Comparative analysis of anticipated pain versus experienced pain in patients undergoing office vasectomy

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Introduction: Advances in vasectomy technique have minimized patient discomfort; however fear of pain remains a primary concern. The objective is to determine how the anticipation of pain associated with vasectomy compares with patient's actual intraoperative experienced pain levels.

Materials and methods: A cohort of patients undergoing clinic vasectomy was analyzed. Using visual analog pain scale patients were asked to rate their anticipated pain score (APS) pre-procedure and then an experienced pain score (EPS) post-procedure. Patients were also stratified by APS scores (high versus low). Changes in pain score were compared across these groups. Pain scores stratified by age, race, narcotics use, psychiatric history, and prior surgical history were also compared. **Results:** In the 172 patients included, the average pre-op APS was 5.2 (95% CI 4.3-5.6), while post-op EPS was 2.1 (95% CI 1.8-2.4). Patients were stratified into "high" (6-10) and "low" (0-5) pre-op APS groups. The average drop in pain scores was found to be significantly larger in the "high" versus the "low" APS groups (4.66 versus 1.65 p < 0.001). No statistical difference was noted in the change in pain scores based on age, race, prior surgical history, chronic narcotics use or psychiatric history. Both groups tolerated the procedure well, with the mean EPS of 2.56 for the "high" and 1.73 for the "low" APS group (p < 0.05).

Conclusions: The actual pain experienced by a patient is significantly lower than their anticipation of vasectomy pain, which will aid clinicians in appropriately counseling patients and minimizing pre-procedural anxiety.

Key Words: vasectomy, pain, in-clinic procedures, visual analog pain scale

Introduction

Vasectomy has been utilized as reliable permanent male sterilization and is the most common in-office procedure performed by urologists in the United States (US).^{1,2} An estimated 175,000 to 354,000 vasectomies were done annually from 1998 to 2002 in the US.³ In 2004, almost 43 million men underwent vasectomy worldwide.⁴ Overall, vasectomy has been widely accepted as the safest and least expensive option for permanent male sterilization. However,

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Address correspondence to Dr. James Furr, Department of Urology, University of Oklahoma, 920 Stanton L Young Blvd., Oklahoma City, OK 73106 USA despite the noted advantages of vasectomy, it is still an underutilized procedure in comparison to female sterilization.^{5,6} Historically aversion to the surgical procedure in the genital area as well as associated pain are believed to be common deterrents to the widespread acceptance of vasectomy.⁷

Multiple advances in the vasectomy procedure such as use of specialized vasectomy instrument set, no-scalpel approach, utilization of a no-needle spray anesthetic, use of topical local anesthetic cream etc. have been noted to have lesser pain, faster surgical times, and overall decreased incidence of complications.⁸⁻¹⁴ In spite of these advances, it is unknown if the perception of the vasectomy procedure among general public has changed. It is unclear whether patients' fear of anticipated pain from vasectomy is in accordance with the actual intraoperative pain experienced using these newer surgical approaches. To study this 'fear factor' we conducted this study to evaluate how pre-vasectomy anticipation of pain compares to the actual pain experienced by men undergoing vasectomy in the contemporary era. We hypothesized that the anticipation of pain from vasectomy is not in accordance with the actual pain level experienced during the procedure. Ultimately, results from this study may help healthcare providers to counsel patients to achieve realistic expectations regarding pain experienced during clinic vasectomy. This may also help dispel the historic fears surrounding vasectomy among men.

Materials and methods

Following institutional review board approval, a cohort of 172 patients undergoing elective sterilization using in-office vasectomy from 1/2013 to 5/2015 was studied. All patients underwent an initial counseling visit to discuss family planning options. Patients were given the visual analog pain scale (0-10) and asked to rate the anticipation of the pain from the vasectomy by the nursing staff and was recorded as Anticipated Pain Score (APS). Within 30 minutes of the procedure, patients were again asked to rate their pain experienced during the procedure using the visual analog pain scale (0-10) which was recorded as Experienced Pain Score (EPS). No physician was present for the acquisition of pre or post procedural pain scores.

