

Recanalisation of Vas—A Technique

R. N. Sharma, M.S., F.R.C.S.

Professor of Plastic Surgery

Unit of Plastic Surgery K. G. Medical College, Lucknow, India

Ramesh Chandra, M.S., M.S.

Lecturer

I. INTRODUCTION

THE intensive family counselling programme besides checking the growth of the population by various means at its command and motivating people to accept the whole programme in principle, is now likely to face public criticism from those who need recanalisation for one reason or another. Severe critics are those who have been sterilised during the campaign, and are now facing a variety of Post-vasectomy problems. The nature of these problems in the majority of cases is complex. Couples have come to us blaming male sterilisation for their socio-economic, psychological, behavioral, mental and sexual problems. Interestingly enough they believe that the solution of all their problems lies in recanalisation which only can bring back happiness in their families that they enjoyed earlier. In certain instances the need of recanalisation may become genuine.

One should not therefore underestimate these operative procedures which no doubt are minor but carry great significance. A badly sterilised case on the one hand and a failed recanalisation on the other are bound to advertise against our programmes, that may come to disrepute very soon. Therefore we should have a method of sterilisation which is fool proof and a

method of recanalisation which is more or less hundred percent successful. With this object in view we have done some rethinking in retrospect based on the clinical experience that we have gained from the material presented to us.

II. Historical

Bandenheuer (1886) did the first operation on the vas and the testicle. From the available literature it appeared that Martin (1902) was the first to describe an operation in a case of post gonococcal sterility in which he did laterolateral anastomosis using silver wire sutures. Watson & Cunningham (1908) described Termino-Terminal anastomosis for similar patients. They amputated the epididymis at its lower end. After a partial epididymectomy a tunnel was cored out of the proximal cut end. In this tunnel the proximal patient end of the vas was fitted in by using stainless steel or silver wire sutures.

Mckenna (1915) thought of an improvement on Martin's procedure which he designated as "A short-circuit of the vas deferens". This procedure was advocated in post gonococcal obstruction anywhere between the tail of the epididymis and the vas deferens upto the external ring. The vas and the epididymis were widely exposed through an oblique incision. Having

ascertained the patency of the vas proximal to the globus minor he then made a vertical slit in the vas nearly a centimeter in length. A silk worm gut suture was drawn through an incision into the globus major and was brought out of the lumen of the vas 5 cm. proximal to the vertical slit. It was again taken through the globus major and brought out below the incision in it. Latero-lateral anastomosis was performed with interrupted chromic catgut stitches.

Direct vas-epididymostomy was suggested by Lespinasse (1918) by isolating a single tubule in the epididymis just above the obstruction through which he could express motile spermatozoa freely. With a five zero silk suture this tubule was probed into the vas two to four millimeter in its lumen and the silk suture was taken out of the the vas to transfix the tubule in its lumen. The vas was fixed to the capsule of the epididymis with interrupted sutures in order to avoid traction.

O'Connor's (1919) interest was roused in this work while working with Dr. William C. Quinsby, the urologist at the Peter Bent Brigham hospital in Boston. Dr. Francis Hagner of Washington D C. demonstrated a procedure of anastomosis. After this Quinsby operated on several patients of gonococcal obstruction with success. In his series O'Connor has described cross anastomosis of vas also in five patients. One of these had earlier bilateral ligation of vas for sterility and the other had traumatic destruction of testis on one side. The healthy vas was joined to the opposite epididymis as end-to-side proce-

dure and a splint was left through its lumen and the site of anastomosis that was removed after 7 to 10 days. In patients where normal ejaculate was not possible i.e. in the paraplegics or resection of prostate he described the formation of a marsupial pouch (inverted skin pouch) in the scrotum in which the vas was allowed to open, thus making artificial insemination possible from the collected material.

Humphery & Hotchkiss (1939) reviewed literature and reported a technique of vaso-epididymal anastomosis using silk. Michelson (1946) reported that he used stainless steel wire in the fenestra of his vaso-epididymal anostomosis to further the development of a permanent fistula. The wire were brought out through the scrotum and held in place by a shot on either end.

