Vasectomy and the human testis

We still know too little about the effects of vasectomy

Concerns about vasectomy have so far focused on its reversibility and fears that it might predispose to cardiovascular disease. But a recent study by Cale et al has raised a new and serious worry: that vasectomy might accelerate the growth of testicular tumours.

Of a cohort of over 3000 men in central Scotland who had undergone vasectomy, eight developed testicular cancer within four years after the operation—compared with an expected 1-9. As the authors did not indicate the types of tumours we do not know whether this finding was just an unhappy coincidence (as different tumour types would suggest) or whether we should be more worried (as similar pathological appearances would suggest).

This is not the first suspicion of accelerated testicular tumour growth after vasectomy. Thornhill et al in Dublin reported three cases of a comparatively rare mixed seminoma and malignant teratoma within eight weeks after surgery. Strader et al reported an increased incidence of testicular cancer among Catholic but not among non-Catholic men in Washington state, but they attributed the difference to a failure to report vasectomy by Catholic controls in the questionnaire study.

These observations may be chance findings by rightly cautious practitioners, and there is insufficient evidence to implicate vasectomy in accelerated tumour growth. If vasectomy does promote such growth it is not clear how it does so. Indeed, its general effects on the human testis are controversial and incompletely understood.

Animal studies have made it clear that there are considerable differences in the effects of vasectomy among species. Dogs show temporary depression of spermatogenesis, which may be related to raised intraluminal pressure; guinea pigs suffer autoimmune orchitis with infiltration by leukocytes; rabbits develop degeneration of the seminiferous epithelium associated with deposition of immune complexes along the basement membrane; and rats, rabbits, and hamsters all show testicular atrophy associated with the formation of sperm granulomas in the caput epididymidis.

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Which, if any, of these models applies to man is not known. Several groups have reported finding abnormalities in testicular biopsy specimens in some men after vasectomy. The changes are variable but include degeneration of seminiferous epithelium; loss of germ cells, especially spermatids; dilatation of testicular tubules; thickening of tubular walls; and interstitial fibrosis. The causes are not known. Dilatation of seminiferous tubules suggests raised intraluminal pressure, which might account for the epithelial changes. Raised intraluminal pressure has been detected in the seminiferous tubules of guinea pigs given vasectomies. Rats with vasectomies, although usually showing normal testes, develop appreciable distension of seminiferous tubules if the caput epididymidis becomes obstructed.

Some of these changes may be reversible. Three groups of workers have shown that some men who undergo reversal of vasectomy are subsequently fertile despite showing pronounced degeneration on testicular biopsy at the time of reversal. In dogs the depression of spermatogenesis after vasectomy is only temporary and may be attributable to raised intraluminal pressure. Perhaps the seminiferous epithelium of the dog adapts more readily to raised pressure than that of man and regressive changes in humans are reversed only when the ductus deferens is reanastomosed. The presence of interstitial fibrosis in biopsy specimens taken at the reversal of vasectomy may carry a poor prognosis for fertility.

Bigazzi and Alexander and Tung, working on rabbits with vasectomies, reported degeneration of seminiferous epithelium associated with immune complex deposition in the basement membrane; elution techniques showed that the complexes contained antisperm antibodies. It has been suggested that the thickening of the tubular walls seen in testicular biopsy specimens from such patients may represent the same process, but Bigazzi et al could not show any immune complex deposition.

2 Bull GM, Morton J. Relationships of temperatures with death rates from all causes and from certain respiratory and arteriosclerotic diseases in different age groups. Age Agric 1975;4:232-46.
Several groups have attempted to investigate the effect of vasectomy on the endocrine function of the human testis.1-5 The results have been conflicting and difficult to interpret because the changes may have been due to alterations in the sensitivity of the assay.6 Nevertheless, it does seem that hormone concentrations remain within the normal range after vasectomy, though seasonal variations seem to be lost.8 Clearly, then, we need to learn much more about the effect of vasectomy on seminiferous tubules. We need to know about the possibility of different forms of testicular change in different people, predisposing factors such as a history of orchitis or a personal or family history of autoimmune disease, and the relation between the formation of sperm granulomas and testicular changes in man. Most importantly, however, we need further studies to define the risk of testicular cancer after vasectomy and to identify causal factors.

STUART W MCDONALD

Lecturer in Anatomy,
University of Glasgow,
Glasgow G12 8QQ


Hirsutism

Treatable and usually caused by the polycystic ovary syndrome

In the past decade the polycystic ovary has emerged clearly as the source of excess androgens in most hirsute women,1 and the establishment of effective antiandrogen treatment, combining oestrogen with cyproterone acetate,2 has resulted in an increased demand for treatment by patients and doctors. We now enter an era in which the long term safety of treatment must be determined to provide a more accurate assessment of the risk-benefit ratio of hormone treatment.

Until recently most patients with excess hair growth were labelled as having idiopathic hirsutism because they had no discernable abnormality of the menstrual cycle or of gonadotrophin or androgen secretion. Two lines of investigation have altered our understanding of the pathogenesis of hirsutism. Firstly, the total serum testosterone concentration, which is normal in many hirsute patients, has been shown to be an inaccurate reflection of androgen production. More subtle investigation has shown that excess androgen concentrations exist in nearly all patients.2 Moreover, specific venous sampling has shown the ovary rather than the adrenal gland to be the source of androgen excess.3 Secondly, ultrasonographic examination of the ovary has shown the typical morphology of the polycystic ovary in 92% of women with hirsutism.4 Most hirsute women have symptomatic and biochemical hyperandrogenism together with polycystic ovaries. Hirsutism is therefore one of the components of the polycystic ovary syndrome, even when the menstrual cycles and gonadotrophin concentrations are normal.

Many investigators have been tempted by the notion of a single mechanism to explain hyperandrogenism, but it is probably the result of defects in several metabolic and endocrine pathways. Induction of excessive synthesis of ovarian androgens through stimulation by luteinising hormone,5,6 insulin,7,8 or corticotrophin9 or through overactivity of the cytochrome P-450c17α enzyme complex10 have all been postulated. Applying molecular techniques to the study of hormone production should define subgroups of women with