All vasectomies were performed by a single staff surgeon using the no-needle, no-scalpel technique. Local anesthesia was administered with a MadaJet injector with 2% lidocaine. All patients received diazepam 10 mg and hydrocodone/acetaminophen 7.5 mg/325 mg tab on arrival to the clinic, on the day of the procedure. Anticipated pain score was obtained prior to taking medications. Vasectomy was performed in all patients in a standardized manner: isolation of the vas deferens, use of MadaJet device for anesthetic spray, incision of vas sheath using sharp hemostats, isolation and excision of approximately 1 inch of the vas segment after occluding the ends with clips. The vas mucosa was cauterized and intervening fascia was interposed.

For statistical analysis, we compared the prevasectomy APS pain scores to the post procedure EPS pain scores to see how experienced pain differed from their anticipated pain from the procedure. Patients were then stratified based upon their APS of pain. If the patient's APS was between 0-5, they were placed to the "low anticipation" group. If it was between 6-10, they were placed in a "high anticipation" group. A two-tailed t-test was performed to compare average EPS and change in pain scores between the groups.

The percentage of patients whose pain score changed by 25% and 33% were also analyzed and compared between groups using chi-squared analysis. Additionally, we isolated certain patient characteristics, such as race, age and history of chronic pain, psychiatric history and surgical history. A history of chronic pain was defined as patients who required chronic use of narcotics. Surgical history was further separated in terms of specific genitourinary procedures, which included inguinal hernias, prior scrotal surgeries, cystoscopies, varicocelectomies, and urethral stricture procedures. For age and race, a one-way analysis of variance was used to compare the average APS and EPS pain scores, as well as average difference in pain score. For categorical data, a two-tailed t-test was used to compare the mean differences in pre and post pain scores. STATA/ SE 12.0 was used for all statistical analysis. Statistical significance was deemed to be < 0.05.

Results

We present a contemporary patient cohort in which pain expectation was directly compared to the actual pain experienced during clinic vasectomy. In the 172 patients studied, the overall average APS was 5.2 (95% CI 4.3-5.6), while EPS was 2.1 (95% CI 1.8-2.4), which was a statistically significant different (p < 0.001) as seen in Table 1.

Patients were also stratified by APS scores (high versus low). Results of this comparison are summarized in Table 2. The changes in pain score were compared across these groups. Seventy-three patients were stratified into the "high" (6-10) pre-op pain score group and 99 into the "low" (0-5) pre-op pain score group. There was no significant difference in age between these groups. The average drop in pre versus post pain scores was found to be significantly larger in the "high" versus the "low" group (4.66 versus 1.65 p < 0.001). Further, there were a greater proportion of patients in the "high" group with a 25% and 33% drop in the pain scores (p < 0.05). A scatter plot depicting each patient by APS and EPS, further stratified by "high" and "low" group can be seen in Figure 1. Both groups tolerated the procedure well, with the mean EPS of 2.56 for the "high" and 1.73 for the "low" APS group (p < 0.05).

TABLE 1. Overall pre and post procedural pain scores

| Total | 172 |
|--------------------|-----------------|
| Mean age (range) | 34 (21-61) |
| Mean pre (95% CI) | 5.20 (4.3-5.6) |
| Mean post (95% CI) | 2.09 (1.8-2.35) |

| | "Low" (APS 0-5) | "High" (APS 6-10) | p value |
|-----------------------------|-----------------|-------------------|---------|
| Number of patients | 99 | 73 | |
| Race (n) | | | |
| White | 74 | 56 | |
| Black | 2 | 9 | |
| Hispanic | 7 | 3 | |
| Unknown | 16 | 5 | |
| Psychiatric history | 4 | 3 | |
| Chronic pain history | 10 | 4 | |
| Prior genitourinary surgery | 4 | 7 | |
| Average age | 34.5 | 34.7 | 0.80 |
| Average pre | 3.38 | 7.23 | < 0.001 |
| Average post | 1.73 | 2.58 | 0.002 |
| Average drop | 1.65 | 4.66 | < 0.001 |
| % drop > 25% (n) | 76 (73) | 95 (68) | 0.003 |
| % drop > 33% (n) | 73 (71) | 88 (64) | 0.028 |

