

No scalpel vasectomy, a novel technique for permanent male sterilization – Our institutional experience



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ABSTRACT

Background: No scalpel vasectomy (NSV) is a novel modern innovation technique wherein vas deferens is delivered, ligated, and excised without use of a scalpel. It is a permanent sterilization option for male with low complication rate and greater patient compliance and low morbidity. **Aims and Objectives:** The objective of this study was to analyze the effectiveness, safety, complications, and acceptability of NSV. **Materials and Methods:** A total of 140 vasectomies were performed using NSV technique in Government Mohan Kumaramangalam Medical College and Hospital, Salem, Tamil Nadu, India, during December 2020–November 2022 (24 months). **Results:** A study of operative time, effectiveness, and complications of the procedure were analyzed. The mean age of patients was 34 with 2 Nos of children on an average. The average operative time was 10 min with a range of 8–30 min. No cases required for conversion into standard incisional vasectomy. Complication of NSV included bleeding – in 3 cases (2%), hematoma – in 2 cases (1.4%), wound infections – in 3 cases (2%), and scrotal pain – in 4 cases (2.8%) which were managed conservatively. There was no failure of NSV reported during follow-up of these cases. **Conclusion:** NSV is an effective, safe, cost-effective, and permanent male contraceptive procedure, with very minimal manageable complications. India is fighting population explosion and does need this technique to be popularized among the people.

Key words: Vasectomy; Contraceptive; Sterilization

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INTRODUCTION

No scalpel vasectomy (NSV) was developed and first performed in China in 1974 by Dr. Li Shunqiang of the Chongqing Family Planning Scientific Research Institute, located in Sichuan Province. At that time, vasectomy was unpopular with Chinese men, and tubal occlusion was the predominant method of voluntary sterilization. Over 10 million Chinese men have undergone vasectomy by this method.^{1,2} In 1986, Dr. Marc Goldstein performed the first NSV in the United States. NSV technique then slowly spread to European, African, and Asian countries.

In India, the NSV technique was brought 1st time in 1991 after two surgeons, Dr. R.C. M. Kaza and Dr. Alok Banerjee

got the skill training from Dr. Apichart Nirapathpongorn at Bangkok, Thailand, and subsequently they became the National Trainers for the NSV procedures. In March 1992, NSV was officially put into National Family Planning Program of India. Subsequently with the initiatives of Government of India, nationwide promotion, skill training, and advocacy on NSV procedure was done, which resulted in several State/District level trainers and NSV service providers in almost all the districts of the country.^{1,4}

Widespread publicity is required to remove the sexual, social, religious, and health misconceptions for this simple method to have a greater acceptance. Historically, vasectomy has long been a safe, effective, and easy to perform contraceptive method for men. Throughout its

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history, people have been trying various new Innovative Surgical Techniques in Vasectomy procedures to make it simpler and easier. “NSV – An Illustrated Guide for surgeons” was published first by Engender Health in 1992. The manual was a great success and since then has trained worldwide in more than 40 countries.^{5,6}

NSV uses a refined approach to isolate and deliver the Vas using Vasal Block Anesthesia. NSV Technique requires unique surgical skills using special instruments – ringed clamp, dissecting forceps, and straight scissors. Because of its innovative features, it has been recommended that any physician who is interested in learning this innovative technique receives hands on training with a well-qualified and experienced trainer.

NSV results in fewer complications compared to the conventional open (Incisional) vasectomy. NSV is contraindicated in the presence of large varicocele, large hydrocele, elephantiasis, filariasis, and intra-scrotal mass. Because of its simplicity of the procedure, less complications compared to the conventional open incisional vasectomy and no hospital stay (day care) NSV procedure is beginning to become popular in India nowadays.

Aims and objectives

The objective of this study was to analyze the effectiveness, safety, complications, and acceptability of NSV.