In the absence of an effective contraceptive, Phadke (1961) advocated vasectomy in males as the immediate answer to reduce the birth rate in our country. This he advocated to be done on a mass scale. Results of vasectomy are very gratifying, when properly performed. It is 100 percent successful as a permanent contraceptive measure. Certain contingencies necessitate its recorection, which is possible in a large majority of cases. He performed vaso-vasal and vaso-epididymal anastomosis using an intact hypodermic injection needle for insertion of splint (one side only) and used 5/0 silk for anastomosis. He further said "if the medical profession realises that vasectomy can be corrected, it will encourage more males to come forward for sterilization operation.

This correction can be undertaken even years after vasectomy. Results of operation on 17 patients were mentioned of whom 14 (88 percent) had become positive, i.e. they had sperms in their semen after reanastomosis and 9 of them had impregnated their wives.

During Phadke's time many techniques were developed for vas-anastomosis. There was some controversy as to whether or not a splint should be used. Many types of splints were reported and among these are, stainless steel, tantalum wire, nylon, horse-hair and other. One main objection to the use of splint is trauma to the vas and epididymis. Waller and Turner, Halstead and Kansas (1962) have always used a 4F and smaller ureteral catheters as a splint, while Schmid's (1961) used a polythene tube. It seemed logical that a ureteral catheter was safe to use because it is less traumatic than a splint made of more rigid materials. Ureteral catheter also has a lumen for drainage. In addition one might inject dye into the vas before its removal to see the patency of anastomosis.

III. Vaso-Vasal Anastomosis—The Present Technique

Our (Authors) interest in the work on recanalisation of vas was initiated in Nov. 1966 when we were asked to undertake treatment of male sterility as a part of the family counselling programme.

1. Indications and Contraindications :

This operation is usually indicated after vasectomy in such people who have lost their children for one reason or another and want to have them again. If unfortunately the male children die in vases-

ctomised couples, then the desire to have the male child again forces them to come for recanalisation. Diseases known to produce block in the epididymis might result in primary or secondary sterility, and thus form an indication for recanalisation or bypass operations on the vas.

2. Special Instruments Required:

1. B. P. Handle with blades No. 15
2. Fine toothed and Non-toothed forceps each.
3. Mosquito artery forceps (Straight and Curved) 6
4. Spencerwell artery forceps 6" 4
5. Kilner hooks 2
6. Curved or flat (Kilner's) scissors 5½" 1
7. Curved scissor (Blunt) 5½" 1
8. Fine sharp pointed straight eye scissors 5½" 1
9. Stitch cutting scissors, 1
10. Langenbeck single and double ended retractors.
11. Nylon (Black) No. 1 thickness, or silk worm gut.
12. Nylon (Black) No. 7/0 finest preferable on a atraumatic needle.
13. Glass beads and lead shots and short compressor.
14. Shaft of No. 1 needle.
15. Methylene Blue (1—2 cc)—2%
16. No. 1 polythene tube (about 2)
17. Asepto-syringe.

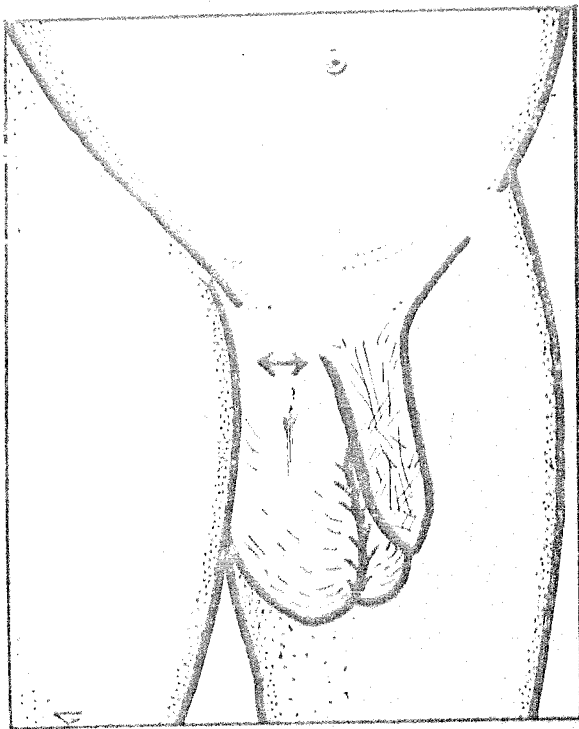
3. Anaesthesia and Position of the Patient

Patient lies supine on the table with the lower limbs together. Inhalation anaesthesia is preferable but local anaesthesia can also be used. About 5 cc of 2% lignocaine with 0.3 cc of 1 in 1000 adrenaline is infiltrated along the line of incision and in

its depth.

