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Microsurgical Anastomosis of Vas Deferens by a Telescopic Technique

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Summary. A telescopic microsurgical anastomosis of the vas deferens was performed on 24 rats. Sequential histological examination demonstrated mucosal healing in 7 days. Healing was complete in 21 days, and tubal patency was confirmed by histology in 100% of the cases.

Key words: Microsurgical recanalization of vas deferens, Histology of vas deferens, Male infertility, Vas deferens healing, Sperm granuloma.

Introduction

There are many reasons for reversal of vasectomy. In the USA, 6 to 10% of vasectomized patients underwent subsequent reanastomosis of the vas deferens [6].

Previously, vasectomy reversal employed a stent of some type [9, 10], but in contemporary practice anastomosis has been made using an operating microscope and without a stent [1, 5, 8, 13].

In spite of the progress that has been achieved in the last ten years by microscopic techniques; results have not been dramatically improved [12].

Histological sections taken at various intervals after anastomosis, indicated that microscopic sperm granulomata hindered the healing process [3].

According to Schmidt [12], fibrosis and sperm granulomata were the primary causes of failure of reanastomosis.

In order to minimize sperm granuloma formation and obstruction, an experimental model was developed.

Materials and Methods

Operations were performed on 24 adult albin rats under ethyl ether anaesthesia using an operating microscope and microsurgical instruments.

The animals were first vasectomized through a midline abdominal incision. Thirty days later, they were submitted to a reversal operation. The scar between the two free cut-ends was removed, with, 2 mm of the length of the adventitial coat and half of the muscular coat of the proximal cut-end (Fig. 1A).

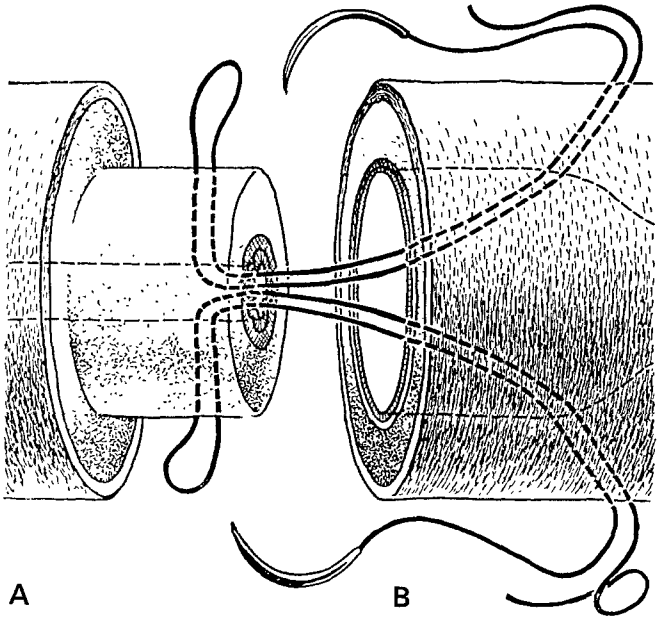

Fig. 1

The distal cut-end was gently dilated with glass dilators with diameters varying from 0.3 to 1.0 mm (Fig. 1B).

Two opposed U-shaped stitches were made, starting from the distal cut-end. Each stitch crossed all the layers of the distal cut-end and penetrated the lumen of the proximal cut-end, crossing both the mucosal layer and the remaining muscular tissue. The U-shaped stitch was completed in a similar manner (Fig. 1A and B).

After the stitches have been completed the threads were pulled and tied. Consequently the proximal cut-end was telescoped into the distal one. The anastomosis was reinforced by four stitches which passed through the adventitial and muscular tunics only (Fig. 2).

The animals were sacrified on the 4th, 7th, 14th and 21st days (groups A, B, C, D) respectively, after the anastomosis of the vas deferens had been performed. In this way both the healing process and the patency of the anastomosis could be studied.

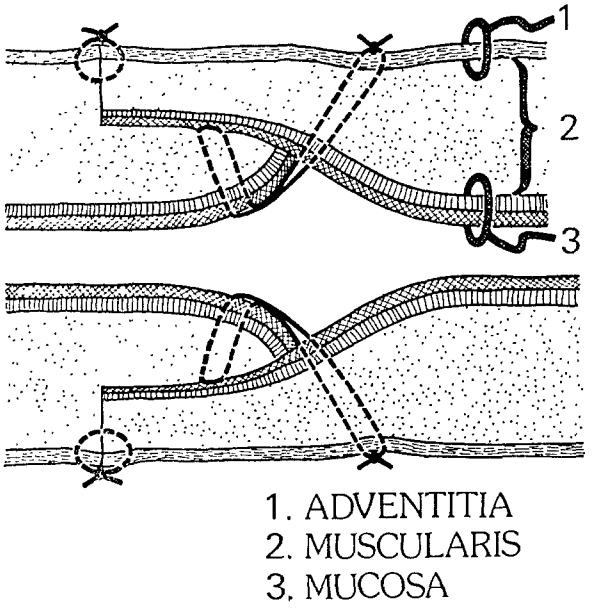

Fig. 2

The segment of each vas containing the anastomosis was maintained in Bouin's fluid for six hours and serial longitudinal histological sections were obtained. The material was analized using optical and electron microscopy.

Results

4th Day. The lining epithelium of the distal cut-end covered the telescoped end disappeared. In the lamina propria and at the rims of both cut-ends lymphocytes, neutrophils, plasma cells, macrophages, mesenchymal cells and neo-capillaries could be seen. Between the cut-ends at all levels, a thin gap was still visible. There was no evidence of granuloma in any case.

7th Day. Either the lamina propria or the lining epithelium were remodelled. At the level of muscular and adventitial layers, fibrous connective tissue was interposed between the cut-ends. There was also a fair number of inflamatory cells, with an increasing number of plasma cells and macrophages. There was one case of granuloma.

14th Day. At the site of the junction of the epithelia of both cut-ends, the lumen was slightly dilated and contained an accumulation of spermatozoa and other cells of desquamation. The scar tissue which was interposed between the cut-ends had a dense fibrous component and a scarty inflamatory infiltrate. There were two cases of granuloma.

21st Day. All tissue layers were integrated. However, the smooth muscle cells were neither hypertrophied nor hyperplastic. Thin fibrous connective tissue was interposed between the muscular layers. The lumen of the vas deferens at the site of the anastomosis was slightly dilated and was continuous. There was no case of granuloma.

Discussion

Many authors have suggested different types of stents to facilitate the anastomosis [3, 7, 9]. Later Schmidt [11] and Waller & Turner [14] defended the use of tubular stents in reversal of vasectomy, to prevent contact with the healing tissue and minimizing sperm leakage and the formation of sperm granuloma at the site of anastomosis. However, the results obtained with stents of all types were not satisfactory [8].

The improvement of optical aids has allowed the identification of the individual layers of the vas deferens and consequently the development of the microsurgical techniques [4].

The introduction of the proximal vas into the distal end by this telescopic technique, may have reduced the contact of the seminal fluid at the site of anastomosis.

The telescopic technique reduced the percentage of sperm granuloma at the site of anastomosis (12.5%) and achieved a 100% patency rate.

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