Vasal Irrigation With Sterile Water and Saline Solution for Acceleration of Postvasectomy Azoospermia

Ali Roshani,[1,2] Siavash Falahatkar,[1,2] Iradj Khosropanah,[1,2] Mohamad Reza Asghari Golbaghi,[1,2] Seyed Amir Kiani,[2] Marzieh Akbarpour[2]

Introduction: Vasectomy is the safest and most reliable method of all the contraception methods, but azoospermia is not achieved immediately by this method. We decided to determine whether irrigation of the vas deferens with sterile water or hypertonic saline solution irrigation during vasectomy would reduce the time needed to obtain azoospermia.

Materials and Methods: A total of 126 fertile men presented for vasectomy were divided in 3 groups. No-scalpel vasectomy was done for all of the participants and irrigation of the vas deferens was carried out during the procedure in 2 groups with either sterile water or hypertonic saline solution (9 g/L sodium chloride solution). Forty-two participants underwent vasectomy without irrigation. Semen analysis was performed at 4, 8, 12, and 16 weeks after vasectomy.

Results: Azoospermia was achieved in all of the men with sterile water after 12 weeks, while at the end of the study (16 weeks) it was achieved in 37 (88.1%) of those with saline solution and in 11 (26.2%) of those without irrigation. There were significant differences in the rates of azoospermia between the participant with sterile water and saline solution at 8 weeks (38.1% versus zero; $P < .001$), 12 weeks (100% versus 30.9%; $P < .001$), and 16 weeks (100% versus 88.1%; $P = .02$). No pregnancy developed during the follow-up and no complication was reported.

Conclusion: Vasal irrigation with sterile water and hypertonic saline solution during vasectomy were effective in removing sperm from the distal vas and increasing the rate at which men achieved azoospermia. Sterile water was a promising option with no complications.

Keywords: vasectomy, hypertonic saline solution, sterile water, vas deferens

Urol J. 2008;5:37-40.
www.uj.unrc.ir

[1]Department of Urology, Razi Hospital, Gilan University of Medical Sciences, Rasht, Iran
[2]Urology Research Center, Gilan University of Medical Sciences, Rasht, Iran

Corresponding Author:
Siavash Falahatkar, MD
Urology Research Center, Razi Hospital, Rasht, Iran
Tel: +98 131 323 2050
Fax: +98 131 323 2050
E-mail: falahatkar_s@yahoo.com

Received October 2007
Accepted January 2008

INTRODUCTION

Vasectomy continues to be the most reliable form of male contraception worldwide, because vasectomy is the safest, easiest, cheapest, most effective, and most reliable method among all the methods of contraception.[1,2] The number of sterilized men is estimated to be between 40 and 60 million in the world, and vasectomy is thought to account for 5% to 10% of all contraceptive methods used.[3] Previous reports suggested that the failure rate of vasectomy is nearly zero.[4,5] Nonetheless, the desired endpoint of azoospermia is not achieved immediately after the surgery. It is widely accepted in clinical practice that becoming azoospermia may take up to 4 months in most men because of the sperm residing in the seminal vesicles and the vas

deferens upstream from the surgical incision.[1]

In most developing countries, an important factor that contributes to vasectomy failure is the negligence of the patients who assume that they are sterile shortly after vasectomy. If all spermatozoa could be flushed from the vas deferens without any adverse effect, then this disadvantage might be ameliorated.[6] Many investigators have attempted vasectomy with various irrigation methods. Irrigation of the vas deferens by saline solution and injection of aqueous euflavine with sterile water have been tried in some studies with varying degrees of success.[1,6-9] The purpose of this study was to evaluate and compare vasectomies using saline solution and sterile water as simple, inexpensive, and readily available irrigation fluids to reduce the time needed to reach azoospermia.

MATERIALS AND METHODS

A prospective, nonrandomized, double-blinded, controlled trial was conducted between January 2003 and October 2004 to evaluate the efficacy of vasal irrigation by sterile water and saline solution during no-scalpel vasectomy compared with no-scalpel vasectomy without irrigation. A total of 126 men who attended the Gilan Family Planning Research Center were enrolled in our study. The study participants had to meet the following criteria to enter study: age of 25 years or older, being in good physical and mental condition, being healthy according to physical examination, and having at least 2 living children. The exclusion criteria included inflammation or infection of the scrotal sac, abnormalities or congenital anomalies of the vas deferens, and previous sterilization.

