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Communication

Diagnosis and management of a scrotal wall mass with the aid of a Scrotoscope: a descriptive observational study

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Abstract

Background and objective: A scrotal wall mass is relatively rare in clinical practice, and very difficult to differentiate from a scrotal content lesion by a physical or ultrasound examination. In this study, we share our experience with the scrotoscope for diagnosing and treating scrotal wall masses. **Methods**: We retrospectively reviewed all clinical data of scrotal wall mass patients treated by our medical team between June 2015 and July 2019. Diagnostic value was evaluated by comparison with a Doppler ultrasound examination and therapeutic value was evaluated by comparison with traditional surgery. Suspected scrotal tuberculosis or malignant scrotal tumor patients were excluded. **Results**: Six patients with scrotal wall masses were diagnosed and treated with the scrotoscope. A preoperative ultrasound examination led to an ambiguous or incorrect diagnosis for the origin of the scrotal wall masses in all six cases. The location of all of the masses was confirmed by exploring with the scrotoscope. Three patients were diagnosed with scrotal wall cysts, and one was successfully resected during the procedure; the other two were resected through a small incision. Four scrotal wall solid masses were resected in the other three patients through small incisions after the diagnosis using the scrotoscope. No wound infection, scrotal edema, hematoma, chronic scrotal pain, or injury to the testicles or epididymis were observed. **Conclusions**: Scrotal wall masses are relatively rare, and it was very difficult to obtain a firm diagnosis of their origin using preoperative ultrasound. The scrotoscope confirmed localization of the tumor, and provided us important information for a minimally invasive resection. Endoscopic resection of a mass can be performed using a scrotoscope.

Keywords: Scrotoscope; Scrotal wall mass; Minimal incision; Testicle; Peridiymis

1. Introduction

The scrotal wall is involved in various primary and secondary pathological processes, which can lead to a variety of lesions. An ultrasound examination is usually the first choice in patients with a scrotal mass and is frequently able to provide a firm diagnosis. Computed tomography or magnetic resonance imaging may be needed in some complex cases [1]. However, a scrotal wall mass is relatively rare in clinical practice, and is very difficult to differentiate from a scrotal content lesion by physical, ultrasound, or CT and MRI examinations owing to the complex structure and relatively tight space within the scrotum. We have directly observed and determined the nature of a scrotal mass with the aid of a scrotoscope, which provided the necessary information for proper management [2–5]. In some cases, a scrotal mass can be directly resected under the scrotoscope [2,6–8]. This study is the first to evaluate the diagnostic and therapeutic value of scrotoscopy for scrotal wall masses.

2. Methods

2.1 Patients

All scrotal mass patients treated by our medical group between June 2015 and November 2019 were reviewed retrospectively. Patients diagnosed with a scrotal wall mass with the aid of the scrotoscope were selected for further study. Clinical data, including age, ultrasound results, scrotoscopy results, surgery method, surgery time, wound size, complications, pathological results, and length of hospitalization and follow-up time were collected. Diagnostic value was evaluated by comparison with a Doppler ultrasound examination and therapeutic value was evaluated by comparison with the results of traditional surgery. Suspected scrotal tuberculosis or malignant scrotal tumor patients were excluded. Ultrasonography was performed in all patients by two experienced radiologists before the scrotoscopic exploration. The study was approved by the Ethics Committee of Fujian Provincial Hospital (K-2019-10-03).