MATERIALS AND METHODS

In this study, NSV technique for male sterilization, performed during the period of December 2020 till November 2022 in Government Mohan Kumaramangalam Medical College Hospital, Salem, was included in the study. All 140 cases with NSV-related complication were metrically noted and all the patients were followed for 3–6 months for late complication and to access the success of the procedure.

Inclusion criteria

Case selection was made on stringent basis of Government of India – Family Planning guidelines.

1. Male patient should ideally be below the age of 60 years
2. The couple should have at least one child whose age is above 1 year
3. Patient must be in a sound state of mind so as to understand the full indication of sterilization
4. Patient or their spouses/partners must not have undergone sterilization in the past.

Exclusion criteria

Anatomic abnormalities, such as inability to palpate and mobilize both vas deferens or large hydroceles or varicoceles or inguinoscrotal hernia, past trauma and

scarring of the scrotum, acute local scrotal skin infection, and bleeding disorders, were excluded from the study.

Instruments used in NSV (Figure 1)

- Vas fixation forceps or Ringed clamp
- Vas Dissecting forceps
- Straight scissors.

Procedure steps

Dr. Li's Three-Finger technique^{6,9} was applied to perform the NSV (Figure 2).

1. The vas is identified and fixed between the thumb, middle, and index fingers in the midline of the scrotum at the midpoint between the root of the penis and top of the testes
2. Local anesthesia (2% xylocaine without adrenaline) is infiltrated into the scrotal skin overlying the vas followed by peri vasal infiltration (Figure 3)
3. Vas with overlying scrotal skin grasped with Allis forceps followed by puncture of scrotal skin and fascial

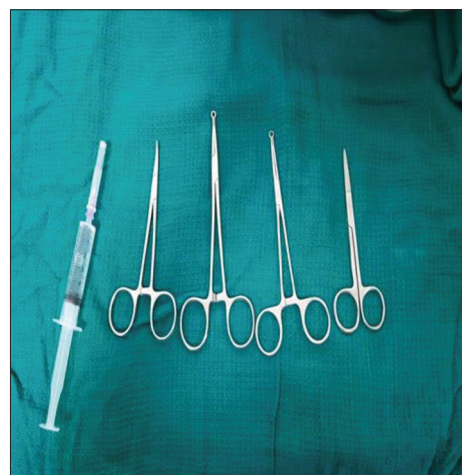


Figure 1: Instruments used in No scalpel vasectomy



Figure 2: Three-Finger technique

sheath of vas with the pointed dissecting forceps (Figure 4)

4. The vas was isolated and delivered using the same instrument through the punctured area followed by ligation and excision of 2–3 cm of vas deferens (Figure 5)
5. The procedure was repeated for the remaining vas using the same skin puncture. The punctured area was sealed with the medicated adhesive tape (Figure 6).

Post-operative instructions

1. To Take Adequate rest -24 h
2. To Resume Normal work by 48 h
3. Antibiotics and analgesics – 5 days
4. Temporary contraceptive methods like condom
5. Third month semen analysis to confirm azoospermia
6. Review after 3 months in family planning outpatient department.

RESULTS

A total of 140 vasectomies were performed using NSV technique at Government Mohan Kumaramangalam Medical College and Hospital, Salem, between December 2020 and November 2022.

The mean age of the selected cases was of 34 years with two children on an average. About 48% of patients in the study were literate people. The main reasons for accepting the procedure were family completion, day care procedure, early resumption to work, wife suffering from a cardiac disease or severe anemia, and unfit for tubectomy. Common complications were hemorrhage, seen in 3 cases (2%) and 2 cases (1.4%) had Scrotal haematoma (Figure 7) and the rest had wound infection (Figure 8) in 3 cases (2%), pain in 4 cases (2.8%) and there was no vasectomy failure (0.0%), as shown in Table 1.

