. Introduction

Idiopathic infant pyocele, also described as infected hydrocele, is a rare urologic emergency and cause of acute scrotum that is poorly described in the literature [1]. We performed a systematic review of the literature using pubmed and the search terms "infected hydrocele" "pyocele" "pyocele of scrotum" to determine the number of cases of infant pyocele. All patients under the age of 18 months were included in the review. Since 1957, there have been only 28 described reports of the condition [2–23]. A review of these case reports and series concluded that these pediatric patients generally present with fever, tenderness of the scrotum or inguinal canal, erythema, and sometimes scrotal discoloration. Although the majority of cases are idiopathic in origin, several cases have been the result of spread from an intraperitoneal infection through a patent processus vaginalis [20,24]. The majority of cases in the literature emphasize the need for hospitalization and surgical exploration [25,26]. Unfortunately, given the infectious nature and resultant inflammation, surgical drainage with preservation of the testis can be challenging and several cases have resulted in orchiectomy [27,28]. We present a case of idiopathic pyocele in a 12 day-old boy managed with ultrasound-guided aspiration under local anesthesia. To our knowledge, the successful treatment of infantile pyocele with percutaneous aspiration has not been reported in the literature.

2. Presentation of case

A 12 day-old full-term boy with no significant medical history presented to the emergency department with a two-day history of fever, right hemiscrotal redness, swelling and discomfort. On initial presentation, the patient was a well-nourished, alert infant. Vitals signs were within normal limits with the exception of a temperature of 39.1 °C. Physical examination revealed a soft, non-tender abdomen. Scrotal examination revealed an enlarged, erythematous right hemiscrotum which was extremely tender to palpation. The right testicle was not palpable secondary to right hemiscrotal fluid collection. The left testicle was palpable in the left hemiscrotum and non-tender. The patient's abdomen was soft, non-tender, non-distended and without peritoneal signs.

Laboratory testing revealed leukocytosis (WBC count 14,000/μL). A catheterized urine analysis and basic metabolic panel were within normal limits. Urine culture and peripheral blood cultures were obtained. Scrotal ultrasonography was performed and revealed a thickening of the right tunica vaginalis, a

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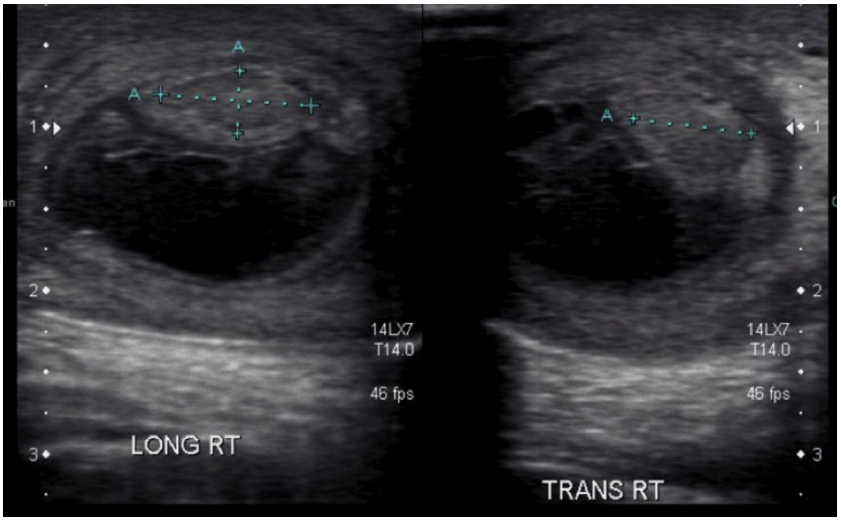

Fig. 1. Longitudinal and transverse scrotal ultrasonography showing thickening of the right tunica vaginalis, well-vascularized right testicle, and an extra-testicular fluid collection measuring 7 mm by 5 mm with multiple septations concerning for infected hydrocele (Testicle marked A).

hyperemic, well-vascularized right testicle, and an extratesticular fluid collection measuring 7 mm by 5 mm within the processus vaginalis with multiple septations (Fig. 1). The left testicle was within normal limits on ultrasound. These findings were concerning for an acute pyocele of the tunica vaginalis also known as an infected hydrocele. Abdominal ultrasound imaging was negative for an intraperitoneal etiology for the pyocele under local anesthesia.

The management options were discussed with the family and focused on the need for drainage of the loculated fluid collection. Surgical exploration and drainage with possible orchiectomy versus transcutaneous intra-vaginal aspiration and drainage were discussed with the family. Given the potential risk of orchiectomy associated with surgical exploration as well as the associated anesthesia risks in a newborn, the family opted for conservation management with transcutaneous aspiration and drainage of the pyocele.

