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Microsurgical Hydrocelectomy: Rationale and Technique

Ali Dabaja and Marc Goldstein*

From the Department of Urology and Reproductive Medicine, Weill Cornell Medical College, New York, New York

Abstract

Introduction: Hydrocelectomy may be complicated by hematoma, infection, testicular atrophy, epididymal injury and recurrence. Microsurgical hydrocelectomy allows for better visualization of epididymal tubules and testicular vasculature. We investigated the clinical outcomes of microsurgical hydrocelectomy.

Methods: We retrospectively reviewed the charts of all men who underwent microsurgical hydrocelectomy from 1999 to 2013. All operations were performed through a scrotal incision. The spermatic vessels, vas deferens and epididymis were identified under an operating microscope at 6× to 25× magnification. The hydrocele sac was excised under the microscope. Assessment of operative outcomes included postoperative physical examination, need for subsequent fertility treatment and recurrence. Pathology reports were reviewed and descriptive analysis was performed.

Results: Mean ± SD patient age was 44.4 ± 17.4 years. Mean hydrocele volume was 275.5 ± 260 ml. The etiology was prior inguinal hernia repair in 21% of patients, nonmicrosurgical varicocelectomy in 16%, recurrent hydroceles in 14%, epididymitis or orchitis in 7%, trauma or scrotal surgery in 7% and an idiopathic cause in 35%. Surgery was performed on 70 units (12 bilateral) in a total of 58 men. There was a 12% postoperative complication rate and all complications were Clavien grade I. No recurrence developed during a mean followup of 68.8 months. At hydrocelectomy concomitant surgical procedures were done in 60% of cases, of which 50% were spermatocelectomy. In 69 hydrocele sac pathology specimens no epididymal tubules were identified. In an older man in whom fertility was not an issue part of the epididymis was intentionally transected with the sac.

Conclusions: Microsurgical hydrocelectomy minimizes the risk of injury to the epididymis, vas deferens or testicular blood supply as well as the risk of infection or hematoma.

Key Words: testis, hydrocele, complications, risk, microsurgery

Hydroceles are pathological collections of fluid in the tunica vaginalis. They are the most common cause of benign scrotal swelling with an estimated incidence of 1% in the adult male population.[1] Noncommunicating hydroceles in adults form in the tunica vaginalis and are commonly idiopathic. Hydroceles can also develop as a result of infection, tumor, trauma or lymphatic obstruction resulting from nonmicrosurgical varicocelectomy.[2] Although most patients can be treated conservatively with watchful waiting, some require hydrocelectomy for pain or infection. Large hydroceles can theoretically have an insulating effect on the testicle, causing the temperature to increase, similar to varicoceles.[3,4]

Nonmicrosurgical hydrocelectomy is commonly performed in an outpatient setting with a success rate of 81% to 98%.[5] Traditionally the Jaboulay or Lord surgical technique has been used but recently other techniques were proposed, such as aspiration and sclerotherapy.[6] Hydrocelectomy using local anesthesia,[7] minimal access hydrocelectomy[8] and a pull-through technique were also reported.[9] Most of these techniques are performed through a scrotal skin incision, in which a large disk of parietal tunica vaginalis about double the size of the skin incision is excised without visualizing the epididymis,

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* Correspondence: Department of Urology, Weill Cornell Medical College, 525 East 68th St., Star 900, New York, New York 10065 (telephone and FAX: 212-746-5470; *e-mail address:* mgoldst@med.cornell.edu).

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vas deference and spermatic vessels. These structures are often adherent or splayed in the layers of the hydrocele sac. Indiscriminate resection of the hydrocele sac places these structures at risk for unintentional resection or injury. In sclerotherapy the sclerosing agent is injected in the hydrocele sac, intentionally producing severe sclerosis, which can result in epididymal obstruction and is associated with a high rate of hydrocele recurrence.[10] Open repair after failed sclerosis is extremely difficult due to the obliteration of landmarks, making identification of the epididymis, vas and vessels challenging.

During hydrocelectomy there is a risk of injury to the male reproductive tract, especially at the epididymal tail since the epididymis may be resected with the excised portion of the sac. Thermal injury to the vas or epididymis can be caused by electrocautery. The epididymal or testicular blood supply may be injured when imbricating the remaining hydrocele sac posterior to the testicle during bottleneck repair, leading to testicular atrophy. Surgical scarring is also possible postoperatively.