The average operating time for NSV was about 10 min with a wide range of about 8–30 min. Post-operative analgesic and antibiotic requirement after NSV were advised for 3–5 days. No patient reported for vasectomy failure during



Figure 4: Vas grasped with ringed clamp and dissection of vas done with dissecting forceps

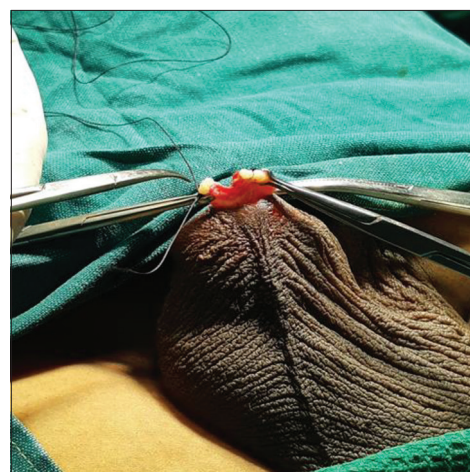


Figure 5: Excision of 2–3 cm of vas

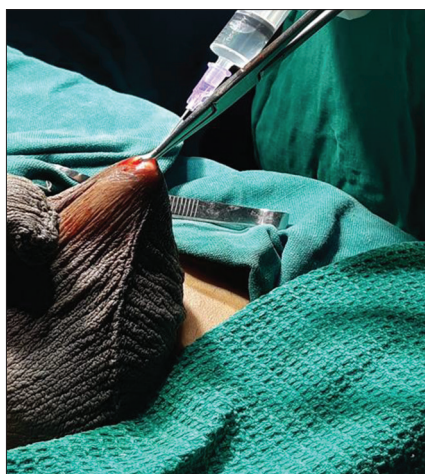


Figure 3: Local anesthesia-Scrotal skin and Peri vasal infiltration



Figure 6: Puncture hole invisible after procedure



Figure 7: Scrotal haematoma

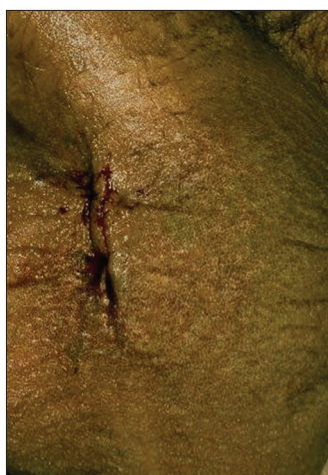


Figure 8: Wound infection

Table 1: Complications after NSV

S. No.	Complications	Number of cases n (%)
1.	Hemorrhage	3 (2)
2.	Scrotal hematoma	2 (1.4)
3.	Wound infection	3 (2)
4.	Scrotal pain	4 (2.8)
5.	Vasectomy failure	Nil (0.0)

the follow-up period. The patients with complication of hematoma required hospital admission and was managed conservatively with antibiotics and analgesics. We noticed that the learning curve for the NSV procedure was high and it required at least 20 operations before being able to perform the procedure safely without complications/failure. Three patients had wound infection who required hospitalization and it was managed conservatively with antibiotics and analgesics.

DISCUSSION

In 1952, National Family Welfare program was launched and vasectomy was introduced as a method of permanent

sterilization for males. The acceptance of incisional method has since then declined with the rising trend of NSV and it now constitutes only about 1.9% of all of the modern contraceptive methods, the main factor being the fear of pain, loss of libido, and other complications.⁴

In our study, it was found that acceptability of NSV technique by our patients was mainly due to no psychological scare of incision associated with open vasectomy, no wound scar, no skin sutures, less pain, and early discharge (Day Care Surgery).

Previously, in one study by Sandhu and Kao 92 (52.27%) underwent NSV while 84 (47.72%) underwent open vasectomy, but in our study, all patients underwent only NSV and no one opted for open vasectomy.¹⁰

Mean age of the patients was 34 years in this study, which is similar to the previous studies conducted. On an average, each had 2 children, which was higher than the national average.^{4,8,11}

In a study of 124 NSV patients, it was found that 46% had studied till high school education. ASHA and Anganwadi workers were responsible for spreading the awareness among the people in the villages.^{4,10}

