

OPEN-ENDED VASECTOMY, SPERM GRANULOMA, AND POSTVASECTOMY ORCHIALGIA

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The presence of a sperm granuloma at the vasectomy site prevents epididymal pressure build-up, perforation, and the formation of an epididymal sperm granuloma. It thus enhances reversibility of the vasectomy and lessens the likelihood of epididymal discomfort.

In two prospective vasectomy series, a sperm granuloma was intentionally allowed to form by not sealing the testicular end of the vas. The sperm granuloma resulted in no instance of orchialgia, but created a greater risk of spontaneous recanalization. This latter problem could only be solved by more careful sealing of the upper end of the vas.

In a separate series of nine patients vasectomized elsewhere and specifically referred to us for chronic and persistent postvasectomy orchialgia, seven had no sperm granuloma at the vasectomy site. Pain in these cases was localized in the epididymis and was relieved by vasovasostomy.

Any technique of vasectomy carries a very small risk of orchialgia, whether due to the presence of a sperm granuloma at the vasectomy site or to increased epididymal pressure. Fertil Steril 32:546, 1979

It has been demonstrated that the formation of a sperm granuloma at the vasectomy site allows decompression of the vas and epididymis after vasectomy with assurance of good quality sperm in the vas fluid and an extraordinarily high likelihood of recovering fertility after vasovasostomy.¹⁻³ Furthermore, it has been reported by us in a large series of patients requesting vasovasostomy that the presence of such a sperm granuloma at the vasectomy site does not usually cause discomfort. Indeed, the incidence of orchialgia after vasectomy was somewhat greater in patients who did not have a sperm granuloma at the vasectomy site.⁴ When a sperm granuloma is present at the vasectomy site, venting the otherwise high intravasal

pressure, there is virtually no occurrence of epididymal disruptions or perforations. Epididymal disruption with formation of an interstitial sperm granuloma in the epididymis occurred on one side in more than 10% of patients whose vasectomy was performed within 10 years, and on both sides in approximately 50% of patients whose vasectomy was performed more than 10 years previously. Thus the formation of a sperm granuloma, either at the vasectomy site or in the epididymis, seems to be an unavoidable complication of vasectomy.⁵⁻⁷ However, the presence of a sperm granuloma at the vasectomy site is more favorable for reversal than the presence of a sperm granuloma in the epididymis.

In many regions of the United States the ligature method of vasectomy has led to a very high incidence of these sperm granulomas of the vas (from 20% to 50%). Although favorable for reversal, there is a potentially increased risk of spontaneous recanalization with techniques of vasc-

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omy that lead to sperm granuloma formation. In addition, a recent report in the literature stated that sperm granulomas at the vasectomy site were intensely painful in 83 of 154 cases, and in 63 of those cases (40%), surgical intervention was required.⁸ This high incidence of disabling pain after sperm granuloma, requiring further surgery in the majority of cases, is contrary to the experience of most urologists.

In the following studies, performed in different cities (indeed in different countries), we wished to determine whether the deliberate encouragement of the formation of a sperm granuloma at the vasectomy site, with efforts aimed at reducing the risk of spontaneous recanalization, would have a greater risk of complications than techniques aimed at preventing sperm granuloma. In addition, we wished to study a small group of patients vasectomized elsewhere who did not want their fertility restored, but who experienced chronic orchialgia after vasectomy.

METHODS

Ottawa Open-Ended Vasectomy Series

Over a period of 1 year, 410 patients were subjected to "open-ended" vasectomy after carefully and completely informed consent was obtained. All vasectomies were performed by one surgeon who had previously performed more than 4000 conventional vasectomies. Open-ended vasectomy simply means that, after the vas is divided, the lumen on the testicular side is not ligated, clipped, or cauterized. The abdominal end, however, is cauterized or clipped. Heat cautery with a Concept vasector unit is used. All patients were examined at 1 week and then at monthly intervals after vasectomy. The presence or absence of a sperm granuloma, its size, and any tenderness either in the vasectomy site or in the epididymal region were recorded. Sperm counts were performed after 15 ejaculations and at monthly intervals thereafter. Even after the patient had been azoospermic for two separate monthly sperm counts, verification of continued azoospermia was required for each patient.

