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Title Page

Epididymectomy is an Effective Treatment for Chronic Epididymal Pain

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The data sets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Abstract

Introduction

Chronic scrotal pain is difficult to manage, and epididymectomy is a treatment option for a subset of men with pain localized to the epididymis. We sought to evaluate the efficacy of epididymectomy at our institution.

Methods

Between 2000-2020, 225 men underwent epididymectomy at our institution for pain localized to the epididymis, and not part of a greater constellation of pelvic pain or urinary symptoms. Our primary outcome measure was change in pain after epididymectomy, categorized as cured/improved or no change/worsened. Multivariable logistic regression compared the impact of pain duration, and surgical and psychiatric histories on postoperative pain.

Results

Patients in both outcome categories - cured/improved and no change/worsened - were similar in age and BMI. Overall, 162 patients (72%) reported cured/improved pain at the last documented follow-up visit. Median follow-up time was 12 (1-364) weeks. About half of the cohort (n=117, 52%) had a prior vasectomy, and there was no difference in outcome based on vasectomy history on multivariate analysis (OR 0.625, p=0.3). Men with pain duration ≥ 1 year (OR 0.46, p=0.03), diagnosed psychiatric conditions (OR 0.44, p=0.04), or prior scrotal/inguinal/abdominal surgeries other than vasectomy (OR 0.47, p=0.03) had decreased odds of pain relief after epididymectomy.

Conclusions

This 20-year analysis is the largest review of post-epididymectomy outcomes reported. Among carefully screened men, 72% had resolution or improvement of scrotal pain. Epididymectomy is most effective for men with <1 year of focal epididymal pain, with no history of psychiatric conditions or scrotal/inguinal/abdominal surgery other than vasectomy.

Introduction

Chronic scrotal pain is estimated to affect up to 100,000 men in the United States per year, and can be due to numerous etiologies including varicoceles, prior vasectomy causing painful sperm granulomas or epididymal congestion pain, recurrent epididymitis, pelvic floor dysfunction, or sequelae of inguinal hernia surgery based on the scrotal organs it involves¹. It may also be idiopathic in nature. There is also an association with chronic orchialgia and mental health conditions such as depression and somatization disorder^{2,3}. The evaluation and management of men with chronic scrotal pain is historically difficult for treating providers as the management of this population can be challenging due to the lack of reliable, curative treatments.

Men with chronic epididymal pain represent a subset of chronic scrotal pain patients for whom a surgical intervention, epididymectomy, may result in resolution or improvement in pain. While there are numerous prospective studies highlighting satisfaction scores and improvements in pain for specific patient cohorts, it remains unknown which aspects of the history, physical exam, and imaging can be used to predict ideal candidates for surgical intervention with epididymectomy. For instance, it is possible that history of vasectomy or painful epididymis on physical exam are the main predictors of a good response^{4,5}. In our institution, physical exam is crucial to the selection process for epididymectomy, and therein we build upon the work and cohort presented by our colleagues Siu et al. in evaluating epididymectomy outcomes at our institution.

In this manuscript we present the largest cohort of published epididymectomy outcomes to help elucidate preoperative selection criteria that help predict improvement or resolution of pain following surgery. We specifically classify the etiology of pain; define important components of the history, exam, and imaging evaluation; and evaluate prior therapies prior to surgical treatment to better understand the ideal candidate for treatment of scrotal pain by epididymectomy.

Materials and Methods

A retrospective chart review was utilized to identify patients who underwent epididymectomy between 2000 and 2020 at an academic medical center. We extracted data, clinic, and operative notes on 225 men including demographic data, pain duration, and surgical and psychiatric history (Supplemental Table 1). Duration of pain prior to surgery was categorized as <1 year and ≥ 1 year of pain prior to undergoing surgical treatment. Men were offered epididymectomy based on physical exam alone, specifically those who had pain localized exclusively to the epididymis or a vasal sperm granuloma. Those who had epididymal pain on exam in the setting of a constellation of other symptoms like penile pain, perineal pain, spermatic cord or inguinal pain, etc. were not offered surgery as their symptoms were more consistent with pelvic floor dysfunction. The study was deemed exempt from IRB approval by our institutional review board.