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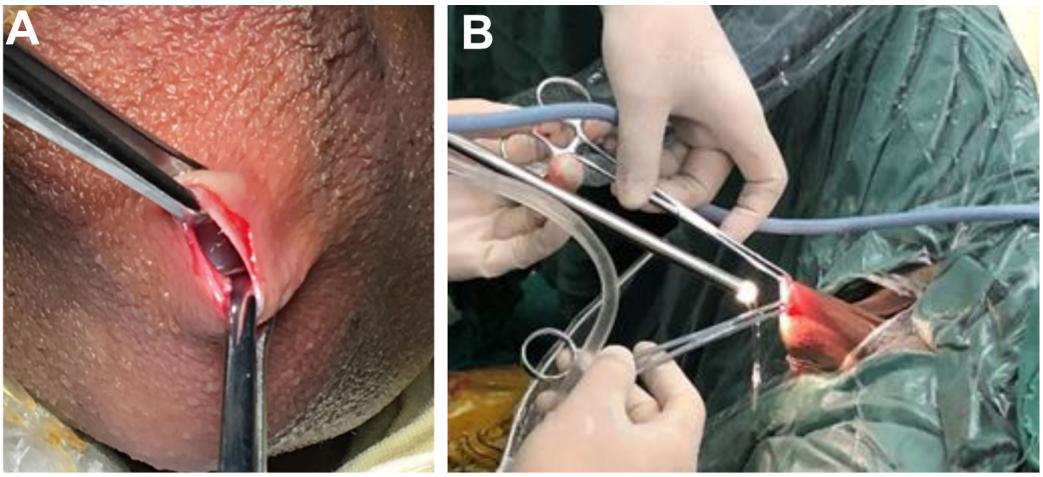

Fig. 1. Scrotoscopic procedure. (A) Two Allis clamps were secured at the edge of the scrotal incision to avoid perfusion fluid leakage through the incision into the interlayer of the scrotal wall. (B) The scrotoscope was inserted into the peridiymis cavity.

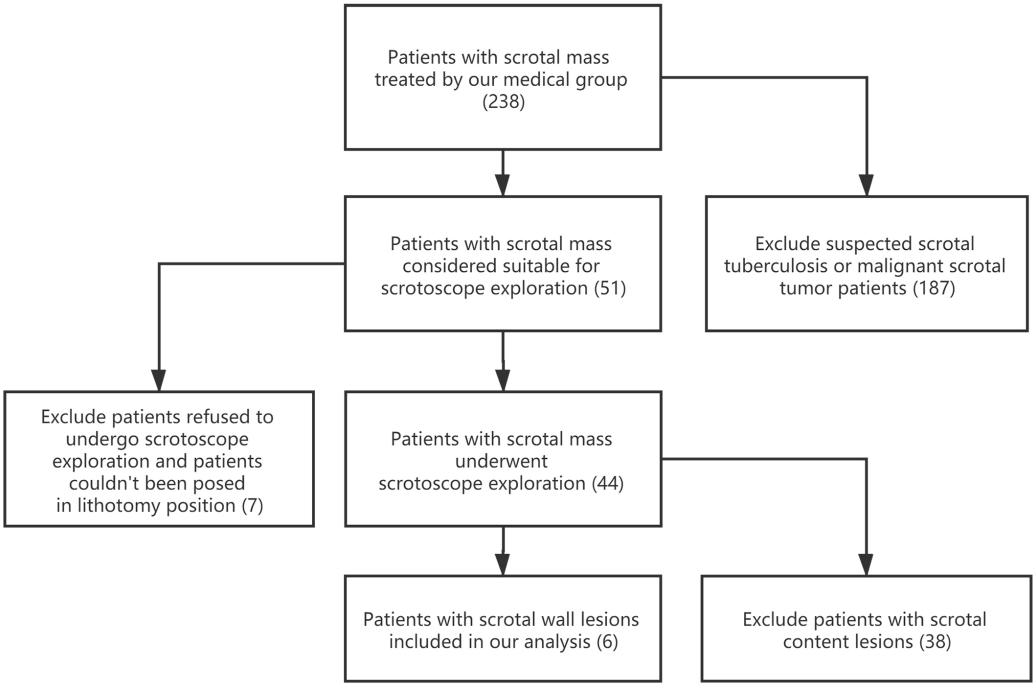

Fig. 2. Flow chart of the included patients.