St. Louis Open-Ended Vasectomy Series

Twenty-three patients underwent open-ended vasectomy similar to the Ottawa technique, while during the same period of time 91 patients underwent closed-ended conventional vasectomy. Again the Concept heat cautery vasector unit was used in

all cases. In the open-ended cases only the abdominal ends of the vas deferens were cauterized; in the closed-ended cases, both the abdominal and the testicular ends were cauterized. The patients were followed in the same fashion as in the Ottawa series.

Patients Referred to St. Louis for Evaluation and Possible Surgical Correction of Orchialgia following Vasectomy

Nine patients who experienced relatively severe chronic orchialgia following vasectomy were evaluated for possible surgical correction. None of these patients wished to regain his fertility. All wished to remain sterile but hoped to be relieved of the orchialgia which had had its onset after the vasectomy. After physical examination had determined the presence or absence of a sperm granuloma at the vasectomy site, or tenderness either at the vasectomy site or in the epididymis, the patients were offered the choice of surgical treatment or watchful waiting.

RESULTS

Ottawa Open-Ended Vasectomy Series

Of the 819 vasa (the first 410 patients) operated upon with the open-ended vasectomy technique, 26 (3%) developed no sperm granuloma. Of the remaining 793 vasa (97%) which developed a sperm granuloma, 693 had a granuloma of 3 mm or less, 80 had a granuloma of 3 to 5 mm, and 20 had a granuloma of greater than 5 mm. All of the latter sperm granulomas decreased in size over the following 2 months to 4 mm or less. None of the 793 vasa which developed a sperm granuloma was tender to palpation. None of the patients in this prospective series had pain or discomfort referable to the sperm granuloma after 1 month postoperatively. Interestingly, one of the 410 patients in this series had unilateral congenital absence of the vas deferens. In the first author's experience of approximately 4000 vasectomies, 5 such cases of unilateral congenital absence of the vas have been noted (0.1%).

A disturbing number of patients operated upon with this technique (17) had live, motile sperm even after 15 ejaculations postvasectomy. Of these 17 vasectomies, 7 had been performed with the Concept heat cautery, and all 7 were ultimately considered failures requiring repeat vasectomy. Since 148 of the 410 patients had undergone open-ended vasectomy with the Concept unit, the

failure rate was clearly an unacceptable 4%. All of the other 10 patients showing live sperm after 15 ejaculations progressed to permanent azoospermia over the next 2 months. Of the 262 patients in which the open-ended vasectomy was performed using Hemoclip application to the abdominal end, there was only one failure, or a incidence of 0.4%. In summary, the Ottawa open-ended vasectomy series demonstrated an unacceptably high (4%) failure rate when heat cautery was used to seal the abdominal ends of the vas deferens, and a somewhat more acceptable 0.4% failure rate when Hemoclips were applied to the abdominal end of the vas deferens. No pain or discomfort was associated with any of the sperm granulomas resulting from this open-ended technique.

St. Louis Open-Ended Vasectomy Series

In this smaller series, only 23 patients who agreed to a detailed informed consent underwent open-ended vasectomy. During that period the majority of patients seen by this author underwent routine closed-ended vasectomy using a Concept heat cautery unit similar to the technique described by Moss in 1300 vasectomies without failure.⁹ Of the 91 patients who underwent closed-ended vasectomy with this technique, 4 developed small sperm granulomas. All of the 23 patients who underwent open-ended vasectomy developed sperm granulomas. There was no case of tenderness or discomfort after 1 month postoperatively in any of the patients with sperm granulomas. In one patient undergoing closed-ended vasectomy (who did not develop a sperm granuloma at the vasectomy site), a rather severe episode of congestive epididymitis ensued which improved over the subsequent 6 months. However, this patient continues to have moderately tender epididymides without any evidence of sperm granuloma formation at the vasectomy site.