Our primary outcome measure was the provider-documented change in pain after epididymectomy. We characterized this outcome as cured/improved or no

change/worsened. Our group agreed on the use of this categorical variable based on prior studies linking improvement in pain to patient satisfaction⁴. Pain response was obtained retrospectively based on a review of provider documentation in the electronic medical record. We also collected information on psychiatric history, duration of pain prior to surgery, history of vasectomy, and history of other scrotal, inguinal, or abdominal surgery. Short- and long-term pain outcomes were defined as the reported pain at the initial post-operative visit and final documented clinic encounter, respectively. A multivariable logistic model was used to assess the association of prior pain duration, and surgical and psychiatric histories with postoperative pain outcomes.

Our secondary outcome sought to evaluate whether a lower number of postoperative opioid prescriptions would impact requests for refills. This additional analysis was performed in the context of legislative changes in the state of Michigan in 2018, aimed at addressing the opioid epidemic by requiring a separate consent form for opioid prescriptions, requiring providers to review recent opioid prescriptions using a state-wide database, and limiting prescriptions to 7-days for acute pain. To standardize the quantification of opioid medication use, we converted all prescriptions to morphine milligram equivalents (MME). We then compared calculated MME for the cohort and compared prescription refill rates for patients prescribed below and above the median. To ensure that opioid medication use was not contributing to final pain outcomes, we compared MME prescribed for patients with cured/improved and no change/worsened at their first post-operative visit and their last visit with their urologist. Medians with 25th and 75th percentiles representing the interquartile range (IQR) were used to describe

the continuous measures and compared using Wilcoxon rank test. Statistical analysis was performed using SAS9.4 (SAS Institute, Cary, NC).

Results

Between January 2000 and January 2020, of 287 cases identified, 225 patients underwent epididymectomy for localized epididymal pain. Cases were excluded if they included resection of other scrotal organs or was only a spermatocelectomy or isolated epididymal cyst excision or was performed for oncologic reasons. Patients in both outcome categories - cured/improved and no/change worse - were similar in age and BMI (Table 1). Prior to undergoing epididymectomy, a total of 139 men reported use of conservative measures including non-narcotic pain medication (84%), narcotic pain medication (35%) and a course of antibiotics (40%). Of our entire cohort, 110 out of 225 patients (49%) had a scrotal ultrasound performed prior to epididymectomy. Within this subset, there was no difference in surgical outcome based on presence or absence of abnormality such as epididymal cyst or hydrocele ($p=0.073$). Within the cured/improved group, 84 patients underwent scrotal ultrasound prior to surgery, 26 of which had a cyst or hydrocele on ultrasound. Additionally, 117 men (52%) had a prior vasectomy and 69 (31%) had one or more prior scrotal, inguinal, or abdominal surgeries other than vasectomy.

Overall, 162 patients (72%) reported their pain was cured or improved at the last documented follow up visit. We found that out of 162 men within the cured/improved group, 84 men (37.3%) reported complete resolution of their pain. At the first post-

operative office visit, 85% of men reported cured/improved pain (Table 2). Median follow up time was 12 (Interquartile range (IQR): 4 – 25) weeks. Eighty percent of men who underwent epididymectomy within 1 year of pain onset had cured or improved pain compared to 67% of men with a ≥ 1 year history of pain ($p=0.05$). Prior pain duration data was missing for 17 patients. On multivariable analysis, there was no difference in outcome based on vasectomy history (OR 0.625, $p=0.3$). Men with pain duration ≥ 1 year (OR 0.46, $p=0.03$), diagnosed psychiatric conditions (OR 0.44, $p=0.04$), or prior scrotal, inguinal, or abdominal surgeries other than vasectomy (OR 0.49, $p=0.04$) had decreased odds of pain relief after epididymectomy (Figure 1).