Ethical approval was obtained from a relevant local ethics committee. All patients were thoroughly counseled about the study, were given information leaflets, and were provided informed consent to the operator. Patients were divided into 3 groups by alternative allocation: patients in the first and second groups were selected to receive sterile water and hypertonic sodium chloride solution (9 g/L sodium chloride solution), respectively, as vasal lavage, and those in the third group were planned to receive no lavage (to act as a control group). The enrolled patients were blinded to the procedures.

Each group consisted of 42 participants. Vasectomy was done based of United Nations Population Fund protocols, in which semen analysis before vasectomy is not necessary. A single technique of no-scalpel vasectomy with a single midline puncture was used in all of the participants. The procedure was carried out under local anesthesia; 10 mL to 15 mL of lidocaine 1% (with no adrenaline) was used. Before transecting the vas deferens a 16-gauge tube was inserted into the distal vas deferens and 40 mL of sterile water or 40 mL of hypertonic saline solution was infused for the men in groups 1 and 2, respectively. The vas deferens catheterization in the prostatic sight did not induce epithelial damaging. This method is used after distal vas exploration routinely to confirm there is no obstruction. Irrigates was done for 1 minute. Participants in group 3 remained as control group and underwent vasectomy without irrigation. The cut ends of the vasa deferentia were cautered in separate tissue planes.

The participants were asked to provide semen sample for analysis at 4, 8, and 12 weeks after their vasectomy. The main outcome in this study was achieving azoospermia defined as the total absence of sperm from the ejaculate.

Analyses of data were done by the SPSS software (Statistical Package for the Social Sciences, version 11.5, SPSS Inc, Chicago, Ill, USA), and the chi-square test was used for comparisons of the dichotomous variables. A *P* value less than .05 was considered significant.

RESULTS

Participants failing to return for semen analyses were contacted via phone calls, and eventually, all the participants completed the study. The mean ages of the men in groups 1, 2, and 3 were 38.5 ± 5.2 years (range, 28 to 48 years), 39 ± 5 years (range, 29 to 50 years), and 38.5 ± 4.0 years (range, 28 to 49 years), respectively. There was no history of urogenital surgery in the subjects.

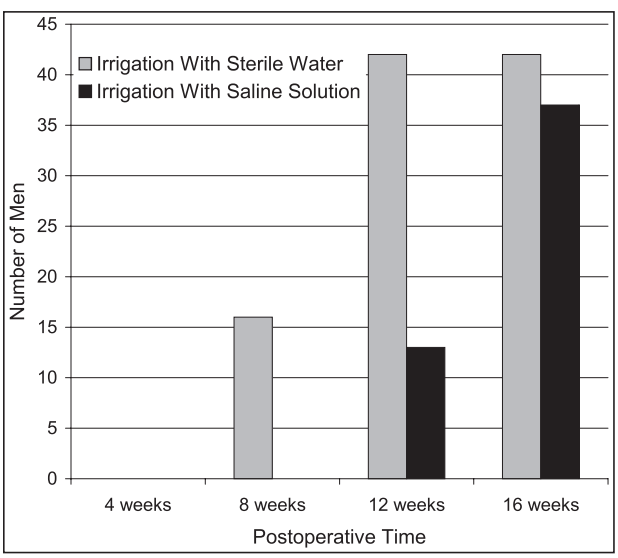
The Table shows the number of the participants who achieved azoospermia in the three groups

Achievement of Azoospermia in Men With Vasectomy During the Postoperative Period*

Azoospermia	Vasectomy Method			*P*
	Irrigation With Sterile Water	Irrigation With Saline Solution	No Irrigation	
Achieved after				
4 weeks	0	0	0	...
8 weeks	16 (38.1)	0	0	< .001
12 weeks	42 (100.0)	13 (30.9)	0	< .001
16 weeks	42 (100.0)	37 (88.1)	11 (26.2)	< .001
Not achieved	0	5 (11.9)	31 (73.8)	< .001

*Values in parentheses are percents. Ellipsis indicates not applicable.

at 4, 8, 12, 16 weeks postoperatively. While irrigation of the vas deferens resulted in azoospermia in most of the men, sperm could be found in the majority of the vasectomy cases without irrigation at the end of the follow-up period. Also, there were significant differences in the rates of achieving azoospermia between the participant with sterile water lavage and saline solution lavage at 8, 12, and 16 weeks ($P < .001$; $P < .001$; and $P = .02$, respectively; Figure). No pregnancy occurred during the follow-up. No complication was seen.