There was no case of recanalization among the 91 patients who underwent closed-ended vasectomy, but there was one case of recanalization among the 23 patients who underwent open-ended vasectomy. Thus the results of this smaller vasectomy series corroborates the findings in the Ottawa series.

Patients Referred to St. Louis for Evaluation and Possible Surgical Correction of Orchialgia following Vasectomy

Of the nine patients referred for chronic and persistent orchialgia following vasectomy, only

two had sperm granulomas at the vasectomy site. One of those two men was a physician who had a unilateral sperm granuloma 6 mm in diameter which was moderately tender and caused considerable pain during ejaculation. Excision of this sperm granuloma resulted in relief of his post-vasectomy orchialgia. The second such patient had bilateral sperm granulomas only 4 mm in diameter which were moderately tender and also associated with postejaculatory pain. Excision of these sperm granulomas also resulted in the relief of discomfort.

The other seven patients either had no sperm granuloma at the vasectomy site on either side, or had no sperm granuloma on the side which was producing the pain. These patients all had rather severe epididymal tenderness, also aggravated by intercourse and ejaculation.

Patient 1. The first patient in this group of seven had a sperm granuloma present at the vasectomy site on the right, but no tenderness or pain on this side. On the left side he had no sperm granuloma but a severely tender epididymis. This patient did not wish to become fertile again, but because of a tender, engorged epididymis he decided to undergo a microscopic vasovasostomy and then to use other methods of birth control. Vasovasostomy relieved the pain completely.

Patient 2. The second patient in this group had no sperm granuloma on the right side, but severe epididymal pain aggravated by intercourse. On the left side he had a 4-mm sperm granuloma which was very slightly tender, but his epididymis on that side was not tender and he did not complain of pain on that side. Once the physiologic basis of the pain was explained to him, he decided to defer surgery and was relieved somewhat by at least being told that we did not think it was all "in his head."

Patient 3. The third patient was a physician from the east coast area who had no sperm granuloma on either side but severely tender epididymides. His pain was completely relieved by a vasovasostomy. At the time of vasovasostomy the vas fluid was noted to be under considerable pressure, as is often routinely seen at the time of vasovasostomy in patients not complaining of pain. Postoperatively the epididymides were decongested, much less swollen, and nontender. However, the ultimate complication of vasovasostomy, pregnancy, occurred in his wife despite attempting other birth control measures.

Patient 4. The fourth patient in this group again had no sperm granuloma on the right or left but

severely tender and swollen epididymides. His pain was completely relieved by a vasovasostomy. His postoperative sperm count showed an adequate number of sperm, although the motility was consistently less than 1%.

Patient 5. The fifth patient in this series was a farmer from the northern midwest region who had severe orchialgia after his vasectomy and was diagnosed elsewhere as possibly having a sperm granuloma. He underwent bilateral resection of this "sperm granuloma," but his pain was not relieved. The pathology report on this resected specimen indeed demonstrated no sperm granuloma. When we saw the patient, on physical examination there was no tenderness in the vasectomy region, and no sperm granuloma was palpated. However, he had severely tender, swollen epididymides bilaterally. A vasovasostomy resulted in complete relief of pain as well as recovery of normal fertility, so that now he is using other birth control measures.

Patient 6. The sixth patient in this series had been very poorly counseled, was very nervous about the vasectomy he never should have had in the first place, and postoperatively had very severe epididymal pain without a sperm granuloma on either side. His pain was also relieved completely by a vasovasostomy.

Patient 7. Finally, the seventh patient in this series also had no sperm granuloma on either side, but had bilateral epididymal pain, tenderness, and engorgement. His pain was also relieved by vasovasostomy.

