Unsatisfactory Results of Epididymovasostomy for Post-Inflammatory Obstruction

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INTRODUCTION

During the past 17 years, a total of 159 post-testicular azoospermia due to epididymal obstruction were surgically treated by the authors, but the incidence of both patency and pregnancy after the epididymovasostomy was not up to our expectation. We have, therefore, carefully analysed the operative results of our series in an attempt to isolate the causative factors of the failures.

MATERIALS AND METHODS

Subjects: The pertinent clinical history of the patients was summarized as follows: Mean age of the patients was 33(20-53), and that of their sexual partners, 30(21-42). Mean marital life was 7 years(1-30 years), and duration of obstruction, 8 years(1-22 years). Mean frequency of sexual intercourse per week was 2.5 before obstruction, 2.3 after obstruction and 2.2 after the epididymovasostomy. Educational background of the patients was relatively high in this series. That is, more than 2/3 of the patients finished above the high school with an average of 12 grades. The common occupations of the patients were clerks and commerce. The occupational background was not particular about the causes of the epididymal obstruction.

In the present series, testicular biopsy, epididymovasography, and measurements of plasma FSH, LH, and testosterone were performed in the majority of the patients pre-operatively in order to make sure of post-testicular azoospermias. And also tissue samples were obtained from the obstructed site of epididymis for the histologic examinations during surgery.

Suspecte causes of epididymal obstruction were gonorrheal and nonspecific epididymitis in 86 patients(54%), tuberculous epididymitis in 57 patients(36%), injuries of scrotal contents in 4 patients(2%), and bilateral aplasia of vasa deferentia in 12 patients(8%). The incidence of post-tuberculous obstructions has gradually decreased but that of congenital anomalies increased more frequently in these years. Among these, 147 patients were subjected to this clinical observation. The remaining 12 patients were excluded because of vasal anomalies.

Surgical techniques: Under the spinal or general anesthesia, scrotal contents were exposed through a single median scrotal incision. Testis, epididymis and vas deferens were carefully inspected and the point of obstruction should be ascertained on the epididymis. A longitudinal incision of 1 cm in length and 0.5 cm in depth was made with a sharp scalpel in the epididymis just proximal to obstruction site in which a mixture of blood and milky fluid cozed out. In some patients a window was made and epididymal tubule was opened by removing small piece of the tubule. The milky fluid was examined under a microscope for spermatozoa. If none was found, the incision must be made at more proximal level of epididymis until sperms were found. A
longitudinal incision of 1 cm in length was then made over the normal vas or vas was divided opposite the epididymal incision level. The patency of distal vas was examined by injection of 10 ml of normal saline or passing the 3-0 blue nylon thread. In the majority of the patients, a short circuit operation was effected between the epididymal and vasal openings mostly by the side-to-side technique or by side-to-end technique with a total of 10-15 interrupted sutures of 7-0 to 9-0 nylon. The approximation of epididymal and vasal openings was usually started at the upper angle of both wound. Both upper and lower margins of the anastomosis were secured by a few additional sutures. The placement of the internal splint of 1-0 to 3-0 dermalon has been abandoned since 1976.

A surgical microscope has been used instead of 4-6 fold loupé to enhance the technical perfection of minute and delicate operation. Thirty-eight patients out of the 147 were operated by this microsurgical technique. In an attempt to prevent later possible closure of the opening of the original epididymal tubule by spontaneous healing process and also to maintain the spermatic fluid with sperm may pass through the epididymal tubule immediately to the vas lumen, we tried to anastomose the end of mucosal layer of vas deferens directly to the end of original epididymal tubule from which spermatic fluid leaked continuously out in 6 patients of the 38 cases. However, we could not satisfactorily ascertain the original epididymal tubular end nor could we perfectly anastomose the epididymal tubule to the vasal lumen.

In cases of the tuberculous epididymitis triple anti-tuberculous regimens were given for more than 1 year pre-operatively.

Patients were asked to have repeated semen analyses post-operatively every month for at least 12 months following the corrective surgery, since sperm appeared in the ejaculates of some patients even 6-12 months after the operation. If azoospermia persists for more than 1 year after the anastomosis, reoperation may be then considered.

The success of an operation was judged by the appearance of more than $10 \times 10^6$/ml of normal viable sperm (anatomical success), and the occurrence of pregnancy (functional success) after the anastomosis.

**RESULTS**

Among the 147 cases of epididymovasostomies, 130 patients were followed-up for more than 1 year after operation. More than 3 semen samples were examined on each patient during the follow-up period. The results were correlated with the following factors.

