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Prostatic Acid Phosphatase, Aspermia, and Alcoholism in Rape Cases

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ABSTRACT: In a few alleged rape cases, examination of vaginal secretions will be negative for spermatozoa but positive for significant levels of prostatic acid phosphatase. These laboratory results can occur in cases in which the accused is known to have sired children. The most common etiologic factors for the aspermia are vasectomies and chronic alcoholism with or without cirrhosis.

KEY WORDS: pathology and biology, criminal sex offenses, phosphatases

The determination of prostatic acid phosphatase is now an essential laboratory procedure in the investigation of alleged rape cases [*1*]. This is especially true when the accused has aspermia or oligospermia resulting from congenital or acquired diseases or trauma of the genitalia, or has undergone an elective vasectomy. Another common etiologic factor, not mentioned in the forensic science literature as a cause of aspermia or oligospermia in rape cases, is chronic alcoholism. Therefore, the determination of prostatic acid phosphatase may give the only laboratory evidence that vaginal penetration and ejaculation took place. Two cases that illustrate these facts are presented.

Case Reports

Case 1

A 13-year-old girl was raped by her 52-year-old uncle. He had been married and was the father of two grown children. A divorce caused in part by his alcoholism had occurred when he was in his twenties. His chronic alcoholism had persisted up to the time of the sexual attack. During this time he had not undergone any operative procedures. Oral, vaginal, and rectal smears of the victim were negative for spermatozoa, but the acid phosphatase determination was 19.0 Bodansky units. He admitted the rape and was sentenced to prison.

Case 2

A woman was raped by her ex-husband. She had borne him a child, who was 22 years of age at the time of the rape. A divorce, which had occurred some twelve years prior to the

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sexual attack, was again a result of alcoholism, which also played a part in the rape. He had not had a vasectomy. Oral, vaginal, and rectal smears were negative for spermatozoa, while the acid phosphatase determination was 30 Bodansky units.

Methods

Oral, vaginal, and rectal contents were obtained by the use of cotton-tipped applicators. Smears made from this material were stained by the Papanicolaou technique. A specimen for the acid phosphatase determination was also made from material obtained by cotton-tipped applicators saturated with vaginal secretions. One swab was immersed in 3 ml of saline for 30 min at room temperature, with occasional agitation. A modified Bodansky technique (β-glycerol phosphoric acid, disodium salt, as substrate) was used on 0.5 ml of this elution to determine the level of prostatic acid phosphatase.

Discussion

It is a well-documented observation that chronic alcoholism with Laennec's cirrhosis can cause testicular atrophy and aspermatogenesis [2]. For example, in ten recent medical examiner's autopsies from the Office of the Deputy Chief Medical Examiner, Northern Virginia, in which there were pathologic alterations of the liver parenchyma resulting from

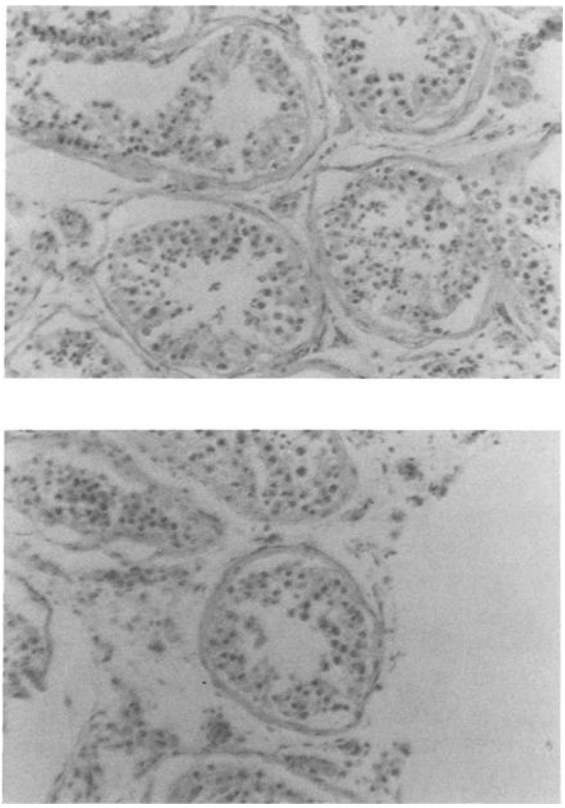

FIG. 1—*Section of seminiferous tubules showing slight basement membrane thickening with suppressed spermatogenesis from a 34-year-old white male chronic alcoholic with moderate liver disease.*