TABLE 2. Comparison of patient characteristics and pain scores between "low" and "high" anticipation groups

The effect of patient characteristics such as age, race, psychiatric history, and surgical history were studied. Results are summarized in Table 3. Ages were stratified into four groups which were age < 30 (n = 38), 30-35 (n = 67), 36-40 (n = 37) and > 40 (n = 30). APS and EPS



Figure 1. Patient plot depicting all APS and EPS, stratified by anticipation group. Note that regardless of anticipation group, all patients experienced comparable intraoperative pain scores (EPS), with a mean EPS of 2.1 for all patients.

were not statistically different across age groups. The mean difference in the pre and post op pain scores was also not statistically different across age groups. Race did not show any statistically significant difference in the APS, EPS or mean difference. Similarly APS, EPS pain

> score, and average drop in pain scores were not statistically different based upon history of psychiatric condition, prior genitourinary surgery or chronic narcotic use, though interpretation is limited due to low numbers of patients in these comparison groups.

Discussion

Vasectomy is an efficacious and safe means of permanent male sterilization. For reasons that are not well established, it has been underutilized in comparison to female sterilization. Multiple techniques have been utilized and published that have sought to minimize procedural pain related to vasectomy.¹¹⁻¹⁶ These studies quantify differences in levels of pain between techniques. This study is the first one of its kind to look into the anticipated pain or fear factor in a contemporary cohort of patients undergoing an office vasectomy. Our study does not seek to analyze the surgical or anesthetic techniques, but rather, to determine how the anticipation (fear) of Comparative analysis of anticipated pain versus experienced pain in patients undergoing office vasectomy

| TABLE 3. Pain scores based on patient characteristics | | | | | | | |
|---|-----|---------|-----|---------|--------------------|---------|--|
| Group (N) | APS | p value | EPS | p value | Mean difference | p value | |
| Age | | 0.36 | | 0.10 | | 0.34 | |
| < 30 (38) | 5.2 | | 2.7 | | 2.5 | | |
| 30-35 (67) | 4.9 | | 2.0 | | 3.0 | | |
| 36-40 (37) | 4.6 | | 1.8 | | 2.8 | | |
| > 40 (30) | 5.6 | | 1.9 | | 3.6 | | |
| Race* | | 0.31 | | 0.29 | | 0.71 | |
| White (133) | 5.0 | | 2.1 | | 2.9 | | |
| Black (11) | 6.1 | | 2.5 | | 3.6 | | |
| Hispanic (10) | 5.0 | | 1.8 | | 3.2 | | |
| Psychiatric history | | 0.97 | | 0.39 | | 0.56 | |
| Y (7) | 5.0 | | 2.6 | | 2.4 | | |
| N (165) | 5.0 | | 2.1 | | 3.0 | | |
| Chronic pain | | 0.13 | | 0.84 | | 0.23 | |
| Y (14) | 4.1 | | 2.0 | | 2.1 | | |
| N (158) | 5.1 | | 2.1 | | 3.0 | | |
| Surgical history | | 0.93 | | 0.88 | | 0.86 | |
| Y (82) | 5.0 | | 2.1 | | 2.9 | | |
| N (90) | 5.0 | | 2.1 | | 3.0 | | |
| Genitourinary surgical history | | 0.08 | | 0.99 | | 0.11 | |
| Y (17) | 6.0 | | 2.1 | | 3.9 | | |
| N (155) | 4.9 | | 2.1 | | 2.8 | | |
| | | | | | | | |

*unknown races were omitted from analysis; APS = anticipated pain score; EPS = experienced pain score

pain from office vasectomy compares with patient's actual intraoperative (experienced) pain levels.