None of the patients in this series wished to be fertile again, and none of them had any psychiatric problems. Only two of the nine had pain referable to an irritating focus in the sperm granuloma. Seven of the nine had pain referable to the epididymis and had no sperm granuloma at the vasectomy site. Thus painful congestive epididymitis was apparent only in patients who had no sperm granuloma. On the other hand, a sperm granuloma was not a totally innocent lesion, since two of the nine patients were relieved of their pain after excision. It should be remembered that these nine patients comprise a highly select group from all over the country and represent a very small percentage of the literally millions of men undergoing vasectomies in the United States.

DISCUSSION

Certainly no surgical procedure or method of either birth control or sterilization can be without

complication. When a patient elects to have a vasectomy, he must understand that pressure build-up proximal to the vasectomy site, congestion of the epididymis, and, indeed, epididymal blowouts are inevitable consequences of this surgical procedure. In more than 800 vasovasostomy patients whom we have seen, there is always some degree of epididymal engorgement and congestion. Indeed, after one explores these postvasectomy patients microsurgically, it becomes difficult to understand why the vast majority of such patients have no pain or discomfort. Nonetheless, a tiny percentage do have disconcerting symptoms resulting from the sterilization and the obvious microanatomical changes which the sterilization produces.

Of course, there are many vasovasostomy patients who do have intermittent and subtle discomfort in the scrotal region, which they do not complain about and are not seriously concerned over. Such vasovasostomy patients were excluded from the present series because their major desire was to become fertile again. The small group of vasovasostomy patients included in the series were those who had no desire to become fertile again and who indeed considered fertility a necessary evil if they were to be relieved of the congestive discomfort created by the vasectomy. Discomfort after any vasectomy technique is minimal. In our prospective series of open-ended and closed-ended vasectomies during the last year, no significant pain has been caused by the formation of a sperm granuloma, and the only case of chronic orchialgia after vasectomy in more than 500 patients occurred in a patient who had no sperm granuloma at the vasectomy site, but rather congestion of the epididymis.

It appears that any technique of vasectomy is relatively innocuous insofar as chronic orchialgia is concerned, and only a tiny fraction of vasectomized patients will incur difficulties with that problem. However, pain is more likely to occur when no sperm granuloma forms at the vasectomy site, with subsequently higher epididymal pressure. We cannot explain Schmidt's findings⁸ of severe pain requiring surgical intervention in almost 50% of patients in whom sperm granulomas were noted at the vasectomy site.

The intentional encouragement of the formation of a sperm granuloma at the vasectomy site, however, is not to be taken lightly. The incidence of spontaneous recanalization in this series is disturbingly high. The fact that heat cautery (the Concept vasector unit) has resulted in no recanalization in a series as large as 1300 vasectomies in

which both the abdominal and testicular lumina were sealed would lead us to believe that this is an adequate method of sealing the vas deferens and preventing recanalization.⁹ However, disturbingly high percentages of recanalization in open-ended cases in which only the abdominal side of the vas was cauterized with the Concept unit, and the dramatic improvement in the failure rate to less than 0.4% when Hemoclips were utilized on the abdominal side of the vas, indicate that heat cautery is not an efficient method for sealing the vas. It is possible that the risk of recanalization in open-ended vasectomy might be reduced to even less than 0.4% if either a longer filament were available on the Concept unit, or simply if a standard needle electrocautery unit were utilized instead. It would seem reasonable to suppose that there must be some way of adequately sealing the abdominal end of the vas so that, despite encouragement of sperm granuloma formation, recanalization still would be prevented.

The question of whether or not the presence of a sperm granuloma at the vasectomy site might have harmful immunologic consequences frequently arises. However, a sperm granuloma at the vasectomy site does not seem to cause a significantly increased incidence of sperm antibodies postvasectomy.¹⁰ Perhaps even more to the point, recent studies from Boston in a variety of different laboratory animals conclusively demonstrated that, although antisperm antibodies predictably occur after vasectomy in a certain percentage of cases for any species studied, the incidence does

not correlate at all with the development of a sperm granuloma at the vasectomy site.¹¹ The mechanism for sperm antibody formation is probably intimately associated with the development of high intravasal and epididymal pressure.

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