4. Operative Details (Figs. 1-6)

The spermatic cord is firmly gripped between the left forefinger and thumb to steady the vas either by the surgeon or the assistant at the site of the previous scar. A 3 cm. long transverse elliptical incision enclosing the previous scar is made in the scrotal skin. It is depend to dissect out the two cut ends of the vas. The tissue spaces on either side of the vas are cleared by inserting curved artery forceps and



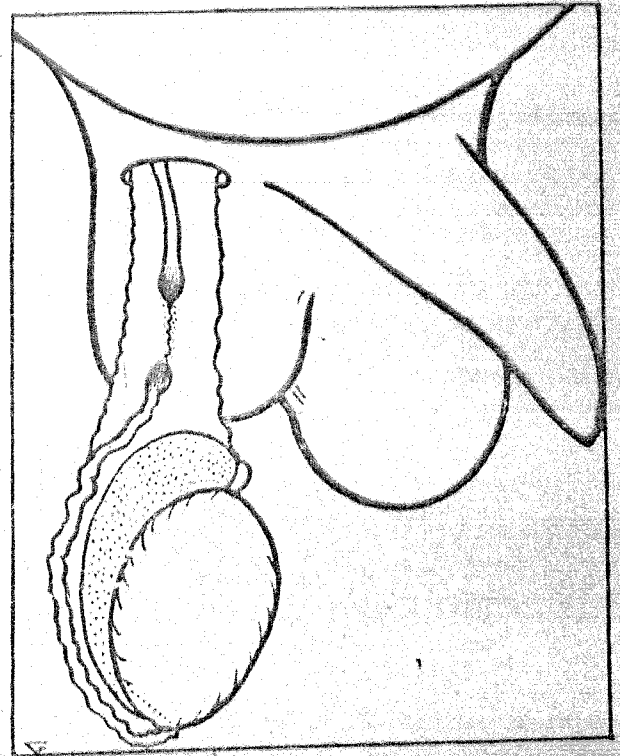
SITE OF INCISION .

FIG. 1

opening them in a direction parallel to the vas.

Cases who come for vas-anastomosis following vasectomy have an intervening

area of fibrous tissue connecting the two cut ends of the vas. The length of this area varies from 1" to 2". The bulbous cut ends (Fig. 2) of the vas feel very firm because of fibrosis following vasectomy. Proximal portion of the vas extending upto the tail of the epididymis and its distal part



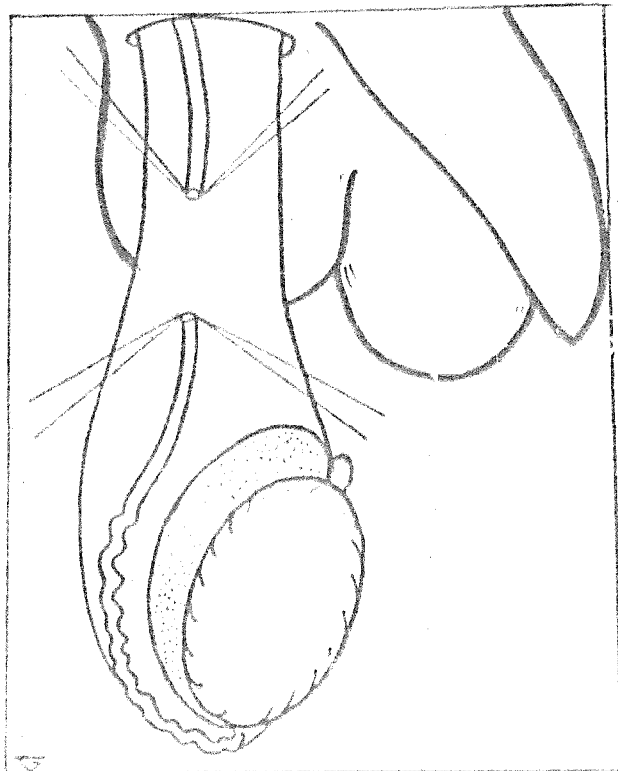
EXPOSURE

FIG. 2

extending upto the external inguinal ring are felt through the cord for any evidence of nodularity. Since the blood supply to the vas is segmental like that of the ureter. Hence care should be taken and it should not be denuded of its adventitia excepting at the site of anastomosis. The adventitia is slit in continuity through which the cut ends are taken out just enough for the

purposes of anastomosis. N.B: (The figures however show that the cord and testes has been delivered out of the incision for clarity of illustration.)