Of the 225 patients, 93 patients had postoperative prescription pain medication information available for analysis. Prescriptions ranged from a median of 40 MME (IQR 30-50) prior to 2018 compared to 10 MME (IQR 5-15) for 2018 onwards ($p<0.001$) due to a change in opioid prescribing laws in the state of Michigan. The median MME prescribed for the entire cohort was 35. There was no difference in the amount of opioids prescribed based on pain outcomes (cured/improved vs no change/worsened) in the initial post-op visit ($p=0.99$) or final follow up encounter ($p=0.54$, Table 3). While a similar proportion of patients requested additional medications whether they receive greater than or less than 35 MME (21.3% versus 21.7%, $p=0.96$), only 20 patients between 2012 to 2019 requested additional pain medications. Within our cohort, zero patients requested additional opioid pain medications in 2019.

Discussion

In this study, 72% of men with chronic epididymal pain isolated to the epididymis on physical exam had resolution or improvement of pain after epididymectomy. This differentiates our cohort from patients who have epididymal or scrotal content pain as a part of a broader pain diagnosis such as pelvic floor dysfunction. Men with pain duration ≥ 1 year, documented psychiatric conditions, or with prior scrotal, inguinal, or abdominal surgeries other than vasectomy had decreased odds of pain relief after epididymectomy. Finally, there was no difference in pain outcomes based on MME prescribed. During the time of the study, changes in Michigan opioid prescribing laws resulted in reduced MME prescriptions. Patients prescribed fewer than the median 35 MME for the entire cohort requested refills at about the same rate as those who were prescribed greater quantities.

Other authors report a wide range of improvement in pain after epididymectomy. Hori et al. found that 93.3% of their 72 surveyed patients who underwent epididymectomy for post-vasectomy pain reported less or no pain after epididymectomy, and similarly, 75% for men who underwent epididymectomy for other indications⁵. On the other hand, Padmore et al. found that only 32% of their 57 patients reviewed had resolution of symptoms after epididymectomy⁶. The aforementioned study by Siu et al. in 2007 included 52 patients who underwent epididymectomy at our same institution and were included in our cohort. The patients were surveyed on their pain level and satisfaction after epididymectomy, and of the 44 patients who returned questionnaires, 31/44 (70%) reported no pain, and 8 of 13 (62%) still with pain reported less pain than

prior to surgery. Ninety percent of the cohort reported they were very satisfied or satisfied with their choice to undergo epididymectomy⁴. Our study builds on this original work by evaluating a larger sample of patients and further demonstrates that careful selection of patients prior to offering epididymectomy is critical for successful outcomes. Physical exam was the fundamental diagnostic tool used to identify surgical candidates for epididymectomy; while some patients underwent scrotal ultrasound and diagnostic nerve blocks prior to surgery, we found no significant difference in pain outcomes based on their results. These adjuncts, regardless of their result, did not determine who was offered epididymectomy.

Epididymectomy was less likely to be effective in men who had pain duration ≥ 1 year, documented psychiatric conditions, or with prior scrotal, inguinal, or abdominal surgeries other than vasectomy in our study. For longer pain duration, in the case of vasectomy, the nature of the pain has been considered to be due to mechanical duct obstruction coupled with perineural fibrosis^{7,8}. Padmore et al. found poorer outcomes after epididymectomy in men with chronic epididymal changes versus an epididymal cyst⁶. Woolf and Salter have described the concept of neural plasticity, describing that neuropathic pain may persist long after the initiating event is healed when it has been present for a long period of time⁹. Based on these findings and those of our study, men with pain isolated to the epididymis for greater than one year should be counseled on the risk of poorer outcomes and prolonged neuropathic pain when deciding when to undergo epididymectomy.

Psychiatric conditions such as anxiety, depression, irritable bowel syndrome, migraines, post-traumatic stress disorder and other conditions (Supplemental Table 1) were predictors of poorer outcomes in our study. Aljumaily et al. found that a majority of men complaining of scrotal pain also had concomitant conditions and diagnoses such as chronic bowel pain, migraines and fibromyalgia; in their cohort, physical exam revealed that this scrotal pain localized to the epididymis in only 53% of these men. They found that further examination of scrotum, inguinal region, and local musculoskeletal structures as well as a focal neurological exam often revealed more than one area of tenderness¹⁰. There is also evidence that depression and chronic pain share common biological pathways². Within our cohort, men with a documented psychiatric history had poorer pain outcomes despite the presence of focal epididymal tenderness; this highlights the importance of utilizing a full history as well as a more comprehensive physical exam when providing care and determining surgical candidacy for these men.