2.2 Surgical technique

Surgery was performed by at least two experienced scrotoscopic surgeons. The patient was placed in a lithotomy position and a 1-cm wide incision was made on the anterior wall of the scrotum. We used an electrotome (electroresection at 60 w and electrocoagulation at 40 w) to sequentially separate the scrotal wall layers and enter the peridiymis cavity. Then, a pale-yellow effusion was observed coming from the scrotum. Two Allis tissue clamps were used to fix the entire scrotal wall layer along the incision to make sure the scrotoscope could be further inserted into the peridiymis cavity (Fig. 1A,B). The scrotoscope was used with either a 17–22 Fr Storz (Tuttlingen, Germany) cystoscope or a 26 Fr Olympus (Tokyo, Japan) plasma resectoscope. The scrotal contents and scrotal wall were carefully inspected with the scrotoscope. Sterile saline perfusion was maintained at 60–80-cm of hydraulic pressure in continuous low-flow mode. If the mass was observable on the inner wall of the scrotum during the exploration and was considered benign, we resected the mass directly with the plasma resectoscope. If the mass was unobservable during the exploration, we made another incision at the expected mass location on the scrotal wall to resect it during open surgery. We closed the incision with absorbable sutures and placed a supportive pressure dressing to prevent edema or a hematoma.

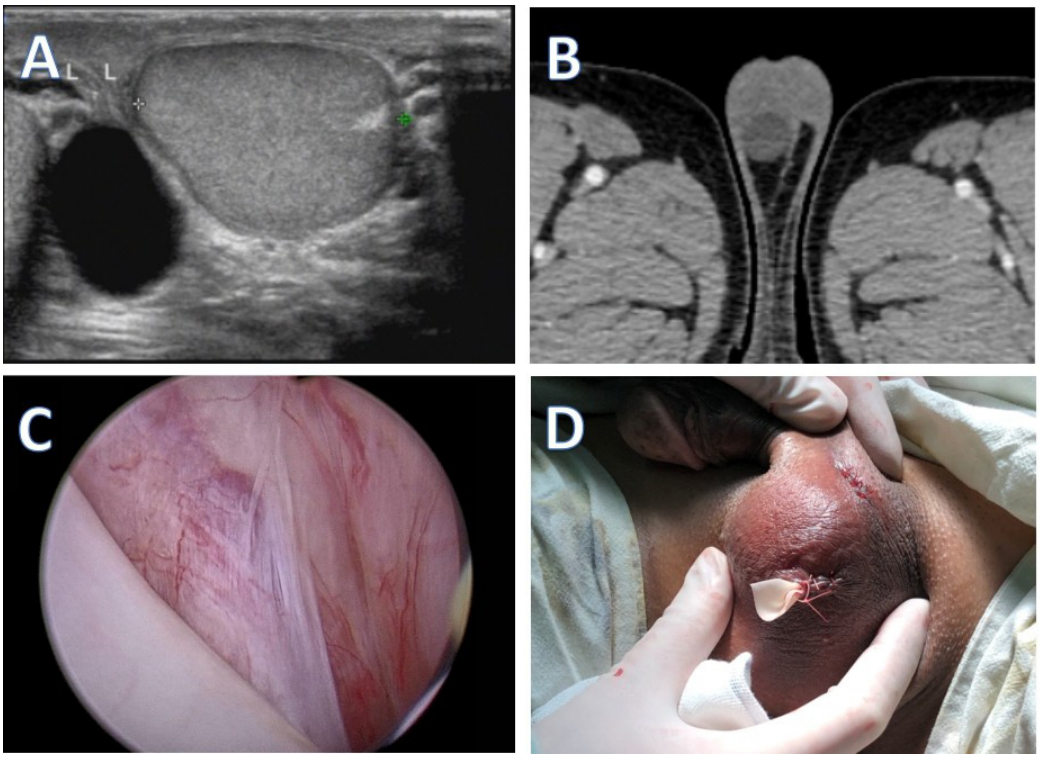

Fig. 3. Clinical features of patients with a scrotal wall mass. (A) Ultrasound image of case No. 6 indicates a 1.9-cm cyst located inside the scrotum that may have originated from the spermatic cord. (B) We further performed enhanced computed tomography for this patient, and the cyst was located posterior to the right testicle. (C) During the scrotoscopic exploration, no mass was observed in the cavity of the perididymis. We confirmed a mass located in the scrotal wall. (D) Postoperative incision of case No. 6 shows that two incisions were made on the right side of the scrotum (the upper incision was for the scrotoscope examination and the lower incision was for mass excision), and no scrotal edema occurred after surgery.