alcoholism, sections of the testicle exhibited faulty or suppressed spermatogenesis (Figs. 1 and 2).

Van Thiel et al [3] stated that in their observations a high incidence of aspermia is found not only in patients with Laennec's cirrhosis but also in cases of chronic alcoholism with relatively mild liver disease. They further pointed out that it is estimated that 9 000 000 Americans abuse alcohol, and 10% of these may develop cirrhosis. They also suggested that alcoholism even without cirrhosis is a nonfunctional cause of male sterility in the United States. They based these observations on the fact that the metabolism of vitamin A is essential for spermatogenesis. Alcohol dehydrogenase (ADH), the enzyme responsible for ethanol metabolism, is also required for conversion of retinol (vitamin A) to bioactive retinal at the end-organ stage. Based on their in-vitro experiments, they proposed that ADH activity is demonstrable in testicular tissue and that retinol is converted to retinal by testicular ADH. Ethanol inhibits testicular retinal formation, causing "relative vitamin A deficiency," which may be a factor in the pathogenesis of sterility in chronic alcoholism.

Conclusion

In alleged rape cases, the laboratory finding of a positive prostatic acid phosphatase determination from vaginal secretions without sperm does not rule out a suspect who has

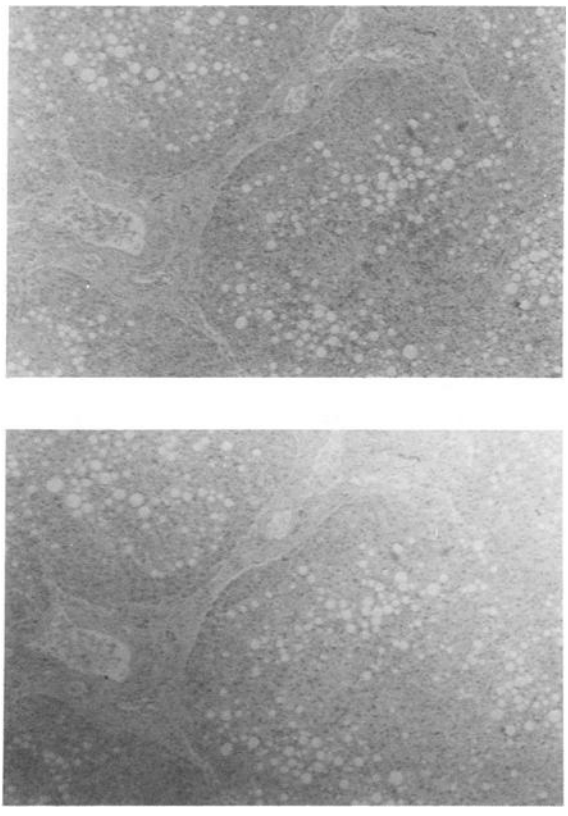

FIG. 2—*Liver section showing periportal fibrosis with lobular bridging and moderate fatty metamorphosis.*

sired children and has not had any diseases or trauma to the genitalia or undergone operations that could account for the lack of sperm in the vaginal smears. Obviously, the defense could use the failure to find sperm as an indication that his client was not guilty because he indeed was fertile, in that he had sired children. If chronic alcoholism can be proved, the physician testifying for the prosecution can cite the fact that chronic alcoholism can account for the negative smears.

To verify aspermia, a seminal analysis of the suspect would be the logical procedure. However, a court order to obtain seminal specimens from the accused is highly unlikely because of the legal atmosphere that exists today.[3]

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