



THREE LAYERS MICROSURGICAL VASOVASOSTOMY VS LOUPE ASSISTED FOR VASECTOMY REVERSAL.

¹Dr Muhammad Waqas, ²Dr Mir Abid Jan, ³Dr Shahid Hussain, ⁴Dr Kashif Ikram, ⁵Dr Saifullah, ⁶Dr Ghulam Abbas

^{1,3,4} SR, Kidney Center, Bahawal Victoria Hospital, Bahawalpur.

²AP, Institute of Kidney Diseases Hayatabad Medical Complex, Peshawar.

⁵ Consultant, Zeenat Hospital Multan.

⁶PGR, Kidney Center, Bahawal Victoria Hospital, Bahawalpur.

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Corresponding author: Dr Muhammad Waqas

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Abstract:

About almost 5- 6% of men who had vasectomy surgery come back to doctors for its reversal in the form of microsurgical vasovasostomy or simplified Loupe Assisted vasovasostomy. Vasovasostomy is a technique which is used to regain fertility in men. This technique, over the years, has gone through many advancements with better results, including one layer, two layers and now three layers microsurgery with equipments and techniques to form a meticulous anastomosis. While, on the other hand, simple Loupe Assisted technique is done using Prolene Stent. During vasovasostomy it is extremely important to maintain normal blood supply to the tissues and muscle to build a tension free anastomosis.

In this modern age of in vitro fertilization (IVF) and intracytoplasmic sperm injection (ICSI), it has become immensely important to clearly identify the outcomes of both the surgery procedures to void future issues after vasectomy reversal. Little data is present in comparison of the outcomes of both the vasectomy reversal methods. Therefore, this paper is compiled up to throw some light on case studies to better evaluate the best methods of reversal. A study was carried out in the hospital of bahawalpur from January 2017 to January 2019.

Introduction:

Vasectomy is a form of surgery that has long and vital history. It is now a very common operation and is considered an effective and safe contraception method all around the globe. ¹ In the recent years, the demand of vasectomy reversal has increased owing to high divorce and remarriage rates, and the growing desire for more than one baby. Even though vasovasostomy is used to restore male fertility, but on the other hand it is also performed to treat post- vasectomy pain syndrome and to cure, secondary obstructions which are caused by infection or iatrogenic injury after hernia repair. ^{2,3}

Studies have suggested that 2 to 6% men who have undergone vasectomy, may eventually go for reversal techniques at some stage in their lives. ^{4,5} The very first vasovasostomy was carried out by O'Connor and Quinby in 1915, and since then the surgery has continued to gain popularity. The success of various techniques is reported, including simple Loupe Assisted using Prolene Stent and Multilayer microsurgery. ⁶

• Gross Anatomy

The relevant gross anatomy which is important to consider during almost all types of vasovasostomy includes the epididymis, testis and vas deferens. ¹⁴ Spermatogenesis (development of sperms) begins in the seminiferous tubules. Sperm, from these tubules, travel to the rete testis and then via ductus efferentes it enters into the

epididymis. Sperms are then transported through the straight portion caput, corpus and cauda of the epididymis to the vas deferens, which is the convoluted portion of vas deferens. In the epididymis portion, sperms gain its motility and maturity. Finally, sperms are carried to the ejaculatory ducts where prostatic and seminal fluids are mixed with them and gets ready to be transported out of the body. ¹⁵

The epididymal artery and deferential artery, later of which belongs to a group of internal iliac artery originating from aorta, supplies blood to the vas deferens. It is extremely important for the surgeons to remember this blood supply while carrying out any surgery in these areas. ¹³ To the testis, blood flow has its origins in deferential (internal iliac), testicular (aorta) and cremasteric arteries (hypogastric ones). If any obstruction of blood supply occurs in patients during inguinal surgery, then it can cause testicular atrophy. ¹²

Histologically, the vas deferens has three particular layers. The innermost layer consists of pseudostratified columnar cells that are ciliated in nature present over basal cell layers and surrounds the lumen. The second layer is muscular and is comprised of inner and outer longitudinal layer with the circular middle cell layer. Finally, the outermost layer is vassal sheath that encapsulates the vas and here vassal arteries and veins can be found. ¹¹

Modus Operandi

The study was carried out in the hospital of Bahawalpur. Written consent and permission was taken from the Ethics Committee of the Hospital and from the patients as well. Total of 74 patients were included in the study and they were thoroughly told about the details of this study.

- **Pre-operative Evaluation**

Before starting the surgery a complete history of patient along with their physical examination was carried out. Past operation details were carefully examined before adding patients in the list of our study, family history, symptoms of any infections and hypogonadism were also included. Additionally, age of the patient and their partner, prior inguinal or scrotal surgery, and time since vasectomy was also added to the chart.

A thorough reproductive history, with the partner and any prior pregnancies were also recorded, because it is demonstrated that vasectomy reversal leads to better results when the fertility history of the patient and partner is well known.⁷

- **Anesthesia**

The Loupe Assisted surgery and Three Layer Microsurgery, both were performed under general anesthesia. This anesthesia provided a favorable environment for the surgeons to promptly carry out the surgery and especially when they encountered complications.

