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LETTER TO THE EDITOR

Operational Andrology

Vasal vessels preserving microsurgical vasoepididymostomy in cases of previous varicocelectomy: a case report and literature review

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Dear Editor,

Vasoepididymostomy plays an important role in treating epididymal obstructive azoospermia¹ and this procedure is becoming more popular in the developing countries.² However, we believe its effectiveness and safety should also be considered. Varicocelectomy is very common in treating male infertility due to palpable varicocele and decreased semen quality, as well as reducing testicular pain.³ Therefore the question remains is whether simultaneous/asynchronous microsurgery of vasoepididymostomy and varicocele ligation safe? During vasoepididymostomy, the vasal vessels are routinely ligated to facilitate anastomosis,⁴ and surgical varicocele repair will change the blood supply and the venous return of testis. Because the integrity of vasal vasculature plays a vital role in postvaricocelectomy blood supply and the venous return of testis,⁵ how to resolve this predicament is therefore crucial in restoring the normal function and homeostasis of testis. We report here one case of vasal vessels preserving microsurgical two-suture intussusception vasoepididymostomy, in a patient who had varicocelectomy previously.

In May 2014, a 25-year-old Chinese male was admitted into our hospital for azoospermia. He came to our hospital in May, 2012 for infertility after 1-year marriage, the history of seminal tract infection 5 years ago was reported. His wife had no infertility factors. The semen analysis indicated that no sperm was detected, although the volume was at 2.5 ml, and scrotal ultrasound evaluation demonstrated bilateral varicoceles and epididymal tubular ectasia, while the testis were normal. Transrectal ultrasound (TRUS) evaluation found normal terminal vas deferens, seminal vesicles, ejaculatory ducts and prostate. The patient refused the recommendation of vasoepididymostomy. In July 2013 he received bilateral traditional inguinal varicocelectomy in his local hospital because of scrotal pain. In May 2014, he comes back to our hospital for the treatment of azoospermia. Ultrasound evaluation shows the similar results to that 2 years ago except the varicocele was cured, sex hormones are all in the normal range.

We discussed with the patient and his wife regarding the alternative procedure of Intracytoplasmic Sperm Injection (ICSI) that may be of help to treat his infertility, and the need to preserve vasal vessels during

vasoepididymostomy, should they elect to receive this procedure. He also required an intraoperative testicular biopsy if it was needed but he refused a biopsy before operation because afraid of the scrotal local anesthesia. The procedure was approved by the Ethics Committee of our hospital, and the informed consent was obtained from the patient.

The procedure was performed under a Zeiss operating microscope (Carl Zeiss, Berlin, German) with 4–21 magnification with modification,^{6,7} and will be described in detail in the following steps: (1) the right testis was delivered through a 3 cm vertical scrotal incision, and the vas was exposed at the junction of the straight and convoluted portions; (2) the vas deferens was subsequently hemi-transected, by cannulating the abdominal end of the vas with a 24-gauge angiocatheter sheath, which patency was confirmed by injecting diluted methylene blue of distal part of vas; (3) the vasal vessels was then carefully isolated for 2–3 cm and preserved, 2 vertical little branches of vas artery supplying vas were ligated (**Figure 1**), and the vas was then completely transected and its proximal part to the epididymis ligated; (4) the epididymis was inspected under the microscope with 4–8 magnification, and a 5 mm buttonhole was made in the cauda epididymidis tunica and one dilated tubule was selected; (5) the vas deferens was drawn through an opening in the tunica vaginalis, the vas was then secured with 2 interrupted 9-0 microsutures on the edge of epididymal tunica opening in proximity to the anastomotic site; (6) according to intraoperative configuration between epididymal tubule and vas deference, the needles of two double-armed 10-0 microsutures are placed transversely on the selected epididymal tubule (**Figure 2a**), and the needles were left in epididymal tubule before the incision was made to avoid the collapse; (7) then a 15° ophthalmic knife was used to incise the tubule transversely between the two needles of the sutures (**Figure 2b**), the epididymal fluid was aspirated with a 24-gauge angiocatheter connected to a 5 ml syringe. The fluid was examined under light microscopy by the surgeon intraoperatively and many motile sperm were founded; (8) then sutures were placed sequentially in inside-out fashion to achieve 4-point anastomosis (**Figure 2c** and **2d**). Fortunately, the anastomosis was tension free. Similar procedures were performed in the left side, and the anastomosis was also transversed two-suture intussusception vasoepididymostomy at site of cauda epididymidis. Data collected included follow-up time, semen analysis, spouse's pregnancy rate and the testicular volume.