The patient was assessed by interventional radiology and underwent ultrasound-guided fluid aspiration under local anesthesia. The patient was placed dorsally in a Circumstraint Newborn Immobilizer. The perineum including the scrotum was sterilely prepped and draped. Ultrasound was used to image the scrotum and the right-sided pyocele identified. A site for puncture superior and slightly laterally was selected. Local anesthesia was achieved with 1% lidocaine. An 18-gauge needle was then advanced into the pyocele collection. Approximately 5 cc of bloody purulent material was aspirated. The cavity significantly decompressed after aspiration of the fluid. Saline was then used to irrigate the cavity. Repeat irrigation with 1 cc of saline was performed yielding additional pus and debris. The needle was removed. There were no immediate complications.

The patient was admitted to the pediatric urology service for serial scrotal examination. IV cefotaxime and ampicillin were started on hospitalization day #1. The serial examinations revealed significant decrease in hemiscrotal swelling. Patient remained afebrile and there was significant improvement in discomfort starting hospitalization day #1. On Hospitalization day #3 the patient was observed to have a small increase in right hemiscrotal size compared to the previous day; repeat scrotal ultrasound showed significant improvement in the size of the infected hydrocele with a small residual collection of loculated fluid adjacent to the testis. A second ultrasound-guided aspiration was performed with removal of 3 mL of serosanguineous fluid. The technical approach is identical to the first aspiration. Cultures of the pyocele fluid grew *Escherichia coli* with a susceptibility profile sensitive to cefotaxime and ceftriaxone.

The infectious disease service was consulted and recommendations were made for placement of a peripheral central and a two-week course of ceftriaxone. The remaining hospital course was uneventful and final blood and urine cultures demonstrated no growth. The patient was discharged home on hospital day #5 in stable condition. Patient had clinical follow-up at 1 week and 3 months post-operatively, which showed resolution of scrotal pyocele without concern for recurrence at follow-up.

3. Discussion

The acute scrotum is an urgent condition defined as sudden swelling and pain in the scrotal region requiring immediate urologic attention. Cases of pyoceles in the pediatric population present with symptoms of acute scrotum but are rarely described in the literature. The earliest case series by Campbell et al. was comprised of five patients under four months of age with 4 of the 5 being secondary to intraperitoneal processes [27]. The majority of cases of pyocele are idiopathic in etiology and an infectious source cannot be confirmed [29–34]. Pediatric pyoceles have been described as secondary to bacterial contamination of a hydrocele from hematogeous seeding, primary infectious of the testis, and intraperitoneal spread via a patent processus vaginalis. Consistent with the presented patient, the majority of previously reported cases are secondary to *E. coli* or *Staphylococcus* species. We recommend broad-spectrum antibiotics until a specific organism is isolated and coverage can be narrowed.

Pediatric patients diagnosed with acute pyocele require immediate urologic evaluation, with a consideration for surgical exploration and drainage. Unfortunately, orchiectomy may be required at the time of surgical exploration in severe cases. In addition, Kraft documented two cases of pyocele when surgical intervention was contraindicated due to medical comorbidities and patients were treated with antibiotics alone [1]. In both cases, concomitant medical conditions negated the option for surgical exploration. To our knowledge, this is the first case report describing successful percutaneous drainage of infant pyocele.

For those patients with contraindications to immediate surgical exploration, the success of percutaneous drainage in this case suggests that non-operative drainage with concurrent antibiotic

therapy is a successful treatment modality with several benefits. First, ultrasound guided aspiration can be performed under local anesthesia, avoiding general anesthesia in cases when the patient is under the age of 6 months and most susceptible to potential risks of general anesthesia [35]. In addition, percutaneous drainage avoids open surgical exploration, reducing the potential for orchiectomy in cases of complicated, complex infections if percutaneous aspiration is successful.

4. Conclusion

Acute pyocele is a rare cause of acute scrotum that requires immediate urologic intervention. Clinical presentation and etiology of infection help guide the clinical decision-making and management of patient on an individual basis. Operative intervention with drainage of infected fluid collection is recommended. We present the first case of percutaneous image-guided aspiration as an effective management option for pediatric pyocele with the potential to be performed under local anesthesia and avoid the risks of operative exploration in select cases.

Conflicts of interest

None.

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Ethical approval

None indicated.

Consent

The study has been approved by Lurie Children's IRB, appropriate consents were obtained.

Authors contribution

Earl Cheng: Study concept or design, data collection, data analysis or interpretation, writing the paper.

Daniel Oberlin: Study concept or design, data collection, data analysis or interpretation, writing the paper.

Guarantor

Daniel Oberlin, M.D.

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