Public awareness camps by doctors and social workers motivate most people to accept the surgery. Public health workers in PHCs, CHCs, social workers, and doctors have important role in motivating people.¹⁰ There was equal acceptability among all community's people, where Hindus were 52% and Muslims were 48%. In one study, Hindus constituted 95% of the patients.¹⁰

There are a few complications in NSV than in the normal incisional method.⁷ Complications include wound infection, sperm granuloma, scrotal hematoma, and late recanalization. Infections (0-0.9%) and hematoma (0-2.2%) were the most reported complications in various studies done.¹² Incidence of hemorrhage and infection in our study using NSV technique was similar (hemorrhage 2% and infection 2%) compared to the study done by Sandhu and Kao with NSV, which was 1.0% and 3.0% respectively. Similarly in a study by Patel et al., infection rate was 3.26%.

In our study, the overall rate of complication is 8.57%. Bleeding occurred during surgery in 3 cases (2%), hematoma in 2 cases after 24 h of surgery (1.4%), superficial wound infection in 3 cases (2%), and scrotal pain in four cases within 1st week (2.8%).

In a series by Li S-Q, 238 patients who underwent NSV there was no hematoma or infection.⁹ In a study conducted by

Nirapathpongpon et al., there was 3% of failure rate after NSV; however, in our study, there was no single reported cases of vasectomy failure (Repeat semen analysis done at follow-up at 3 months following NSV).¹³ However, NSV like any other new surgical technique requires skills which is difficult to learn. It was also found that the learning curve was high in NSV and to acquire necessary skills, about 20 operations were needed for each operating, which was similar to an earlier study.¹⁴

Operating time when NSV was done was significantly lower compared to the standard open incisional vasectomy. The average operative time in our study was 10 min with a range of 8–30 min. Sandhu and Kao in their study have quoted 37.5% reduction in operating time when NSV was performed compared to open procedure.¹¹ Li and coworkers similarly found 50% reduction in operating time.⁹ In a study by Patel et al., majority of patients undergoing NSV had operating time between 10 and 20 min.¹⁵ Wound infection in our study was 0.4%, however in Patel et al., study, it was 8%.¹⁵

Cochrane review of randomized and controlled trials done showed less bleeding and pain in NSV than in incisional vasectomy.¹⁶ There were less post-operative scrotal pain and infection in the NSV group. Similarly in a study done by Patel et al., only seven out of 25 patients who underwent NSV had perioperative pain compared to standard vasectomy.¹⁵ In our study, four patients had complaints of scrotal pain. Good results can be obtained by proper surgical technique and use of antibiotics.¹⁷

Hence, NSV is a novel technique for permanent male sterilization, definitely superior to the conventional open (Incisional) vasectomy in terms of simplicity, less complications, and lesser or no period of hospital stay (Day Care Surgery). NSV is gaining popularity in India and world-wide and may be 1 day completely supersede and replace female sterilization (Tubectomy) as a permanent sterilization method.

Limitations of the study

Although this study has tried to meet its aims and objectives in all aspects, there are few limitations to it.

1. We conducted a single-center study, but the sample size should have been more for better conclusive result.
2. Absence of control group to make definitive conclusion.
3. Long-term follow-up required.

CONCLUSION

NSV is single step puncture dissection technique which reduces trauma, risk of bleeding and hematoma formation

as compared to multiple steps of incisional procedure. It is safe, painless, easy, and effective method of male permanent sterilization which is cost-effective with lesser complications. The patients can resume normal activities, including to resume sexual activity earlier, within 48 h and also No need to come for suture removal as it is a suture less technique. ASHA workers in rural health establishments can effectively motivate and educate the rural population to limit the family size and accept this simple method of contraception.

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RR- Concept and design of the study and prepared first draft of manuscript; **PP-** Interpreted the results, reviewed the literature, and manuscript preparation; **SKP-** Concept, coordination, interpretation, and publication work; **VS-** Data collection, statistical analysis, and preparation of manuscript; **SS-** Preparation of manuscript and revision of manuscript; and **GRV-** Preparation of manuscript.

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