Comparison of the number of men in whom azoospermia was achieved between groups with vasal irrigation with saline solution and sterile water.

DISCUSSION

One probable disadvantage of vasectomy is that sterility is not achieved immediately. Residual spermatozoa continue to be ejaculated for weeks or months after vasectomy, resulting in a potential risk of pregnancy during the postvasectomy waiting period. This is important, particularly in developing countries, because there is limitation in performing postoperative semen analyses to confirm achievement of azoospermia.[6] Some authors have suggested that time to infertility depends on the frequency of postoperative ejaculations.[10] In a systematic review, evidence-based recommendations on the appropriate postvasectomy semen analysis protocol were proposed, according to which 1 test after 3 months and 20 ejaculations can result in azoospermia.[3]

Some investigators have performed vasectomy perfusion trials with different irrigation material. Irrigation methods of the vas deferens can be divided into two groups based on the use of spermicides. There are many spermicides used for irrigation with varying degrees of success.[6] In a series of vasectomies with irrigation by euflavine, Edwards reported that in most cases, live sperm were absent from samples collected only a few days after the operation. However, it was mentioned that its use did not preclude the need for postvasectomy seminal examination.[8] In a study of comparison between sterile water and euflavine, the first semen sample without spermatozoa was seen after an average of 11 ejaculates with sterile water and an average of 5.5 ejaculates with euflavine. The researchers concluded that while it is not ideal, euflavine is more efficient as an irrigating fluid.[8] It is also mentioned that the spermicide agents could cause destruction of other cells lining the reproductive tract, as well as inflammatory reactions of the seminal vesicles and the prostate.[11] Thus, it seems that use of nonspermicidal irrigation might be appropriate and safer.[6]

Eisner and colleagues found that 100% of 50 men with vasectomy and irrigation by 10 mL of saline solution and 94.6% of those without irrigation became azoospermic at 12 weeks postoperatively. They mentioned that there was no different between the 2 groups in the rate of achieving azoospermia at the end point.[1] In a study on 70 men who underwent vasectomy with or without vasal lavage with 50 mL of hypertonic saline solution, no significant differences were reported in the sterility rate at 8, 10, or 12 weeks after vasectomy.[7] However, Sommer and colleagues reported a statistical difference in infertility rates when using 40 mL of sterile water in 59 patients randomly allocated to vasectomy with and without vasal lavage.[10]

The present study evaluated the efficacy of vasal irrigation with two nonspermicidal fluids. Hypertonic saline and sterile water were chosen because they are nonirritant and might also extend an osmotic effect on spermatozoa. Moreover, both of these solutions are available and inexpensive, which can make the irrigation technique practical. We found a significant difference in the rate and time of achieving azoospermia between men with irrigation with either of these fluids and controls. Furthermore, sterile water lavage was more effective than saline lavage in acceleration of reaching the sperm-free condition.

Our investigation was nonrandomized, with all consecutive vasectomy patients offered entry in to the study. However, we did not have any lost-to-follow up case. Of other limitations of this study was lack of information on the sperm found in urine samples and frequency of ejaculations after vasectomy. These factors may have an additional impact on the rate to achieve azoospermia.

CONCLUSION

We found that vasectomy using nonspermicidal fluids for irrigation of the vas deferens (such as hypertonic saline solution and sterile water) can be associated with accelerating the sperm-free rate. Sterile water was a promising option with no complications. Therefore, it can be used as a safe and effective irrigation fluid for achieving sterility after vasectomy within a shorter period.

CONFLICT OF INTEREST

None declared.

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