Our data shows that on an average, the pain experienced is only half as bad as expected (2.1 versus 5.2) for an office vasectomy using modern techniques. Stated in other words patients' 'fear factor' was making their anticipation of pain to be twice as bad as their actual experience during the procedure. The causes of high-anticipated pain scores have not been studied in the literature and remain obscure. Pre-vasectomy pain scores of 5.2 in our study equates to moderate pain on the VAS, where as the post-vasectomy pain scores of 2.1 equates to mild pain. This information can be used to counsel patients on the day of initial counseling, that in our cohort the anticipated pain APS on an average was twice as high as the actual pain experienced EPS. This may help to allay some of their anxieties and fear of pain from the procedure. Using a different anesthesia technique, Shih et al have reported that pre procedural pain perception has weak correlation between expected pain and actual pain scores. In their study also they found that average pain of the procedure was less than expected (3.6 pre versus 0.6 actual).¹⁵ Their cohort had a lower pre and post

procedural pain score, which possibly can be attributed to the difference in population cohort or methodology. Our data appear consistent with trends reported on previous studies. Based on prior data, office vasectomy carries a post procedural pain score ranging from 0.6 to 2.2.^{15,17,18} The overall post procedural pain score of 2.1 reported in this study corroborates well with pain levels reported in the prior literature. These data indicate that regardless of anesthesia technique used or the experience level of the surgeon, office vasectomy is well tolerated.

We further stratified our patient cohort into "high" (6-10) and "low" (0-5) APS. This allowed for isolation of a group of patients that may be considered more fearful or averse to vasectomy. Our results show that even in patients that had "high" APS pre procedural pain anticipation, the procedure was very well tolerated, with an average post procedural pain score of 2.56. Further, we found that patients with elevated pre operative pain expectations were more likely to have > 25% and > 33% drop pain scores. These data would seem to indicate that patients with high preoperative pain expectations are likely to be pleasantly surprised with their level of intraoperative discomfort. The data also appears to

indicate that this patient population has a poor grasp of what is to be expected during the procedure. We also attempted to look at the effects of certain patient characteristics, notably age, race, psychiatric history, history of chronic pain, and surgical history. The results showed no statistical significance in the differences between anticipated and experienced pain across groups. Our results indicate that such characteristics play little role in either anticipated or experienced vasectomy pain, though conclusions may be limited by the low numbers within these subset of groups, such as patients with history of psychiatric conditions (n = 7) or chronic pain (n = 14). A more extensive look into the differences in pain expectation across education levels, socio-economic strata and their prior source of information about vasectomy could be an area of further study.

This study is not without limitations. The pre and post scores were obtained in the absence of staff surgeon to ensure that his presence would not influence scores. However, pre scores were freely accessible within the electronic medical record, so the staff surgeon could not be considered blinded. The VAS itself may introduce some intrinsic bias as it not validated for anticipated pain, only experienced pain. Additionally, a single, experienced, staff surgeon performed all procedures, which may contribute to low pain scores. However, data from Nguyen et al has shown that there is no statistically significant difference in pain scores regardless of the experience level of the surgeon.¹⁹ Lastly, all patients were medicated with single dose narcotic and diazepam for the procedure, which may contribute to the difference in pain score pre and post procedurally. Given that the post procedure pain scores reported in this study compare well with scores reported in other studies, we feel that the effect of the medication is minimal. Also the end point of our study was to focus on the actual pain experienced by the patients using common office vasectomy techniques, which usually includes oral analgesic and benzodiazepines in many practices. It clearly shows that it was a well-tolerated procedure and the anticipation was in excess of actual pain by a factor of two to three folds.

Conclusions

Ultimately, these results confirm our hypothesis that actual pain experienced by a patient is much lower than their anticipated fear of pain from office vasectomy. Even with the numerous advances in technique that have reduced vasectomy pain, there is a significant knowledge gap amongst this patient population. Our results highlight a patient population that may benefit from more extensive preoperative counseling to manage expectations. Future studies are needed to determine if appropriate management of pre procedural pain anticipation can reduce cancellation rates, no-show rates and overall pre procedural patient anxiety.

Disclosure

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