Regional anesthesia, as spinal or epidural one, is only used when long acting agents are present. Local anesthesia is given only when patients are cooperative, have no anxiety and have short interval to reversal and easily perceptible vassal ends, otherwise this anesthesia will make the successful surgery more complicated and challenging.^{8,9}

- **Incision**

In both the surgery techniques, patients were placed in supine position with proper padding around them. Prior to incision, all the markings were made carefully to avoid any issues. In a few cases, bilateral vertical scrotal incisions were made. The incisions were made in such a precise way to gain maximum access for vasectomy reversal. Some area was left marked during surgery, so that deep cut can be made there if required to gain access to an external ring. The incision which was made by the surgeons, allowed easy access to walls of vas and epididymis.

- **Preparation of Vas**

After the incision was made, vas was prepared to attain adequate length of vassal for tension free surgery. Keen care was taken to maintain the blood supply otherwise it would have complicated the situation. Then surgeons

identified the site of previous vasectomy and they tested the mobilization of vas towards testis as well as towards the inguinal external ring. Stripping of the outer vassal sheath was carefully avoided, otherwise it had prevented the blood supply.¹⁰

- **Three Layer Microsurgical Operative Technique**

Three layered microsurgery was carried out on 36 patients out of 74. The first mucosal layer was placed with 10- 0 monofilament suture. Double armed suture wasn't used because it can prevent the back movement of vas lumen. Then the second muscularis layer was placed with 9- 0 monofilament suture. Extreme care was taken in this layer placement because a tiny mistake could close off the lumen. In the third layer (adventitial layer), watertight placement was done with 9- 0 monofilament sutures. At the end, vassal sheath was arranged with approximately six 9- 0 nylons and 7- 0 Prolene sutures to reduce tension on the anastomosis to as low level as possible.

- **Loupe Assisted Operative Technique**

38 out of 74 patients went through Loupe assisted surgery. For this, a 2cm vertical incision in the midline was made. With the help of 2 vas clamps, the vas was held above and below of the obstruction area. The grasp of vas was made in such a manner that it was mobilized enough to aid tension free anastomosis. At the testicular end site of the vas, a cut very close to the granuloma was made and tagging suture was done here. Semen was taken from the cut surface to carry out some laboratory tests. Then, another suture was placed at the cut of abdominal site of the vas. In order to reduce any intraluminal exposure of suture material in the vas, four anastomoses were carried out by suturing all the layers of vas, including vassal mucosa margins as well.

Then a nylon suture of 6- 0 was used to carry out anastomosis. The needle was carefully passed outside and inside of the testicular vas and then inside and outside of the abdominal walls of the vas to tighten the suture and prevent any leakage. Just under 1 cm of the first incision, another incision of 0.5 cm was made along the median raphe. Then 2 nylon sutures were passed through this second incision to tie them up tightly. Nylon 3- 0 was used to do skin suture and two nylon 9-0 muscularis sutures were used to ensure water tight anastomosis.

Outcomes

The mean age of 36 patients was 35.9 5.2 years in group A (Three Layer Microsurgical group), and mean age of 38 patients in group B (Loupe Assisted) was 36.4 4.4 years. The mean age of wives of patients from group A was 32.4 4.1 years and 33.6 4.3 years in group B. The time period from vasectomy to vasectomy reversal was between 1 to

16 years with mean 6.1 years in group A, and it was from 1 to 14 years with a mean time of 4.9 years in group B.

The most common reason of vasectomy reversal was found as divorce rate and marriage. No significant differences was found in factors that affected time period of vasectomy reversal, ejaculation of sperm, character of vassal fluid, presence of sperm granuloma and vassal dilation degree.

Mean operation time in group A was 90 to 150 minutes with an average of 110 minutes and 82 minutes were a mean average time of group B. Men who succeeded in gaining vasal potency, went through semen analysis. This was performed after 6 months of surgery. The results showed a sperm concentration of 21.5 million/ ml and 18 million/ ml, and sperm motility rate at 33% and 26% in group A and B, respectively.

Patency rates were 95% in group A and 50% in group B. Pregnancy rates in group A was 41% and 29% in group B. One patient from group A and 3 from group B didn't have motile sperm when post-operation semen tests were carried out. Moreover, four patients from group B, who initially showed sperm motility in their semen analysis, lost it in the follow-up semen analysis.

Operation related no complications or infections like hematoma was observed.

Statistical Representation

Measurements	Three Layer Microsurgical vasovasostomy	Layer Loupe Assisted vasovasostomy
Mean operation time	110 minutes	82 minutes
Sperm concentration	22.5 million/ ml	18 million/ ml
Sperm motility	33%	26%
Patency rate	95%	50%
Pregnancy rate	41%	29%

Conclusion

The three layer microsurgery had a higher number of stitches, which provided perfect seal of internal vas deferens layers which ultimately prevents leakage and consequences of granuloma development. In addition, the stitches in third layer were of fine size and length with prevented tension of the anastomosis internal layers, where a liquid tight seal was secured.

The Loupe Assisted technique was less time consuming and comparatively easy to carry out. But the surgeons faced some complication and figured out that some sutures were unnecessary to provide support to anastomosis for muscle

alignment. Moreover, this technique was with less positive outcomes.

In the nutshell, microscopic technique provided higher patency and pregnancy rates by reducing the chances of post- operation vassal stricture, as compared to Loupe Assisted technique. The former seems to be a standard and fine method for vasectomy reversal.

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