Men who have undergone prior scrotal, inguinal, or pelvic surgeries also experienced poorer pain outcomes after epididymectomy in our cohort. Neuropathic pain should be a consideration for these patients prior to undergoing surgery. This pain after inguinal hernia repair has been described to be due to a neuroma of the ilioinguinal, iliohypogastric, or genitofemoral nerve¹¹. This different etiology of pain may help explain why patients who had these prior surgeries had lower odds of having improvement in pain after their epididymectomy. If a neuropathic etiology is suspected,

other options ranging from spermatic cord denervation to orchiectomy in refractory cases may require consideration¹²⁻¹⁴.

We found that the rate of opioid prescription refill requests remained stable at 21% despite the reduction in doses, which is consistent with the work of others across different areas of urology. Most relevant to our cohort, Doolittle et al. published a study revealing no significant difference in requests for pain medications when comparing men who received opioid versus non-opioid pain meds after vasectomy¹⁵. Strategies for managing post-operative pain continue to evolve and reducing opioid prescription use has been a topic of national, state, and urology-specific interest for many years. Within the duration of our study, legislative changes in the state of Michigan resulted in a “natural experiment” whereby after 2018, the MME prescribed after surgery was limited by state laws in addition to institutional and personal efforts to reduce opioid medication use. It was reassuring to find that the rate of opioid prescription requests for refill rate remained stable at 21% despite the reduction in doses provided immediately after surgery.

Our study is not without limitations. This is a retrospective, single-institution study at a tertiary referral center, therefore pain scores were assessed through a review of the provider documentation in the EMR as opposed to a prospective collection of validated pain scores using Likert scales, numerical rating scales, or visual analogue scales. Follow up was also variable in timeframe. Finally, our evaluation of opioid MME prescriptions and changes during our study period were based on health policy changes

in the state of Michigan but do not account for institutional, provider-specific, or patient-specific factors that may also affect postoperative pain management. We were also unable to determine the exact amount of opioid pain medications each patient utilized post operatively, but rather only how many they were prescribed.

Nonetheless, this is the largest review of post-epididymectomy outcomes reported to date, and in addition to greater than 70% improvement in pain for patients, we also describe clinical characteristics associated with poor response to surgery. Future studies that further improve our ability to identify patients who are more likely to have their pain improve or resolve will help with the management of the challenging spectrum of disease that falls into the diagnosis of scrotal contents pain. Further work remains to be done if epididymectomy can join other urologic procedures such as prostatectomy, ureteroscopy, and vasectomy in moving beyond decreased opioids and towards opioid-free recovery.

Conclusions

This 20-year analysis is the largest review of post-epididymectomy outcomes reported to date. Among carefully screened men, 72% had resolution or improvement of their scrotal pain. Epididymectomy was most effective for men with <1 year of focal epididymal pain confirmed by exam, without a history of psychiatric conditions or scrotal, inguinal, or abdominal surgery other than vasectomy.

