Incidence of sperm antibodies before and after vasectomy

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SYNOPSIS Sperm-agglutinating antibodies were present in three (2.6%) of 117 fertile men and in 19 (33.9%) of 56 men who had been vasectomized. Twenty-four of the 56 vasectomized men had been studied before vasectomy; sperm-agglutinating antibodies were present in one (4.3%) compared with eight (33.3%) after vasectomy. No sperm-immobilizing antibodies were detected before vasectomy but were present in 10 (17.9%) of the 56 men after vasectomy.

The presence of sperm-agglutinating antibodies in the serum of four infertile men with oligozoospermia (Rümke, 1954; Wilson, 1954) focused attention on the presence of such antibodies in patients with proven obstruction of the vasa deferentia and also after bilateral vasectomy (Phadke and Padukone, 1964). Subsequently an increased level of complement-dependent sperm-immobilizing antibodies in addition to sperm-agglutinating antibodies was detected in men after bilateral vasectomy for contraceptive reasons (Ansbacher *et al.*, 1972; Shulman *et al.*, 1972; Halim and Antoniou, 1973).

This paper is a study of the incidence of sperm antibodies in fertile men and in vasectomized men.

one and three years after vasectomy. Samples were also taken from a further 32 men who had been vasectomized between one and three years previously but who had not been tested before vasectomy.

Methods

The sera obtained from the blood specimens were tested for the presence of sperm-agglutinating antibodies using the macroscopic sperm-agglutination test of Kibrick *et al.* (1952) starting with a 1:4 dilution, and for the presence of sperm-immobilizing antibodies using the method described by Isojima and Ashitaka (1968) starting with a 1:2 dilution.

Results

The results are shown in the table. Three (2.5%) of the 117 men referred for vasectomy had agglutinating antibodies in their serum in a titre of 1:4 or greater, but no immobilizing antibodies were detected. In the

Patients

Blood samples were collected from 117 men on referral for vasectomy and from 24 of them between

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Titre	Pre-vasectomy		Post-vasectomy	
	Agglutinating	Immobilizing	Agglutinating	Immobilizing
Negative	114	117	37	46
1:2				4
1:4	1		2	2
1:8			2	2
1:16	1		6	
1:32			4	1
1:64	1		3	
1:128			1	1
1:256				
1:512				
1:1024				
1:2048			1	
Positive	3 (2.5%)	0	19 (34%)	10 (18%)

Table Sperm antibodies in 117 men before vasectomy and in 56 men after vasectomy

56 men studied after vasectomy, sperm-agglutinating antibodies were detected in 19 (34%) and sperm-immobilizing antibodies in 10 (18%).

Twenty-four men included in the overall results were studied both before and after vasectomy. The incidence of sperm-agglutinating antibodies increased from one (4.5%) before vasectomy to eight (33.5%) after vasectomy. Sperm-immobilizing antibodies were detected in three (12.5%) after vasectomy whereas none had been detected before operation.

Discussion

These studies support the view that there is a background of sperm-agglutinating antibody activity in fertile men and that this activity increases after bilateral vasectomy (Ansbacher *et al*, 1972; Shulman *et al*, 1972; Halim and Antoniou, 1973).

While it is agreed that a level of sperm-agglutinating antibody in men is compatible with fertility, it has not been possible to establish a threshold of significance. Rümke and Hellinga (1959) found agglutinating antibodies in four of 416 fertile men in titres ranging from 1:4 to 1:16. Two of 100 fertile men studied by Halim and Antoniou (1973) had sperm-agglutinating antibodies to a titre of 1:32, and one of the 117 fertile men whom we studied had sperm-agglutinating antibodies to a titre of 1:64. The Kibrick method was used in all of these studies.

The extent of the reported increase in the level of sperm-agglutinating antibody activity after vasectomy varies in different studies. Halim and Antoniou (1973), considering levels of 1:32 or greater to be significant, found antibody titres of 1:32 in two of 100 men before vasectomy and in six of these 100 men after vasectomy. Shulman *et al* (1972), considering a titre of 1:8 to be positive, found significant increase in sperm-agglutinating activity on at least one occasion after surgery in 12 of their 22 patients. In their study of 27 cases, Ansbacher *et al* (1972) reported antibodies to a titre of 1:4 in one before vasectomy and in 12 in titres ranging from 1:2 to 1:1024 after vasectomy. In the 24 men studied both before and after vasectomy, we found sperm-agglutinating antibodies in one before vasectomy in a titre of 1:64. After vasectomy this was found to be 1:128, the rise being of doubtful significance. However, a further seven patients were found to have sperm-agglutinating antibodies after vasectomy in titres ranging from 1:8 to 1:64.

Antibody levels may depend on the time that has elapsed since vasectomy. Ansbacher *et al* (1972) found an increase in sperm-agglutinating antibody titres at six and 12 months compared with six weeks, indicating continued antigenic stimulation. Shulman

et al (1972) studied the antibody titres at regular intervals after vasectomy in seven patients. They found two types of response. In four of their seven patients, there was a peak between the second and sixth months after operation, followed by a decline, whereas in the other three there was a later response beginning about the fifth or sixth month. All our patients were tested between one and three years after vasectomy.

Halim and Antoniou (1973) also found a background of sperm-immobilizing activity in fertile men which increased after vasectomy, but, as in the 27 men investigated by Ansbacher *et al* (1972), we found no such activity before vasectomy. We did, however, find sperm-immobilizing antibody activity in three (12.5%) of the 24 men after vasectomy, in whom none had been detected before operation, and overall in 10 (18%) of the 56 vasectomized men investigated.

There is evidence that the factor producing sperm agglutination and immobilization is an antibody. Rümke and Hellinga (1959), using paper electrophoresis, found the agglutinating activity in the γ -globulin fraction. Later Quinlivan *et al* (1975) found that immoglobulin G obtained from the sera of men with agglutinating or immobilizing activity by column chromatography produced the same effect as whole sera.

The significance of these antibodies is not known. The fact that more sterile men than fertile men have antibodies in their sera (Rümke and Hellinga, 1959; Halim and Antoniou, 1973) suggests an association with infertility. However, there is evidence that obstruction of the vasa may result in the formation of antibodies, and it cannot be concluded that the antibodies rendered the men sterile (Rümke and Hellinga, 1959).

In the case of antibodies appearing after vasectomy, one possible consequence is infertility persisting after reanastomosis of the vasa. This is not supported by Phadke and Padukone (1964), who reported that in six patients in whom obstructive azoospermia was corrected by vaso-epididymal anastomosis, three subsequently proved fertile despite having high titres of sperm agglutinins.

Further evidence is clearly required to establish a possible relationship between the sperm antibodies which appear in vasectomized men and their subsequent infertility after reanastomosis of their vasa.

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