The intervening fibrous part of the vas is excised (Fig. 3). The two ends of the vas are serially sectioned obliquely by a



RESECTION OF VAS.

Fig. 3

sharp knife till the lumen is clearly seen or the spermatic fluid starts coming out from the proximal cut end. The fluid is examined by smearing it on to a slide for the morphological characteristics of the sperms under low magnification whenever possible:

Test of the Patency of the vas :

It always can be demonstrated in the beginning that coming out from the proximal

cut end, it in itself is enough indication of the patency of the proximal passage. If no spermatic fluid comes out, No. 1 polythene tube can be passed down its lumen upto the tail of the epididymis freely in the absence of a block. For testing the patency of the distal passage, the No. 1 polythene tube is guided through it and its other end is mounted on a hypodermic needle which facilitates injection of methylene blue through it. The dye is seen in the posterior urethra either by a urethroscope or the urethra is washed with 25-50 cc. of sterile water by an aseptic syringe. If the colour of the washing is blue, the patency of the vas upto its opening in the posterior urethra is confirmed.

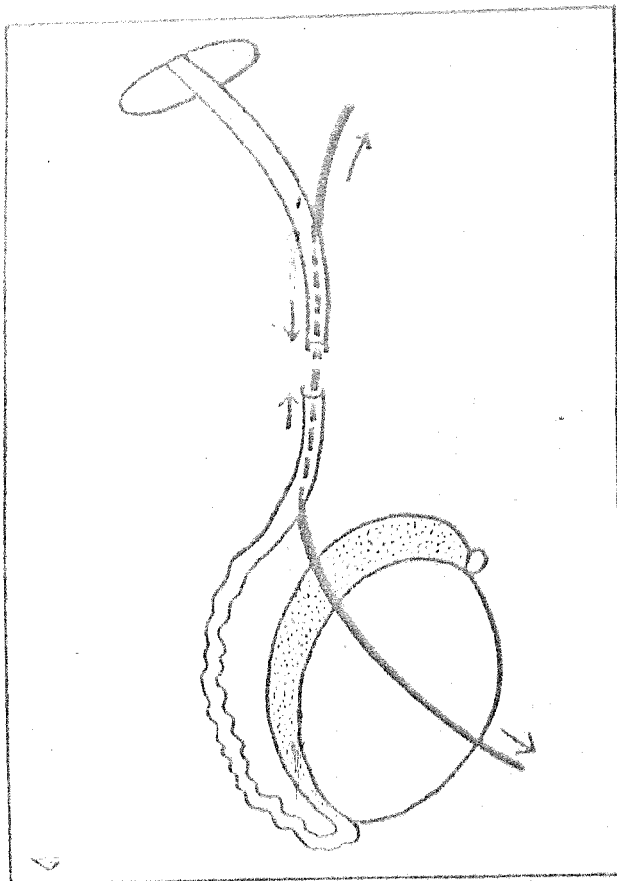
6. Insertion of the Internal Nylon Splint (our Technique).

The shaft (only) of a No. 1 needle is used for insertion of the nylon splint. This can very easily be prepared by bending the shaft to and fro at its nozzle end and thus detaching it away from the nozzle. The bevelled edge is passed through the lumen of the proximal cut end of the vas and is brought out of it after it has travelled a distance of 2 cm. from the cut end by piercing its wall. The black nylon No. 1 splint is then threaded through the bevelled edge of the needle and is guided so that it may come out through the other end. The shaft of the needle is then withdrawn back.

The needle is now put in through the distal cut end of the vas in a similar manner. The end of nylon coming out of the proximal cut end of the vas is now guided through the blunt end of the needle that has been put into the distal cut

end of the vas and is made to emerge out through the rolled edge. By an artery forcep the part of the needle is held near its bevelled edge and traction is applied thus drawing the needle from vas. This is how we put in our internal nylon splint in the vas producing negligible or minimal trauma to the lumen of the vas. This we think is the secret of success of our technique.

