Pregnancy caused by sperm from vasa efferentia

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It has long been assumed that sperm must pass through a certain length of the epididymis to mature, gain progressive motility, and become capable of fertilization. All animal models thus far studied have confirmed that sperm which have not gone through the epididymis are only capable of minimal vibratory movement and are not capable of fertilization.1 When sperm are sampled from the head of the epididymis in intact animals, many will have circular swimming motions, but none will have forward progressive motility and they will not fertilize. When sperm are sampled from the corpus epididymis, there is a gradually increasing velocity of unidirectional progression.

The key unanswered questions, however, are whether the factors governing this maturation process are intrinsic to the sperm and occur over a period of time, or reside specifically in the epididymis, and whether sperm transit through the epididymis is specifically required for fertility. This report discusses two patients who had blockage all the way up to the vasa efferentia and who underwent an end-to-end anastomosis of the vas deferens to one of the vasa efferentia flush against the testicular surface, with subsequent normal semen parameters, and pregnancy.

CASE REPORTS

Case 1

Patient 1 was a 47-year-old engineer from the South who had undergone vasectomy 15 years earlier. He had had four healthy children in a previous marriage, and his present wife, 28 years old, had never been married or pregnant.

At the time of attempted vasectomy reversal, no sperm whatsoever was found in the vas fluid. Meticulous exploration of the epididymis was accomplished by first freeing up the entire epididymis from the testicular surface on both the right and the left sides, and transecting proximally, checking the fluid at every stage to see whether there was sperm in it. No sperm was found on either the right or left side until we had transected serially up the entire length of the epididymis in the manner illustrated in Figure 1. Emerging from the testis were several vasa efferentia, each effluxing an abundant amount of clear fluid that harbored many nonmotile sperm. All the distal transections of the epididymis had revealed no sperm, with inspissation and inflammatory blockage of the epididymis.

As illustrated in Figure 2, the largest and easiest of the vasa efferentia tubules was specifically anastomosed to the inner lumen of the vas using four 10-0 nylon interrupted sutures. The outer muscularis of the vas then was sutured separately to the testicular tunic using 12 9-0 nylon interrupted sutures.

The patient was given a dire prognosis because, even if patency might have been achieved, we believed there would be no progressive motility. However, at 4 months postoperatively, the sperm count was 18,000,000/ml with 10% progressive motility; 10½ months postoperatively, the sperm count was 78,000,000/ml with 10% progressive motility. By 1 year and 2 months postoperatively, the patient had 110,000,000/ml and 40% had directional forward motility. At 1 year and 8 months postoperatively, the wife became pregnant, and she carried a normal intrauterine pregnancy to term.

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DISCUSSION

These are two admittedly unusual cases in which sperm that have had no opportunity to go through any length of epididymis have acquired normal motility, maturation, and fertilizing capacity. This observation may help to answer in part the question raised by Orgebin-Crist in 1969: are the factors governing the maturation process intrinsic to sperm or do they reside in the epididymis? There have been various animal experiments that attempted to determine the answer to such a question by ligating various regions of the epididymis to determine whether aging alone matures the sperm or whether the sperm need to pass through specific regions of the epididymis to mature. After interruption of sperm flow, epididymal spermatozoa, which had previously been poorly motile in the caput region of the epididymis, showed increased motility. However, because of the pathologic nature of the chronic obstruction created by such an experimental model, all of these sperm once again lost their motility by 3 weeks. Thus, the increased time allowed for maturation in those experiments was counter-balanced by the abnormally obstructed environment.

The difference between clinical cases of anastomosis of the vas to the vasa efferentia, and the animal experiments in which sperm are simply withdrawn from various regions of the epididymis or vasa efferentia, is that, with anastomosis of the vas to the vasa efferentia, a new physiologic milieu results in which the sperm have time to mature in the vas deferens before being ejaculated. The dif-
ference between these clinical cases and the epididymal ligation experiments in animals is that this is not an obstructed environment that could adversely affect sperm viability.

The difficulty of achieving "patency" with these kind of unusual and difficult clinical cases creates a tremendous technical obstacle for being able to report any larger series. We have performed several other such attempts at anastomosis to the vasa efferentia where blockage was this high, and obtained no technical success. We have no idea of whether these two cases are an aberration or the rule. At least we can conclude that it certainly is possible for sperm that have never passed through any length of epididymis at all to mature on their own in the vas deferens and become capable of fertilization.

Comment

This is a fascinating report that runs contrary to all other information available. Because of this, it would seem appropriate that proof of paternity be established by genetic testing. The author has indicated he is attempting to get appropriate testing!

—The Editor

REFERENCES