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PRACTICE COMMITTEE REPORT

A Technical Bulletin

VASECTOMY REVERSAL

PATIENT EVALUATION

Although reversal of vasectomy can be technically performed for most candidates, the appropriateness and ultimate success depends on both male and female fertility factors. The age and fertility status of the female partner should be included in the discussion of success rates.[1] General medical problems that would complicate any surgical procedure should be considered prior to vasectomy reversal. Patients who desire vasectomy reversal for reasons other than fertility (psychologic reasons or discomfort) should be advised to seek counseling or more conservative means of pain reduction prior to proceeding with vasectomy reversal. They also should be informed that neither epididymectomy nor reversal of the vasectomy necessarily will relieve their scrotal discomfort. Physical examination may reveal that a very long segment of the vas deferens was removed during the vasectomy, thus alerting the surgeon to the possible need for a nonstandard incisional approach. Examination also may reveal testicular abnormalities or epididymal induration, which indicates that vasoepididymostomy may be necessary when the reversal is performed.

PREOPERATIVE TESTING

No unique preoperative laboratory tests are required before a vasectomy reversal is performedother than the standard laboratory tests required by some facilities or anesthesiologists. About 60% of men develop circulating antisperm antibodies after bilateral vasectomy.[2] Some investigators[3,4] suggest that such antibodies may decrease the chance for pregnancy after reversal, but the high overall postoperative conception rate (between 50% to 70%),[5] and the questionable correlation of preoperative antibody testing with postoperative fecundability, makes preoperative antisperm antibody testing a controversial predictor of the patient's postoperative fertility and is of unproven value.[6-13]

Before a patient undergoes a vasectomy reversal, his wife should be encouraged to have a gynecologic evaluation to assure adequate fertility potential, and the effect on fertility of female age should be explained. Counseling of the couple as to any foreseeable complications of pregnancy, such as fetal chromosomal abnormality if the wife is of an advanced age, is mandatory, as it is when presenting any procedure to promote progeny in the older female patient. The option of epididymal aspiration or testicular sperm aspiration combined with IVF/ICSI should be discussed in addition to a second attempt at vasectomy reversal, but current data suggest that this may not be cost effective.[14,15]

OPERATIVE CONSIDERATIONS

Anesthesia

Vasectomy reversal may be performed with local, regional, or

general anesthesia. The choice of anesthesia depends on the preference of the surgeon and patient. Local anesthesia may be administered by infiltration of the spermatic cord at the level of the pubic tubercle and/or by infiltration of perivasal tissue just above the vasectomy site.

Placement of Incision

A vasectomy reversal usually is performed through vertical incisions in the anterior aspect of each side of the scrotum. If the vasectomy was performed at a very high scrotal level, or if a long segment of the vas deferens was removed at the time of the vasectomy, it may be necessary to extend the scrotal incisions up into the lower inguinal region. An alternate approach in such situations is an infrapubic incision.[16] This incision provides ready access to the old vasectomy site when the vasectomy was performed at an unusually high level and which avoids anastomotic tension by allowing mobilization of an adequate length of the abdominal vas when there is a long distance between the vasal ends.

General Intraoperative Considerations

If vasovasostomy is to be performed, it may or may not be necessary to expose the testis and epididymis. When not required to isolate the ends of the vas, it is preferable to avoid exposure of the testis and epididymis, in order to prevent adhesions of the tunica vaginalis that could make later performance of a vasoepididymostomy, if needed, more difficult. The ends of the vas deferens above and below the old vasectomy site may be exposed through 2 to 3 cm vertical scrotal incisions. If vasoepididymostomy is required, then the surgeon must extrude the scrotal contents and incise the anterior parietal tunica vaginalis.

As soon as the scarred ends of the vas have been excised, patency of the abdominal end of the vas is tested, and fluid from the testicular end is examined microscopically for the presence of sperm. Patency of the abdominal end may be assured by observing the free flow of sterile irrigant solution instilled through a 24-gauge blunt tip needle. Formal vasography rarely is necessary.

When microscopic examination of the testicular vasal fluid is performed, the sperm quality in the vas fluid generally is categorized into one of five grades[l,17] as follows:

Grade 1 - mainly normal motile sperm

Grade 2 - mainly normal nonmotile sperm

Grade 3 - mainly sperm heads

Grade 4 - only sperm heads

Grade 5 - no sperm

If the vas fluid has a thick, creamy consistency, it should be diluted with normal saline to allow observation of sperm that otherwise may be overlooked because they are packed together tightly and obscured by debris in the viscous fluid. The person who performs the microscopic examination of the intraoperative vas fluid must be alert to identify sperm heads that do not have attached tails.

The surgeon should bypass the entire scarred portion of the vas above and below the vasectomy site to permit anastomosis of viable tissue. The ends of the vas are placed in an approximating clamp and are advanced toward each other to facilitate anastomotic suturing. Some surgeons prefer to perform the anastomotic suturing without using a vas approximator clamp and will often approximate peri-vasal tissue. The ends of the vas should be mobilized sufficiently to avoid anastomotic tension.