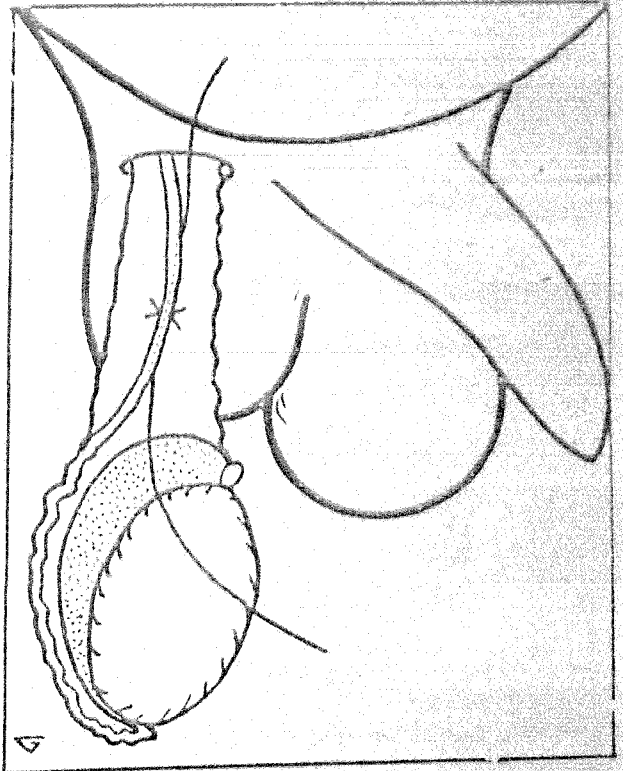
The two cut ends of the vas are slid together towards each other on the nylon splint maintaining the stay sutures together (Fig. 4). Insert Black nylon No. 6 or 7/0 on an



INTERNAL SPLINT IN BOTH SEGMENTS

Fig. 4

atraumatic cutting curved needle as used for anastomosis. Three interrupted sutures are applied at 12, 4 and 8 O'clock positions. One of them is taken through all the coats



VAS ANASTOMOSIS

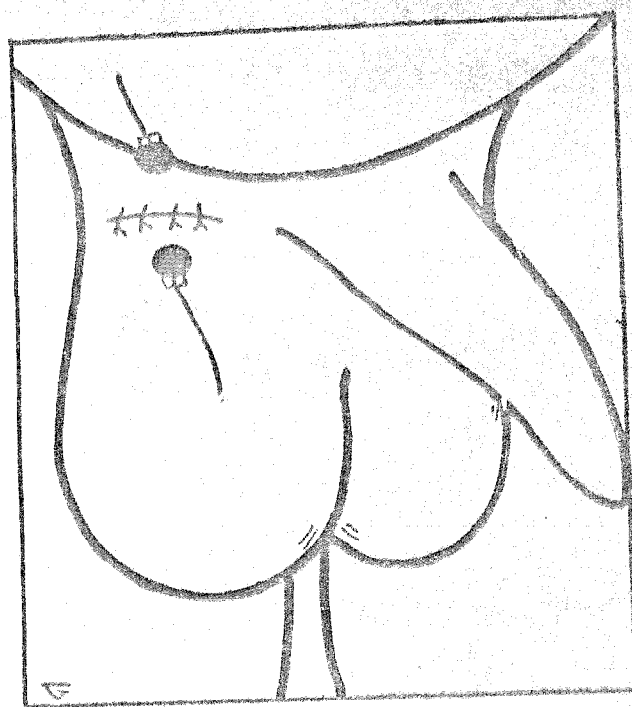
Fig. 5

The stay sutures are now removed and the other two interrupted stiches are passed through the adventitia of the vas for better approximation (Fig. 5). Perfect haemostasis is now ensured in the operated area.

7. Closure :

The ends of the nylon splint are now threaded on an ordinary curved cutting needle and are brought out through the various layers of scrotum and the skin 1" away from the edge of the original transverse elliptical incision. The subcutaneous layer

rs are stitched now by interrupted plain catgut stitches while the skin closure is done by nylon or cotton sutures. A glass bead and over it a lead shot each mounted over the nylon splint at its either end so that they may lie against the scrotal skin. The lead bead on one side first is pressed by a strong artery forcep so as to clamp the nylon at that point. The nylon splint coming out through the other ends is now held under slight tension and the glass bead of this side is slid against the scrotal skin by the hand. The lead shot is compressed just behind the glass bead so as to clamp the nylon at that very point (Fig. 6).