Scrotal surgery is associated with a risk of complications, specifically injury to the epididymis, vas deferens and testicular blood supply. In a study of 95 men who underwent a total of 110 procedures 95% of complications occurred during a procedure that included hydrocelectomy ($p = 0.01$).[11] Most of these complications were minor and in up to 74% of patients they were due to suture plication.[5] Aggressive dissection of the tunica vaginalis during hydrocelectomy with excision and eversion of the hydrocele sac increases the risk of injury to the reproductive tract. It was reported that 5.62% of patients sustained epididymal injury from hydrocelectomy and 17.12% sustained injury during spermatocelectomy.[12]

Due to our experience with repairing iatrogenic injuries to the vas and epididymis,[13,14] and the documented risk of injury to the vas and epididymis during hydrocelectomy[12] we propose using the operating microscope to assist with visualization during hydrocele repair. The optical magnification provided by an operating microscope may theoretically decrease the risk of these injuries and other associated complications. The operating microscope facilitates visualization of the epididymis, vas deferens and testicular blood supply. To our knowledge microsurgical hydrocelectomy has never been reported. We describe the technique of microsurgical hydrocelectomy at our institution and report perioperative and long-term outcomes.

Materials and Methods

Patients and Data Collection

All patients were diagnosed with hydrocele on ultrasound and/or physical examination. Men with no ultrasound on record underwent ultrasound preoperatively to rule out testicular tumor. Hydrocelectomy was performed as an outpatient procedure with the patient under general or regional anesthesia. Preoperatively antibiotics (1 to 2 gm cefazolin) were given only to men previously treated with scrotal surgery. The study protocol was approved by the Weill Cornell Medical College institutional review board. Patients were identified from institutional medical records using CPT codes corresponding to hydrocelectomy. We reviewed operative notes to confirm the diagnosis. Only symptomatic patients were included in analysis. Preoperative data were retrospectively gathered from patient charts detailing physical examination, laboratory testing, imaging, reproductive and urological history, and semen analysis when available. Surgical data were obtained from operative notes and pathology reports. Outcomes regarding complications, pain, fertility and hydrocele recurrence were assessed during postoperative visits. Hydrocele volume was determined by operative room and ultrasound measurements.

Surgical Technique

A transverse scrotal incision is made in the scrotal skin folds overlying the hydrocele sac. The hydrocele is delivered, and the spermatic cord and vas are identified and surrounded with Penrose drains (fig. 1, *A*). An operating microscope is brought into the field. Under 6× to 25× magnification the hydrocele is carefully inspected, and the vas and epididymis are identified. The vas is traced from the cord to the vaso-epididymal junction. Electrocautery is used to open the hydrocele sac anterior away from the testis and epididymis, avoiding large blood vessels in the sac (fig. 1, *B*). Hydrocele fluid is drained and measured. The sac is resected (fig. 1, *C*), leaving a 1 to 2 cm margin of tunica around the epididymis (fig. 2).

The operating microscope assists in identifying the epididymal tubules to avoid transection during hydrocele sac excision and demarcate the edge of the epididymis. Transillumination of the opened hydrocele sac using a bright focused light can

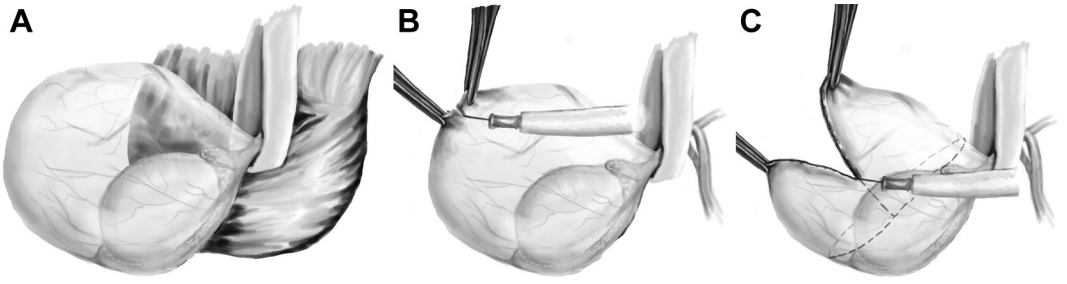

Figure 1. *A*, transverse scrotal incision is made in scrotal skin folds overlying hydrocele sac. Hydrocele is delivered, and spermatic cord and vas are identified and surrounded with Penrose drains. *B*, electrocautery is used to open hydrocele sac anterior away from testis and epididymis, avoiding large blood vessels in sac. *C*, hydrocele sac is resected.