Due to the causes of epididymal obstruction, both anatomical and functional success rates were higher in patients with non-tuberculous epididymitis than in patients with tuberculous epididymitis (Table 1).

Due to the extent of post-inflammatory fibro-

<table>
<thead>
<tr>
<th>Causes, bilateral</th>
<th>Total operations</th>
<th>Semen examined</th>
<th>Sperm positive</th>
<th>Pregnancy positive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cases</td>
<td>Cases</td>
<td>Cases</td>
<td>%</td>
</tr>
<tr>
<td>Non-tuberculous epididymitis</td>
<td>86</td>
<td>79</td>
<td>29</td>
<td>37</td>
</tr>
<tr>
<td>Tuberculous epididymitis</td>
<td>57</td>
<td>49</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>Trauma of scrotal contents</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>50</td>
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<tr>
<td><strong>Total-Average</strong></td>
<td><strong>147</strong></td>
<td><strong>130</strong></td>
<td><strong>38</strong></td>
<td><strong>29</strong></td>
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</tbody>
</table>

--- 408 ---
tic scar on the epididymis, vas to epididymis anastomosis was possible bilaterally on 113 patients and unilaterally on 13 patients. The vas end was implanted directly into the top of the testis on both sides on the remaining patients, because the post-inflammatory scarring on both sides of epididymis was so extensive that no form of anastomosis was technically feasible. Both anatomical and functional success rates were relatively high in the bilateral vas to epididymis anastomosis patients. No successful results were obtained from the vas implantation patients (Table 2).

Due to the level of the epididymal window or incision, vas to epididymal head anastomosis, vas to epididymal upper-body anastomosis and vas to epididymal lower-body anastomosis were carried out. No statistically significant differences were found in both anatomical and functional success rates by the anastomosis levels of the epididymis (Table 3).

Due to the duration of the obstruction and

<table>
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<tr>
<th>Table 2. Success rate by site of anastomosis</th>
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<tbody>
<tr>
<td>Anastomosis site</td>
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<td></td>
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<tr>
<td>Vas-to-epididymis, bilateral</td>
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<tr>
<td>Vas-to-epididymis, unilateral</td>
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<tr>
<td>Vas-to-testis, bilateral</td>
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<td>Total-Average</td>
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<th>Table 3. Success rate by level of epididymal window</th>
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<tr>
<td>Level of epididymal window</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Head</td>
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<tr>
<td>Upper-body</td>
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<tr>
<td>Lower-body</td>
</tr>
<tr>
<td>Testis (implantation)</td>
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<tr>
<td>Total-Average</td>
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<th>Table 4. Success rate by interval of obstruction</th>
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<td>Interval</td>
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<tr>
<td></td>
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<tr>
<td>Years</td>
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<tr>
<td>1~2</td>
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<td>3~4</td>
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<td>5~6</td>
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<td>7~8</td>
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<tr>
<td>9~10</td>
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<tr>
<td>11(+)</td>
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<tr>
<td>Total-Average</td>
</tr>
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age group of the patients, no significant differences were noted in both anatomical and functional success rates (Tables 4 and 5).

Summarized results of our series: Viable sperms were appeared in 38 patients and pregnancy occurred in 15 patients out of the 130 cases following the epididymovasostomy (Table 6).

The results of semen analyses on 38 successful cases averaged that volume was 2.5ml; counts, 26×10⁶/ml; motility, 40%; and normal morphology, 76%. No particular differences were
noted on spermogramme by age group or by intervals of obstruction in the present series (Tables 7 and 8).

**DISCUSSION**

For the anastomosis level of the epididymis, it has been recommended that the higher epididymis level, the more patency rate and the lower epididymis level, the more pregnancy rate. Accordingly the anatomical success rate should be highest when the vas is anastomosed near the epididymal head since a dozen of efferent ducts connect the 20-30 tubules of rete testis to the head of the epididymis. This procedure facilitate the flow of spermatic fluid from the rete testis into the vas deferens. The functional success rate should be theoretically the highest when the vas is anastomosed to epididymal lower-body since the spermatozoa tend to undergo maturation as they are transported through from epididymal head to tail. However, both anatomical and functional success rates were much the same in entire anastomosis groups of vas to epididymal head, vas to epididymal upper-body and vas to epididymal lower-body in our series (Lee, 1972, 1977, 1978; Schoysman, 1978).

