SEXUAL MEDICINE REVIEWS

Micro-Denervation of the Spermatic Cord for Post-Vasectomy Pain Management

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ABSTRACT

Introduction: Post-vasectomy pain syndrome (PVPS) is a challenging problem for the practicing urologist because of its unclear pathophysiology and no clearly established protocol for evaluation or treatment. PVPS is defined as at least 3 months of chronic or intermittent scrotal content pain after a vasectomy procedure once other etiologies for the pain have been ruled out.

Aim: To systematically review the current literature on the effectiveness of micro-denervation of the spermatic cord (MDSC) for PVPS.

Methods: A systematic literature search using PubMed, Scopus, Medline, Embase, and Cochrane databases for all reports pertaining to PVPS using the Medical Subject Heading terms *post vasectomy pain syndrome* and *micro-denervation of spermatic cord* through February 2017.

Main Outcome Measures: Scrotal content pain after MDSC for PVPS.

Results: There were nine retrospective studies evaluating MDSC for chronic testicular pain. After omitting repeated series, there were 213 patients who underwent MDSC for chronic orchialgia. Only one study specifically reviewed the outcomes of patients who underwent MDSC for PVPS. In this study, 17 patients underwent MSDC for PVPS, with 13 (76.5%) reporting complete relief of pain at their first follow-up visit. The other four patients had significant improvement in pain and were satisfied with the results. Long-term follow-up data were not available for this study.

Conclusion: MDSC remains a valuable approach with high success rates and should be considered for PVPS that is refractory to medical therapy. MDSC appears to have the most success for patients who experience a temporary relief from a cord block and can significantly improve the patient's quality of life and ability to return to daily activities. **Tan WP, Levine LA. Micro-Denervation of the Spermatic Cord for Post-Vasectomy Pain Management. Sex Med Rev 2017;X:XXX–XXX.**

Key Words: Micro-Denervation of Spermatic Cord; Orchalgia; Post-Vasectomy Pain Management; Post-Vasectomy Pain Syndrome; Testicular Pain

INTRODUCTION

Vasectomies are the most effective male contraceptive method available. It is one of the most common surgical procedures performed worldwide. It is estimated that 500,000 vasectomies are performed in the United States per annum, representing 10.2 of 1,000 in men 25 to 49 years old.[1] The vasectomy procedure involves excising a portion of the vas deferens and this is often performed under local anesthesia in an outpatient setting. Traditionally, this procedure involves making bilateral small scrotal incisions on the lateral portion of the scrotum to expose and visualize the vas deferens, excising at least 1 cm of the vas deferens, followed by electrocautery fulguration of the ends of the vas deferens, placing sutures or clips on each end, and interposing tissue between the two cut ends to further prevent recanalization. More recently, techniques such as scalpel-free vasectomies and single-incision vasectomies have been described. The success rate of a vasectomy as a form of contraception ranges from 98% to 99%.[1,2] The most common complications include bleeding, development of a hematoma, and infection of the scrotal incision sites.

Although rare, patients can experience chronic scrotal content pain after a vasectomy. The 2013 American Urological Association guideline states that 1% to 2% of men will develop pain that is severe enough to interfere with the patient's daily activities after vasectomy.[3] This syndrome has been labeled by many terms, including testalgia, chronic orchialgia, chronic scrotal

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content pain, post-vasectomy orchalgia, congestive epididymitis, and chronic testicular pain. Currently, the syndrome is widely accepted as post-vasectomy pain syndrome (PVPS).[4]

There is no clear pathway for the treatment of PVPS. However, pharmacotherapy options should be exhausted before considering surgical treatments, which include epididymectomy, excision of sperm granuloma, vasectomy reversal, and orchiectomy. In this article, we review the success rate of microdenervation of the spermatic cord (MDSC) for PVPS.

SEARCH STRATEGY

A computerized bibliographic search of the PubMed, Medline, Embase, and Cochrane databases for all reports pertaining to PVPS using the Medical Subject Heading terms *post vasectomy pain syndrome* and *micro-denervation of spermatic cord* through February 2017 was conducted. The reference lists of eligible studies and relevant reviews also were searched for additional articles that had not been found in the main search.