BEADS IN POSITION

Fig. 6

The very idea of keeping the intrascrotal part of the splint under slight tension is to relax the site of the anastomosis.

This is brought about by the two ends of the vas sliding towards each other on an internal splint which is kept under very mild tension by external fixation by lead beads against the scrotal skin. However, it has to be ensured that this nylon should not be pulled tight or made short lest it may tear the vas vertically from its site of entry towards the site of exit.

The same procedure is repeated on the opposite side. Sterile dressings and a suspensory bandage is given at the end of the operation.

8. Post-operative Care and Complications:

The skin stitches are removed on the 5th or 7th day and the patient is discharged if union is satisfactory. The nylon splint is removed after 3 weeks of the operation and the patient is advised continued use of the suspensory bandage for another month. He should abstain from sexual intercourse till the nylon splint remains and preferably till repeated fortnightly semen examinations confirm the presence of spermatozoa.

The possible complications are haematoma formation and infection. Both of them are preventable provided adequate care is taken during the procedure.

9. Observations and Results :

The break up of cases attending our out-patients for male sterility are given in the table below.

Table

Total No. of cases (Male Sterility)	130
Primary Sterility	69
Secondary Sterility	57
No. of Cases waiting for vas anastomosis	36
Recanalisations done (V/V)	25

Recanalizations done (V/E) 4
 Post Vasectomy Testicular atrophy 5/25

Till now we have operated upon 25 cases of vasectomy. But out of this the last 21 were operated upon by the technique mentioned above. In the earlier 4 cases, the internal splint was put in with the help of a No. 1 needle on one side and ordinary curved round bodied needle was used for the other end. The curved needle which we evidently did not like may have been responsible for the secondary blockage in all these 4 cases within a period of 3-6 months as was evident by the repeated semen examinations. In case if an ordinary round bodied needle is to be used then the thick nylon splint has to be doubled since it passes through its eye. This end may be responsible for greater trauma to the vas. All these cases are under our review and are awaiting revision of anastomosis by our new technique.

Out of the last 21 operated upon by the new technique, all have their passages patent. The first case being over 2 years now. All of them have been allowed sexual intercourse one of them has reported of the occurrence of pregnancy in his wife (7 months). In 3 of the earlier cases only non-motile sperms of abnormal shapes and size were seen in the post-operative seminograms and one of them became oligozoospermic after a period of 1½ months. This made us suspicious of the functions of their testis and in one of them we did a testicular biopsy, which to our surprise showed the presence of testicular atrophy. There after testicular biopsy is routinely done now. And out of 21 biop-

sies done in later cases five showed testicular atrophy.

The finding of testicular atrophy in about 25% vasectomised cases can be due to damage to the testicular artery or else be an affect of vasectomy as such producing disuse or auto-pressure atrophy. The answer to this problem can only be worked out if one carries out extensive experimental trials in animals. With this object in view we are on the look out for an opportunity to undertake this project.

10. Problems Encountered During Vas Anastomosis :

The following problems were encountered in the cases that came under our observation.

(i) *Vasectomy done very close to the level of the upper pole of testes.* In these cases it is little difficult to put the internal splint in the proximal vas because of the natural convolutions present in it.

(ii) *Loss of Length of Vas :-* All these cases required mobilisation of the vas and even inversion (upside down) of testis in two cases, to bridge the gap. The loss of length results because of the method of vasectomy in vogue. About one and a half centimeter of its length is excised and discarded. Secondly the two cut ends retract away from each other.

(iii) *Intervening area of fibrous tissue and extensive fibrosis of the two cut ends of vas.* This probably results due to poor haemostasis during the operation with or without superadded infection.

(iv) Testicular Atrophy

Either due to damage to the testicular

artery or because of autoperfusion atrophy remains to be studied.

In view of all these an ideal situation for vas anastomosis is one where the cut ends of the vas are easily approachable, where they lie very close to each other, there is minimal loss of length of vas, not much of fibrous tissue and lastly where the testicular function is normal. In retrospect therefore we recommend a method of doing vasectomy which provides an ideal situation for vas—anastomosis if required later and at the same time provides sterilization with surety.