It has been considered that cases of post-tuberculous obstruction were no longer contraindicated to epididymovasostomy due to the success of modern anti-tuberculous chemotherapy (Obrant, 1964). Thus, preoperative chemotherapy, with triple drug in full therapeutic dosage for suitable time, has made the epididymovasostomy safe and compatible procedure except beaded vas deferens. However, the success rate of corrective surgery after tuberculous epididymal obstruction was proved to be very poor in this series.

Overall success rates of epididymovasostomy were not encouraging, even though the ano-
mical success rate averaged, 35% (7~66%), and the functional success rate, 15% (0~44%) according to the reported results by different authors (Schoysman, 1978; Hanfey, 1978; Smith, 1963; Kelami, 1980; Hanley, 1955; Lee, 1978). Since Hanley's statement in 1959 that "one could go so far as to say that unless the patient has a gonococcal obstruction in the tail of the epididymis, the chances of becoming fertile after an operation are very slender", results of epididymovasostomy particularly on post-inflammatory obstruction were not much improved yet. And also the prognosis for the obstruction due to malformation or trauma was generally poor one.

The success of epididymovasostomy for post-inflammatory epididymal obstruction depends on technical perfection. That is, skill of surgeon with adequate instruments, proper suture materials, and perfect magnification are, of course, the most important factor. However, this has not been accomplished yet for all one's efforts (Pryor, 1976). Our observation on failed epididymovasostomies at reoperations revealed that there were marked fibrosis and scar formation with sperm and suture granulomas and blockage of the original epididymal tubular opening at the site of the previous anastomosis. It is, therefore, ideal to attempt direct anastomosis between the original epididymal tubule and the mucosal layer of vas deferens (Silber, 1978).

In addition, several factors which have been supposed to be influencing on the success or failure of epididymovasostomy might be listed as follows: inadequate selection of subjects, infection leading to formation of fibrosis, persisting previous residual infection, early ambulation following the anastomosis, regional changes in environments of testis and epididymis, injuries to the sympathetic nervous system which disturbing the peristalsis of seminal tracts, sperm antibody formation, low fertility level of partners, incompatibility between husbands and wives, poor follow-up and so on.

SUMMARY

A total of 147 patients were treated surgically for the correction of post-testicular azoospermia due to epididymal obstruction during the past 17 years. Thirty-eight patients were operated by the microsurgical technique and the remaining patients were operated by the conventional technique. The anatomical success rate was 29%, and the functional success rate, 11% in the 130 patients who were followed-up for more than 1 year after the epididymovasostomy. The success rates were higher in patients with non-tuberculous epididymitis than in patients with tuberculous epididymitis. No significant differences were found in both anatomical and functional success rates by the anastomosis level of the epididymis. Our observation on failed epididymovasostomy at reoperation revealed that there were marked scar formation with sperm and suture granulomas and blockage of the opening of the original epididymal tubule at the site of the previous anastomosis. It is, therefore, ideal to attempt direct anastomosis between the original epididymal tubule and the mucosal layer of vas deferens.
30세가 된다. 평균결혼기간은 7년, 결혼기간은 8년이 된다. 이들의 2/3는 고등학교이상의 준업자로 교육
정도는 비교적 높은 편이다. 職業別에서 閉塞原因과
적별 관계성이 있는 것은 없었다.

이중증에서 12예의 精管缺損情形을 제외한 147예에
계 精索再建을 위한 副睾丸精管吻合術을 시술하였다.
즉 1.8에는 兩側면의 方法으로, 그리고 나머지 109에는
在來式 方法으로 吻合하였다.

吻合術後 1년이상 追求觀察이 가능했던 130예에의 성
적을 분석해 보면 術後 精子가 10x10^9/mL 이상 出現한
精細學の 成功率은 29%가 되나, 姐妹한 機能의 成功率
은 거의 11%가 되는 바 明確적인 성적이 드러나다. 卸
他 結核性 副睾丸炎後의 閉塞에서는 非結核性 副睾丸
炎後의 妊娠에 비해 再建成功率가 높다. 副睾丸의 吻
合部位別로 본 때 開通率에서 妊娠率에서 이상하다 할
못하는 차를 보이지 않는다.

副睾丸精管吻合術의 失敗原因을 살펴본 바 吻合部位
에서 同部位組織이 설하게 纖維化를 일으켰고 또 本來
의 副睾丸近位管의 開口部位가 自然적으로 약하다고
현상등을 발견하게 된다. 따라서 本吻合術의 成功率
向上을 위해서는 閉塞鏡下에서 副睾丸腔과 精管内腔
을 적절 端端吻合이 주는 術式이 개발되어야 할 것으
로 믿어진다.

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