ELIGIBILITY CRITERIA AND PATIENTS

All studies pertaining to PVPS and MDSC were included in the review. Studies were excluded if they were published in languages other than English.

BACKGROUND

PVPS differs from acute post-procedure pain, which typically resolves 2 to 4 weeks postoperatively. PVPS is defined as constant or intermittent testicular pain for at least 3 months, sometimes debilitating the individual, prompting the patient to seek medical treatment.[5] The prevalence of PVPS is not known but the incidence has been estimated to be very low (<1% of patients after a vasectomy).[6] However, recent surveys have found that up to 15% of men have PVPS, with 1% to 2% of men reporting severe pain that affects daily quality of life.[7,8] One review reported that up to 1 in 1,000 men who undergo a vasectomy procedure will require a subsequent surgical intervention for chronic pain.[9] The American Urological Association added a statement to their guidelines, which was recently updated in 2013, stating that "Post-vasectomy pain syndrome is a chronic pain syndrome that follows vasectomy. The cause of this syndrome and its incidence are unclear. It is generally treated with anti-inflammatory agents. Occasionally, patients will elect to undergo vasectomy reversal in an attempt to alleviate this syndrome. Unfortunately, the response to surgical intervention is unpredictable."[3]

ETIOLOGY

The pathophysiology of PVPS remains unclear but postulations behind the etiology of testicular pain include damage to the scrotal and spermatic cord nerve structures by inflammatory effects of the immune system, back pressure effects in the post-vasectomy closed system, vascular stasis, nerve impingement, or perineural fibrosis.[4]

Histologic findings within the proximal segment of the vas after vasectomy include thickened basement membranes and increased phagocytosis by Sertoli cells, which are believed to play a part in maintaining normal physiologic epididymal pressure.[10] In patients with chronic testicular pain, this mechanism fails to compensate for the increase in pressure, resulting in epididymal blowout and the development of a sperm granuloma or vasitis nodosa, which tends to occur approximately 5 to 7 years after vasectomy.[11]

In post-vasectomy patients, the blood-testes barrier also is disrupted, leading to detectable levels of serum antisperm antibodies in 60% to 80% of men.[11] Approximately 7% to 30% of post-vasectomy patients also will have antisperm antibodies within the epididymis.[10] Animal studies have found that these antibodies can cause agglutination of sperm, resulting in activation of the complement cascade, leading to formation of immune complexes and deposition of these complexes in the basement membrane.[10,12] All these mechanisms together or individually can contribute toward the development of PVPS.

CLINICAL PRESENTATION

The mean duration to the onset of PVPS is 7 to 24 months.[13] Demographics (race, age, socioeconomic status) and operative techniques (scalpel free vasectomy, clips vs sutures) have not been shown to be associated with the development of PVPS.[14] Signs and symptoms of PVPS include scrotal content pain focusing on the site of the transected vas deferens, epididymis, and testis; fullness of the vas deferens and epididymis; dyspareunia; pain with ejaculation; premature ejaculation; and pain with bowel movement and straining of pelvic floor muscles.[15] Scrotal ultrasonography might show an engorged or thickened epididymis.

EVALUATION

Evaluation includes a thorough history and physical examination. The duration and nature of the pain, severity (on a 0−10 scale), location, radiation, aggravating factors (voiding, bowel movements, sexual or physical activities, prolonged sitting), associated symptoms, and previous therapeutic maneuvers should be obtained.[16] Surgical histories pertaining to the spine, inguinal, scrotal, pelvic, and retroperitoneal space also should be part of the history-taking process. Psychosocial questions to rule out any somatoform disorders, depression, Munchausen syndrome, or history of sexual abuse also should be included.[13]

Physical examination on the normal or less painful side while supine and standing, focusing on the genitalia and groin, also should be performed. A thorough examination of the testes, epididymis, vas deferens, and a 360° digital rectal examination also are recommended to evaluate for tenderness associated with