References

1. Parekattil SJ, Gudeloglu A, Brahmabhatt JV, et al. Trifecta nerve complex: potential anatomical basis for microsurgical denervation of the spermatic cord for chronic orchialgia. *J Urol*. Jul 2013;190(1):265-70. doi:10.1016/j.juro.2013.01.045
2. Granitsiotis P, Kirk D. Chronic testicular pain: an overview. *Eur Urol*. Apr 2004;45(4):430-6. doi:10.1016/j.eururo.2003.11.004
3. Schover LR. Psychological factors in men with genital pain. *Cleve Clin J Med*. 1990 Nov-Dec 1990;57(8):697-700. doi:10.3949/ccjm.57.8.697
4. Siu W, Ohi DA, Schuster TG. Long-term follow-up after epididymectomy for chronic epididymal pain. *Urology*. Aug 2007;70(2):333-5; discussion 335-6. doi:10.1016/j.urology.2007.03.080
5. Hori S, Sengupta A, Shukla CJ, et al. Long-term outcome of epididymectomy for the management of chronic epididymal pain. *J Urol*. Oct 2009;182(4):1407-12. doi:10.1016/j.juro.2009.06.020
6. Padmore DE, Norman RW, Millard OH. Analyses of indications for and outcomes of epididymectomy. *J Urol*. Jul 1996;156(1):95-6.
7. West AF, Leung HY, Powell PH. Epididymectomy is an effective treatment for scrotal pain after vasectomy. *BJU Int*. Jun 2000;85(9):1097-9. doi:10.1046/j.1464-410x.2000.00656.x
8. Sweeney P, Tan J, Butler MR, et al. Epididymectomy in the management of intrascrotal disease: a critical reappraisal. *Br J Urol*. May 1998;81(5):753-5. doi:10.1046/j.1464-410x.1998.00636.x
9. Woolf CJ, Salter MW. Neuronal plasticity: increasing the gain in pain. *Science*. Jun 09 2000;288(5472):1765-9. doi:10.1126/science.288.5472.1765
10. Aljumaily A, Al-Khazraji H, Gordon A, et al. Characteristics and Etiologies of Chronic Scrotal Pain: A Common but Poorly Understood Condition. *Pain Res Manag*. 2017;2017:3829168. doi:10.1155/2017/3829168
11. Ducic I, Dellon AL. Testicular pain after inguinal hernia repair: an approach to resection of the genital branch of genitofemoral nerve. *J Am Coll Surg*. Feb 2004;198(2):181-4. doi:10.1016/j.jamcollsurg.2003.09.025
12. Murthy PB, Parekh NV, Vij SC, et al. Microscopic spermatic cord denervation for chronic orchialgia/chronic scrotal content pain: operative outcomes and predictors of failure. *Transl Androl Urol*. Oct 2020;9(5):1931-1936. doi:10.21037/tau-20-561
13. Amid PK, Chen DC. Surgical treatment of chronic groin and testicular pain after laparoscopic and open preperitoneal inguinal hernia repair. *J Am Coll Surg*. Oct 2011;213(4):531-6. doi:10.1016/j.jamcollsurg.2011.06.424
14. Narita M, Moriyoshi K, Hanada K, et al. Successful treatment for patients with chronic orchialgia following inguinal hernia repair by means of meshoma removal, orchietomy and triple-neurectomy. *Int J Surg Case Rep*. 2015;16:157-61. doi:10.1016/j.ijscr.2015.09.044
15. Doolittle J, Kansal J, Dietrich P, et al. Is Opioid-free Post-Vasectomy Analgesia a Pain? A Single Surgeon Experience. *Urology*. 08 2021;154:40-44. doi:10.1016/j.urology.2021.01.050

Tables and Figures

Table 1

Demographics	Final Outcome Cured/Improved	Final Outcome No Change/Worsened	P values
N (% of total)	162 (72%)	63 (28%)	
Median follow up period in weeks (IQR)	12 (4-20)	14 (8-42)	0.01
Age in years Mean (S.D.)	46.5 (11.9)	47.5 (11.8)	0.7
Body Mass Index Median (IQR)	28.2 (25.2 – 31.3)	28.8 (25.4 – 32.3)	0.4
Prior pain duration in months Median (IQR)*	14 (6 - 48)	20 (8 - 60)	0.2