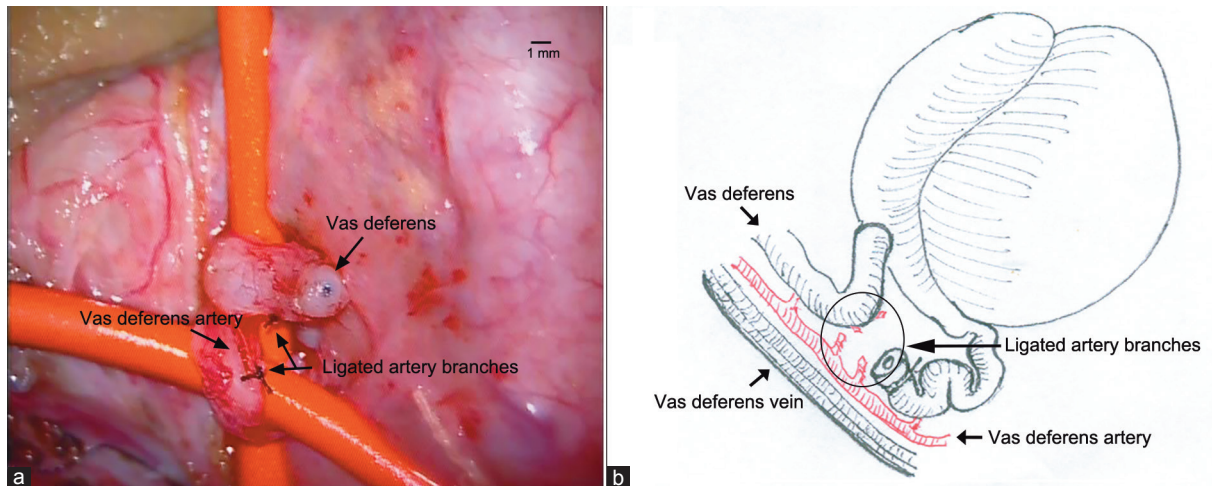


Figure 1: Vertical little branch of vas artery supplying to vas were ligated. (a) The vertical little branch of vas artery supplying to vas were ligated and main artery was preserved, the vas veins had already preserved and isolated under the penrose. (b) Pattern of vas artery preservation.

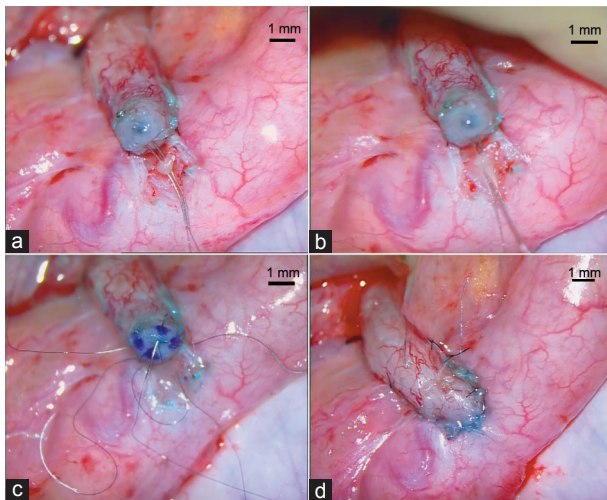


Figure 2: Two-suture transverse vasoepididymostomy. (a) Two double-armed sutures were placed in perpendicular fashion. (b) Incised the tubule transversely with ophthalmic knife. (c) Sutures were placed sequentially in inside-out fashion to achieve 4-point anastomosis. (d) Complete anastomosis.

In the 3-month follow-up, postoperative ultrasonography evaluation revealed that there was no postoperative hydrocele formation and no testicular atrophy, and the extent of epididymal tubular ectasia was decreased. The semen analysis showed that semen density was $1.0 \text{ million ml}^{-1}$ (semen volume 2.6 ml) without forward motile sperm. In 9 months, sperm count increased to $15.7 \text{ million ml}^{-1}$ (semen volume 2.0 ml).

Even with the help of microscope, the incidence of accidental testicular artery ligation in microsurgical varicocelectomy was approximately 1%.⁸ Nonmicrosurgical varicocelectomy often ligated more spermatic artery or arteries than microsurgical approach,⁹ at this situation, just like this patient, the most important artery supply of testis maybe the deferential artery. In the case of that internal spermatic artery has been inadvertently ligated in varicocelectomy, the intraoperative ligating of the deferential artery may cause testicular atrophy, as recently reported by Goldstein¹⁰ that in 19 patients who underwent simultaneous vasoovasostomy and varicocelectomy, a significantly higher rate of varicocele recurrence and testicular atrophy.

When ligating the internal spermatic and cremasteric veins, venous return after varicocelectomy is affected by deferential and scrotal veins, or, when gubernacular veins are ligated, by deferential veins only.⁵ After ligating the internal spermatic vein and cremasteric veins in varicocelectomy procedure, vasal vein ligation in vasoepididymostomy procedure will cause inadequate venous return.

We used the two-suture transverse vasoepididymostomy bilaterally in this patient but not the most popular and most commonly used longitudinal technique by us. This is because that the coincidence that the orientation of selected epididymal tubules were perpendicular to the vas deferens, transverse procedure can make the suture tying under direct vision.⁶

Of course, an intraoperative Doppler can detect if the main branch of testicular artery was injured by previous varicocele ligation,¹¹ but it is not commonly used in developing countries, and it is difficult to confirm if the venous return was enough in vasoepididymostomy procedure in patients who had previous varicocele repair. The limitation is, if there is embolization, if there is less than total venous ligation such as in nonmicrosurgical varicocelectomy that cremasteric and gubernacular veins maybe intact, performing this procedure routinely in all patients appears not justified. However, as far as we know, during microsurgical varicocelectomy, some surgeons will also ligate the gubernacular veins,³ demonstrating that the vas vein can afford the testis vein return independently postoperation, but no paper has ever demonstrated that the cremasteric veins combined with the gubernacular veins can afford the testis veins drainage, furthermore, gubernacular veins are only found in 71%–79% of varicocele patients.⁵ Our results revealed that the vasal vessels preserving vasoepididymostomy was safe and effective in protecting the testicular artery supply and venous return, especially when the site of anastomosis was corpus or cauda and the tension-free anastomosis is feasible.

AUTHOR CONTRIBUTIONS

YZ were responsible for the concept and framework of the paper. XW, XJY and HZ participated in collecting the clinical data. YZ, XW and XJY were responsible for the artwork. YZ wrote the paper and were responsible for the final editing. BZ supervised the study. All the authors read and approved the final manuscript.

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COMPETING INTERESTS

The authors declare no competing interests.

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