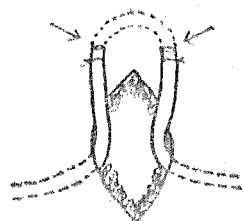
IV. Technique of Vasectomy:

This operation is performed under local anaesthesia. The anaesthetic of choice is 2% Xylocaine. The site of election is 2 to 3 cm. below the public tubercle, because of the easy approachability of the vas. Further at this site there are no corrugations of the skin, the structures are easily discernible, haemostasis is more sure, and the internal splint can be easily applied if recanalisation is required at some later date. The vas deferens of one side first is defined and

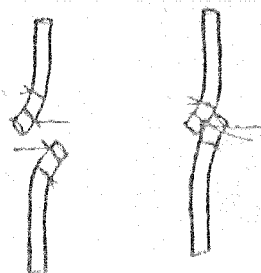
isolated by finger palpation and the assistant holds it firmly between the index finger and thumb of both the hands. Local anaesthesia is now infiltrated around the planned transverse incision. After the skin incision the layers are cut in succession till the vas is isolated and hooked over a fine curved artery forcep. A length of about 3 cm. of vas is dissected away from the adjacent tissues and vessels. It is crushed at two points 1/2 to 3/4 cm. apart. At each point a ligature is tied and the vas is divided in between. One more ligature is applied to the cut ends on each side to ensure double safety. The stumps are overlapped as shown and their sides are anchored with a non-absorbable material (Silk or nylon preferably black in color). Perfect haemostasis is ensured. The method is fool proof, free from complication and provides ideal conditions for the reunion if required later (Fig. 7).

In conclusion one can say that the workers in family planning should not permanently incapacitate an individual who wants to space and limit the size of his

VASECTOMY



IN VOGUE
(PHADKE)



MODIFICATION
(AUTHORS)

Fig. 7

family and comes for advice to them. They have got to know the details of the procedure they are practising before they venture to sterilise an individual. At the same time they must keep their minds open for accepting any modifications in the technique that offers better results. Ours is a technique which has been recently develop-

ed and practiced by us in a small group of patients, but it has given consistently good results. Hence we feel it deserves wide publicity. We are sure that if we stick to the details of the procedure that has been recommended, we can popularise vasectomy as a method of sterilisation without any stigma attached to it.

REFERENCES

1. Brewer, H. : Reversibility following sterilisation by vasectomy. *J. Family welfare*, 11:1, 1964.
2. Hagner, F. R. : Operative treatment of sterility in male. *J.A.M.A.*, 107:1851, 1936.
3. Hotchkiss, R. S. : Fertility in men. J. B. Philadelphia, 1944.
4. Hotchkiss, R. S. : Etiology, and diagnosis in the treatment of infertility in men. Springfield, Ill., Charles, C. Thomas, 1952.
5. Michelson, L. : Vaso-epididymal ductal obstruction. *J. Urology.*, 57:512, 1947.
6. Michelson, L., Michelson, R. : Fertility studies of the male in barren marriages. *J.A.M.A.* 134 : 941—944, 1947.
7. Muffman, W.L. : Reanastomosis of vas deferens. *J. Urol.*, 60:643—644, 1948.
8. O'Connor, V. J. : Anastomosis of vas deferens after purposeful division of sterility : *J.A.M.A.*, 136 : 162, 1948.
9. O'Connor, V.J. : Mechanical aspects and surgical management of sterility in men. *J. A. M.A.*, 153:532—534, 1953.
10. O'Connor, V. J. : Surgical correction of male sterility. *Surg. Gynec. and Obstet.*, 110 : 649, 1960.
11. Phadke, G. M. : Vasectomy sterilisation in male : *J. Indian Medical Assoc.* 36:386, 1961.
12. Phadke, G. M. : Reanastomosis of vas deferens, *J. Indian. Med. Assoc.* : 37:241, 1961.
13. Rock, J. : Investigations and treatment of infertility., *M.C.N.A.*, 1171—1193, 1948.
14. Tyler, E.T. and Payne, S. : Spermatogenesis and the treatment of infertility., *J.A.M.A.* 134 : 770—774, 1947.
15. Tyler, E.T. : Use and misuse of Endocrine therapy in sterility., *J.A.M.A.*, 139 : 560—564, 1949.
16. Waller, J.L., Turner, T.A. : Anastomosis of vas after vasectomy. *J. Urology.*, 88 : 409, 1962.