*Missing data on 17 patients

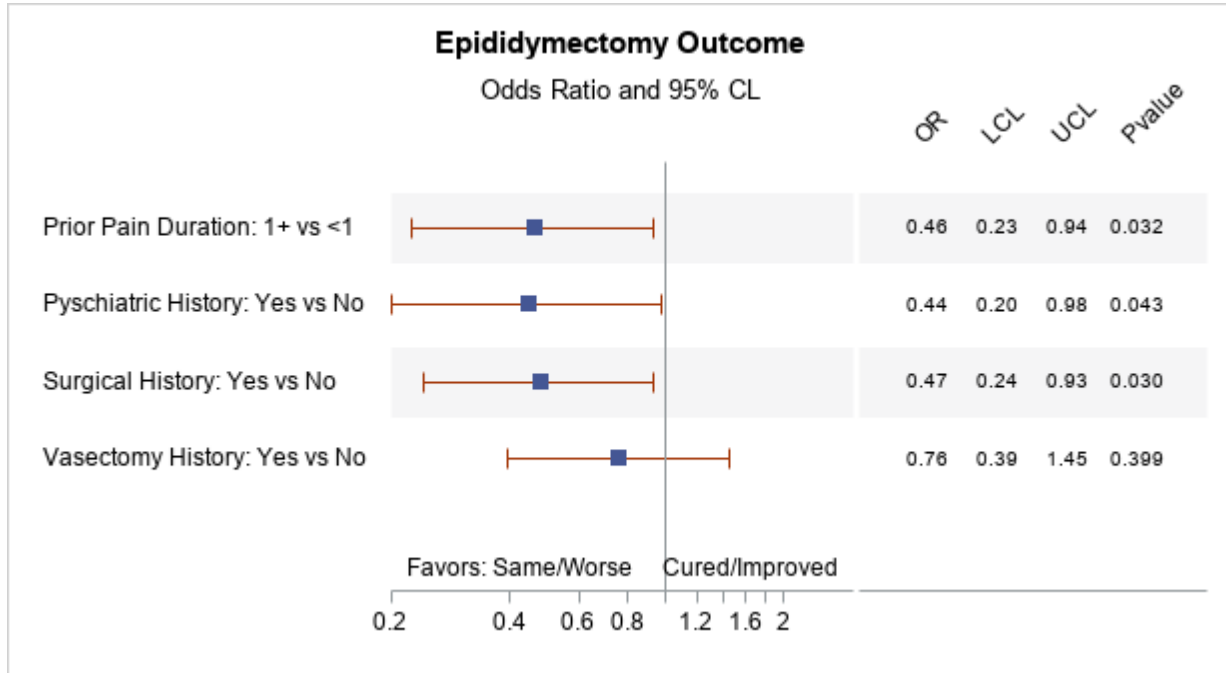
Abbreviations: IQR=Interquartile Range, SD=standard deviation

Table 2

	Number of Men with Cured/Improved Pain N (%)	Men with No Change/Worsened Pain N (%)
Short term (first post-operative visit; median = 2wks, IQR 2-3)	192 (85%)	33 (15%)
Long term (most recent post-operative visit)	162 (72%)	63 (28%)

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Figure 1



Abbreviations: OR = Odds Ratio, LCL = Lower Confidence Limit, UCL = Upper Confidence Limit

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Table 3

MME prescriptions based on short-term pain outcomes				
	N	Median	IQR	p-value
Cured/Improved	77	40	10 – 45	0.99
Worse/Same	16	30	15 – 50	
MME prescriptions based on final pain outcomes				
	N	Median	IQR	p-value
Cured/Improved	63	40	10 – 45	0.54
Worse/Same	30	30	15 – 40	

Abbreviation: MME = Morphine Milligram Equivalents

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Supplemental Table 1

History of Pelvic, Scrotal and Abdominal Surgeries not including Vasectomy	History of Psychiatric Conditions
<p><u>Epididymal surgery</u></p> <ul style="list-style-type: none"> - Partial Epididymectomy - Epididymal cyst removal <p><u>Other Intra-scrotal surgery</u></p> <ul style="list-style-type: none"> - Orchiopexy - Hydrocelectomy - Hydrocele aspiration - Spermatocelectomy - Varicocelectomy - Orchiectomy - Vasovasostomy <p><u>Intra-abdominal surgery</u></p> <ul style="list-style-type: none"> - Appendectomy - Cholecystectomy - Robotic Nephrectomy - Prostatectomy (open and robotic) - Unspecified gastrointestinal surgery 	<p>Anxiety</p> <p>Depression</p> <p>Emotional Lability</p> <p>Headaches or Migraines</p> <p>Attention Deficit</p> <p>Alcohol dependence</p> <p>Psychosis</p> <p>Fatigue</p> <p>Post-Traumatic Stress Disorder</p> <p>Traumatic Brain Injury</p> <p>Parkinson's Disease</p> <p>Irritable Bowel Syndrome</p> <p>Developmental Delay</p>
<p>Inguinal Hernia Repair</p>	