3. Results

As shown in Fig. 2, 238 scrotal mass patients were treated by our medical group from June 2015 to November 2019. Of the 44 scrotal mass cases diagnosed or treated with the aid of a scrotoscope, only six (13.6%) were scrotal wall masses (Table 1). Among these six cases, the median age of the patients was 46.5 years (range 25–64 years). The preoperative ultrasound examination led to an ambiguous or incorrect diagnosis for the origin of the scrotal masses in all six cases. However, the scrotal wall origin was confirmed by exploration with the scrotoscope (Fig. 3). The entire treatment procedure was completed successfully in all six patients within a median operating time of 32 min (range 25–50 min). The median time for the diagnosis and resection were 2 min (range 1–4 min) and 8 min (range 5–11 min), respectively. Three patients were diagnosed with scrotal wall cysts (one multilocular cyst and two solitary cysts); one was successfully resected during the procedure and the other two were resected through small incisions. We found two solid-cystic scrotal content lesions located on both epididymides as well as two solid scrotal wall lesions in patient No. 5. The scrotal content lesions were resected under the scrotoscope, and the scrotal wall lesions were resected during open surgery. Two solid masses were resected through small incisions in the other two patients after the diagnosis using the scrotoscope. Nine masses were detected in six patients (including one patient with two scrotal wall masses and two scrotal content masses on the left and right sides of the scrotum), 13 scrotal incisions were made, with a median size of 1 cm (range 0.8–2.5 cm). We made seven 1-cm incisions for diagnostic purposes and six incisions to resect the scrotal masses with a median size of 1.5 cm (range 0.8–2.5 cm). No scrotal edema, wound infection, hematoma, chronic scrotal pain, testicular injury, or epididymis injury was observed. The postoperative pathological results revealed one case of angiomyxoma, one case of leiomyoma, one case of an adenomatoid tumor, and three cases of cysts. The length of hospitalization was 3 days for all six patients. No tumor recurrence was observed after a median follow-up period of 21 months (range 6–24 months).

4. Discussion

Intrascrotal masses are a common finding in the male population. Most of these masses originate from the testicles and epididymis, and scrotal wall masses are relatively rare [9]. Unlike scrotal content masses, which are 90% malignant, scrotal wall masses are more likely benign.

Table 1. Comparison of ultrasound and scrotoscopic results for scrotal wall lesions.

Case	Age (y.)	Onset time (mo.)	Side	Ultrasound				Scrotoscopy			Pathology
				Nature	Size (cm)	Position	Relationship with testis epididymis and spermatic cord	Role	Position	Position consistent with ultrasound or not	
1	25	18	Left	Heterogeneous echogenic mass	4.2	Inside the right scrotum	Above the head of left epididymis	Diagnosis	Scrotal wall (outside of TVC and visible under scrotoscopy)	Not	Angiomyxoma
2	34	24	Right	Multilocular cystic lesion	2.6	Inside the right scrotum	Posterior of testis	Treatment	Scrotal wall (outside of TVC and visible under scrotoscopy)	Not	Cyst
3	59	24	Right	Cystic mass	3.1	Inside the scrotum	Next to the testis	Diagnosis	Scrotal wall (outside of TVC but invisible under scrotoscopy)	Not	Cyst
4	26	12	Left	Solid mass	1.2	Inside the scrotum	In the tail of epididymis	Diagnosis	Scrotal wall (outside of TVC but Invisible under scrotoscopy)	Not	Adenomatoid tumor
5	64	24	Both	Two solid-cystic lesions as well as two solid lesions	0.4 and 2.0 (left), 0.6 and 0.8 (right)	Four masses inside the scrotums	Located in the both epididymides	Diagnosis and treatment	Scrotal wall (two masses located in the both epididymides, but the other two masses outside of TVC and Invisible under scrotoscopy)	Partially consistent	Leiomyoma in both sides of scrotums, chronic epididymitis with cystic changes in both sides of epididymides
6	62	6	Right	Cystic mass	1.9	Inside the scrotum	Originated from spermatic cord	Diagnosis	Scrotal wall (outside of TVC but invisible under scrotoscopy)	Not	Cyst

TVC, testicular vaginal cavity.