Choice of Vasovasostomy or Vasoepididymostomy

When grade one, two, three, or four sperm quality is present in the fluid that is obtained from the testicular end of the vas, vasovasostomy is performed. Even when only sperm heads (grade

4) are present in the testicular vasal fluid, the results of vasovasostomy are good.[1] However, some experienced microsurgeons would perform vasoepididymostomy in this case. When sperm are not present in the intraoperative vas fluid, the surgeon must decide if vasovasostomy or vasoepididymostomy is more appropriate. If vasovasostomy is performed when sperm are not present in the intraoperative vas fluid, the chances of the return of sperm to the semen (patency) and of pregnancy are best when the vas fluid appears watery (clear, colorless, and transparent), but are lower when the fluid appears cloudy and are even worse when the fluid appears thick and creamy.[1]

When sperm are absent from the vas fluid and the fluid does not appear watery, the surgeon may be able to determine if vasovasostomy or vasoepididymostomy is more appropriate by inspecting the epididymis using optical magnification. When a discolored or indurated area is present in the epididymis, it usually indicates that a back pressure induced rupture of the epididymal tubule occurred after vasectomy, resulting in obstruction at the site of tubular rupture. The surgeon also may observe a level of demarcation in the epididymis above which the epididymal tubule appears dilated and below which it appears collapsed. In both these situations, vasoepididymostomy will be required.[18] The decision to perform vasovasostomy or vasoepididymostomy also may depend upon the time interval after vasectomy and upon the surgeon's experience with performing microsurgical vasoepididymostomy.

Anastomotic Methods

There is general agreement that results of vasovasostomy are better after microsurgical anastomoses than after macrosurgical anastomoses, although some surgeons still report favorable results using macrosurgical techniques.[5] The surgeon who uses the operating microscope and microsurgical techniques should have had formal microsurgical laboratory training.

Most surgeons use monofilament nylon for anastomotic suturing. In order to prevent damage to the vas, only bipolar cautery or a small ophthalmic cautery unit should be used when it is necessary to cauterize bleeding vessels on the adventitia of the vas. These cautery units produce minimal areas of tissue damage compared to the area of damage created by monopolar cautery. Cautery should not be used on the opposing transected ends of the vas.

Vasovasostomy by a modified one layer anastomosis[19] may be performed by placing four to eight interrupted 9-0 nylon sutures through the full-thickness of each end of the vas. After these sutures are tied, interrupted 9-0 nylon sutures are placed through the outer muscular layer between the full-thickness sutures.

Many surgeons prefer a two-layer microsurgical anastomosis[17] when performing a vasovasostomy. Five to eight interrupted sutures of 10-0 nylon are used to connect the inner mucosal edges of the ends of the vas. These mucosal sutures should include a small portion of the inner muscular layer. After the mucosal sutures have been tied, seven to 10 outer muscular layer sutures of 9-0 nylon are placed and tied.

The results of vasoepididymostomy are better with microsurgical anastomoses than with macrosurgical anastomoses. Since it is seldom possible to determine preoperatively if vasoepididymostomy will be required in a man undergoing vasectomy reversal, only surgeons skilled in both vasoepididymostomy and vasovasostomy should perform vasectomy reversal.[20,21] Microsurgical vasoepididymostomy may be performed either using an end-to-end[20] or an end-to-side method[21]. In order to perform the end-to-end method, the epididymis is transected transversely at serial intervals of 0.5 to 1 cm., starting at the

caudal end and progressing superiorly until a level is reached at which the epididymal tubular fluid contains sperm. The end-to-side method is performed by incising through the epididymal tunic and then into a single isolated epididymal tubule, starting caudally and progressing superiorly, until a level is reached at which sperm are present in the epididymal tubular fluid. With either method, the vas mucosa is approximated to the opened edges of the epididymal tubule with four to six interrupted sutures of 10-0 nylon, and the outer muscular layer of the vas is approximated to the incised edges of the epididymal tunic with seven to 10 interrupted sutures of 9-0 nylon.

It is important that the vasoepididymal anastomosis is performed at a level above the epididymal obstruction. This is assured by identifying intact sperm in the epididymal tubular fluid. However, the anastomosis also should be performed at the most caudal level at which sperm are present in the epididymal tubular fluid in order to maximize postoperative fertility rates.

Postoperative Care

The use of drains and of antibiotics is optional. The patient is advised to use a scrotal supporter and to avoid heavy physical activity for three to four weeks. He also is advised to avoid sexual intercourse for at least two weeks postoperatively. Postoperative pain generally is controlled with oral analgesics.

Complications

There are relatively few complications after vasectomy reversal procedures. Postoperative hematomas and deep infections are rare. Such complications may be managed with standard methods and rarely require surgical drainage.