Ultrasonography is the most common diagnostic test for intrascrotal masses, as it has moderately good diagnostic value, but relatively low diagnostic value to the exact location [1,10]. The diagnosis of the origin is challenging because of the complex anatomic structure within the scrotum. Successfully distinguishing a scrotal wall mass from a scrotal content mass, instead of precisely describing its position, is sufficient to develop a proper therapeutic regimen. Herein, we introduce a new minimally invasive method using a scrotoscope to help distinguish scrotal wall masses from scrotal content masses.

A scrotoscope is a kind of endoscope that enables exploration and visualization of the scrotal contents [2,5,11]. The structures within the scrotum, such as the testis, epididymis, and scrotal wall, can be observed with a scrotoscope. During the procedure, we make a firm diagnosis and properly treat the intrascrotal lesions. Use of the scrotoscope to explore scrotal contents was first described by Shafik in 1986 [12]. In China, the scrotoscope was first reported by our group to diagnose intrascrotal lesions in 1992. In this study, our group introduces our scrotoscope experience for the diagnosis and treatment of scrotal wall masses.

As demonstrated by our study, the scrotoscope has moderately good diagnostic value for only some scrotal wall masses. However, it confirms the position of most scrotal wall masses. Therefore, while the benign nature of a mass can be roughly determined by ultrasound examination, a scrotoscope examination can be used to further clarify the origin of an intrascrotal mass and provide a sufficient basis to form a proper surgical plan. In some cases, the scrotoscope can be used as a therapeutic procedure. Edema or hematoma of the scrotum, incision infection, injury to the spermatic cord, testicular torsion, chronic scrotal pain, and orchiatrophy are common complications after scrotoscopic exploration [13,14]. However, none of these complications was observed in any of the six patients in our study during a median follow-up of 21 months. Scrotal edema is the most common complication after a scrotoscopic exploration by an inexperienced scrotoscopic surgeon. The main cause is damage to the perididymis or infiltration of perfusion fluid through the incision into the interlayer of the scrotal wall [3]. Therefore, the scrotal wall incision should be completely clamped with Allis tissue forceps during the procedure and attention should be paid to control the perfusion fluid pressure. According to our experience, 60–80-cm of hydraulic pressure should be maintained. Once scrotal edema occurs, the operating time should be reduced to effectively decrease severity of the edema. If scrotal edema occurs, most cases resolve within 24 to 48 hours, if properly pressurized.

Some limitations of our study should be described. Owning to its retrospective design and small sample size, more well-designed clinical trials are warranted to determine the value of this technique. This is the first study to determine the diagnostic and therapeutic value of the scrotoscope for scrotal wall mass patients, so no similar studies are available for comparison.

5. Conclusions

Scrotoscopy had been widely used to diagnose and treat a variety of scrotal diseases, such as scrotal content masses and testicular torsion. However, this is the first study to evaluate the diagnostic and therapeutic value of scrotoscopy for scrotal wall masses. As shown by our study, scrotoscopy was a safe and effective technique to diagnose and treat scrotal wall masses. The scrotoscope can be used as an important supplement to ultrasonography and open surgery.

Author contributions

RZ prepared the draft of manuscript. YG and TL collected the data. QZ and LY participated in the cases diagnosis and management and follow-up. JY and YW sponsored the study and took part in the paper editing. All authors read and approved the final manuscript.

Ethics approval and consent to participate

All subjects gave their informed consent for inclusion before they participated in the study. The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the Ethics Committee of Fujian Provincial Hospital (K-2019-10-03). Written informed consents were obtained from the guardians of these patients. Identifying information was removed from the study. All data were kept by only the administrator of the study in a confidential manner and was not used by any other purposes. The methods were performed in accordance with the relevant guidelines and regulations.

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Conflict of interest

The authors declare no conflict of interest.

Additional information

As a case series report, all data generated or analyzed are included in this published article.

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