Postoperative Patient Monitoring

After either vasovasostomy or vasoepididymostomy, semen analyses are obtained every two to three months, either until sperm concentration and motility are normal or until a pregnancy occurs. If sperm concentration and motility become normal, then subsequent semen analyses are obtained at approximately four month intervals until a pregnancy occurs. Such monitoring of the semen assures that obstruction due to late anastomotic scar tissue formation, which occurs in 3% to 12% of patients after vasovasostomy[22,23] and 21% after vasoepididymostomy,[23] has not occurred. If sperm are not present in the semen by six months after vasovasostomy, or by 18 months after vasoepididymostomy, then the reversal has failed. If the patient develops normal sperm concentrations postoperatively and his wife does not become pregnant despite gynecologic reassurance of her normal reproductive status, then measurement of antisperm antibodies on the surface of the sperm (direct immunobead testing[24] is preferred) may help when advising the couple as to their choices for future approachs to achieve fertility. Most pregnancies occur within 24 months.[1]

Results

After macrosurgical vasovasostomy, sperm appear in the semen of about 80% of men, and 20% to 40% of their wives become pregnant.[5] After microsurgical vasovasostomy, sperm appear in the semen of 85% to 90% of men, and 50% to 70% of their wives become pregnant.[5] The Vasovasostomy Study Group found that results were progressively less favorable after microsurgical vasectomy reversal as the obstructive interval (time from vasectomy until its reversal) lengthened.[1] That group reported rates of return of sperm to the semen and pregnancy, respectively, in 1,247 patients to be 97% and 76% if the

obstructive interval was less than three years, 88% and 53% if three to eight years, 79% and 44% if nine to 14 years, and 71% and 30% if 15 years or longer.

The Vasovasostomy Study Group[1] similarly reported less favorable results after bilateral vasovasostomy with progressively poorer qualities of sperm in the intraoperative vas fluid. Rates of return of sperm to the semen and pregnancy, respectively, were 94% and 63% when grade 1 sperm quality was present bilaterally in the intraoperative vas fluid, 91% and 54% for grade 2, 96% and 50% for grade 3, 75% and 44% for grade 4, and 60% and 31% for grade 5.

The Vasovasostomy Study Group[1] confirmed Lee's report[25] that the results of microsurgical modified one-layer and microsurgical two-layer anastomoses are comparable. After microsurgical end-to-side vasoepididymostomy performed for the purpose of vasectomy reversal, a recent large series reported that sperm appeared in the semen in 84% (36 of 48) of men followed six months or more, and 42% (17 of 41) followed 12 months or longer achieved a pregnancy.

Management of Operative Failures

Reoperation may be offered after a failed vasectomy reversal, although the majority of men who remain azoospermic after a reversal do not request another procedure. A repeat procedure after a failed vasovasostomy may be more difficult than the first reversal because a longer length of the vas will be involved with scarring than was involved at the time of the first procedure. Reoperation after a failed vasoepididymostomy may or may not be possible, depending on the amount of scar formation around the epididymis resulting from the first vasoepididymostomy. During reoperation after a failed vasovasostomy, the surgeon first should perform a microsurgical vasotomy below the level of the old anastomosis. The vas fluid obtained through the vasotomy incision then is examined microscopically for the presence of sperm. Patency of the old anastomosis is tested, as previously described. If sperm are absent from the vas fluid obtained from the vasotomy site during a reoperative procedure, then vasoepididymostomy will be required. If the old anastomosis is obstructed, it is usually resected before the repeat anastomosis is performed. When performing reoperative vasovasostomy, the surgeon should bypass all of the scarred portion of the vas and mobilize a sufficient length of the abdominal end of the vas to avoid anastomotic tension.

Of 222 reoperative vasectomy reversals reported by the Vasovasostomy Study Group,[1] 75% had sperm in the semen postoperatively and 43% of the wives became pregnant. Although these results of reoperative vasectomy reversals are not as good as the results of first reversals, many patients believe that the percentage of conception is high enough for them to undergo a reoperation.

Intraoperative Sperm Harvesting and Cryopreservation

Before intracytoplasmic sperm injection (ICSI) was available, patients who inquired about intraoperative sperm harvesting and cryopreservation in case the vasectomy reversal failed were informed that the number and percentage of motility of sperm obtained intraoperatively both were too low for the thawed sperm to be useful later for insemination or in vitro fertilization (IVF). However, the availability of ICSI technology has encouraged some surgeons to offer cryopreservation of sperm that may be harvested during vasectomy reversals. Cryopreservation of sperm during vasoepididymostomy is especially important because of a reported 35% rate of

azoospermia after microsurgical vasoepididymostomy.[23] Other investigators have reported that motile sperm were present in the intraoperative vasal and epididymal fluid in 35% of 603 vasectomy reversals.[26]

However, performance of a vasal or epididymal anastomosis should be prioritized over sperm harvesting during vasectomy reversals. The surgeon should perform the reversal at the location farthest from the testicle where intact sperm, regardless of their motility, are present, rather than closer to the testicle in order to harvest motile sperm. Before sperm harvesting and cryopreservation are performed, the patient and his partner should assess the cost effectiveness of, and their ability to afford, IVF/ICSI. When harvesting sperm during vasectomy reversals, surgeons must alert laboratory personnel to cryopreserve small aliquots of sperm that are appropriate for later use with ICSI rather than larger aliquots for either vaginal or intrauterine insemination or IVF without ICSI.[27]

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