Clinical Algorithms

Male infertility

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Infertility, defined as failure to conceive after one year of unprotected coitus, affects some 8-15% of married couples in developed countries. Owing to various sociobiological factors requests for infertility consultations have increased dramatically in the past decade.¹ Male factors alone are estimated to be responsible for infertility in 30% and contributory in another 20% of infertile couples. The presence or importance of the male component in an infertile union can be ascertained only by examination of the ejaculate. Thus semen analysis, together with the history and examination, provides the basic information for the initial evaluation of most patients.

Male infertility may be associated with one or more of many abnormalities. Most of the conditions produce functional disturbances that are demonstrable only as non-specific abnormalities during semen analysis. Investigation should therefore include not only the assessment of fertility potential but also a search for specific aetiological factors. Optimal management also requires the concurrent gynaecological assessment of the female partner.

History

A thorough history may give important clues to underlying aetiologies. Previous surgery such as herniorrhaphy in childhood, trauma, or torsion suggests possible injury to testis or vas. Bilateral cryptorchidism is usually associated with severe impairment of fertility even if treated surgically. Unilateral undescended testis, if treated successfully before puberty, may cause little reduction in fertility. In adults the value of orchidopexy in improving fertility is doubtful, but treatment, either hormonal or surgical, is recommended because of the risk of malignancy. Because feverish illnesses may transiently suppress spermatogenesis the patient should be asked about recent episodes of fever. Chronic disorders such as renal or hepatic failure and poorly controlled diabetes mellitus are associated with various degrees of testicular dysfunction.

Careful inquiry should be made about environmental, industrial, or accidental exposure to chemical toxins (herbicides, pesticides, lead, cadmium), irradiation, or drugs (sulphasalazine, cytotoxic drugs, sex steroids). Previous genitourinary infections in the form of orchitis (mumps, syphilis) and epididymitis (gonorrhoea, non-specific urethritis) are serious causes of infertility, especially in developing countries. A history of recurrent chest infections and sinusitis starting in childhood may be obtained in patients with

epididymal obstruction (Young's syndrome) or those with absent sperm motility due to ultrastructural abnormalities in the sperm tail, which may be associated with situs inversus (Kartagener's syndrome).

It is important to establish not only that sexual intercourse takes place with appropriate frequency and timing but also that normal ejaculation occurs within the vagina. Various forms of vaginal lubricants may have spermicidal effects.

Examination

General habitus, height, weight, and secondary sexual development should be assessed. If androgen deficiency is suspected look for gynaecomastia, cryptorchidism, anosmia, and visual field defects. Special attention should be paid to the detection of hypospadias, nodularity or enlargement of the epididymis (suggestive of obstruction), and palpation of the vasa in the scrotum. Measurement of testicular size with an orchidometer provides a convenient clinical index of seminiferous tubular mass. A varicocele is detected with the patient standing, and internal spermatic vein reflux may be shown during the Valsalva manoeuvre. Rectal examination may show tenderness and irregularities in the prostate suggestive of prostatitis.

History and examination will not show any demonstrable abnormalities in well over half of all infertile men.

Diagnosis

Despite the inadequacies of the conventional semen analysis as a test for fertility it has remained useful as a guide to further investigations in the absence of more precise and practical methods. All patients should produce two and preferably three semen samples, each separated by an interval of four weeks, for analysis. These are produced by masturbation after three days' sexual abstinence and examined within two hours after ejaculation. The sperm count is most useful in azoospermic and severely oligozoospermic ($<5 \times 10^6/\text{ml}$) patients, when interpreted with testis size and serum follicle stimulating hormone concentrations. Usually extra-testicular obstructive, testicular, and pituitary lesions can be differentiated without resorting to testicular biopsy. In patients with higher sperm counts the lower limit of normality cannot accurately be defined and the presence of functional abnormalities will be uncertain. The emphasis has therefore shifted towards the assessment of the functional properties of sperms by *in vitro* tests such as cervical mucus penetration,² interspecific fertilisation,³ and more detailed analyses of sperm movements.⁴ These investigations are relatively time consuming and technically demanding and at present available only in some centres.

Increasing awareness of the importance of sperm antibodies,⁵ accessory gland infections,⁶ and the detection and confirmation of varicoceles by ultrasonic, thermographic, and radiological tech-

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Male infertility

hCG = Human chorionic gonadotrophin
 hMG = Human menopausal gonadotrophin
 FSH = Follicle stimulating hormone
 GRH = Gonadotrophin releasing hormone

niques is beginning to reduce the size of the idiopathic group. It must, however, be emphasised that the value of some of these newer investigations and the subsequent treatment of the conditions remains an open question at present.

Treatment

The therapeutic possibilities currently available for treating male infertility are limited. This is a direct result of our poor understanding of pathophysiological mechanisms. For patients with no obvious explanation for their infertility many non-specific treatments have been tried.⁷ These include clomiphene, tamoxifen, mesterolone, testosterone rebound, gonadotrophins, arginine, kallikrein, and homologous artificial insemination using the first (sperm rich) portions of split ejaculates. None of these have stood up to the test of controlled clinical trials. Even the efficacy of long established surgical treatment for varicocele has recently been questioned.⁸ Notwithstanding, the development of interventional radiology has facilitated varicocele treatment using the technique of transcutaneous retrograde phlebography and embolisation of incompetent spermatic vein or veins.⁸ In the small number of patients with gonadotrophin deficiency spermatogenesis can be stimulated successfully and fertility achieved by treatment with human chorionic gonadotrophin and human menopausal gonadotrophin or, more recently, with pulsatile gonadotrophin releasing

hormone delivered every two hours by programmable miniaturised pumps. Such treatment is given for at least six months. The recognition of partial as well as complete epididymal obstruction as a cause for oligozoospermia and azoospermia is associated with the development of microsurgical techniques for epididymovasostomy. The more widespread use of glucocorticoids for sperm antibody associated infertility and antibiotics for occult accessory gland infections must await the advent of better diagnostic methods and results of large scale clinical trials. When treatment is not available or ineffective, artificial insemination with donor semen and adoption remain the only alternatives for infertile couples. The role of in vitro fertilisation in the management of male infertility is yet to be defined.

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MATERIA NON MEDICA

Einstein

When I was visiting my old chief the other evening, the talk turned to men of genius. I remarked that I had read somewhere that the three greatest mathematicians who ever lived were Euclid, Newton, and Einstein. He expressed his usual interest but then startled me by saying, quite casually, that he had once been Einstein's family doctor. This was before the war, at Princeton University, where Einstein had settled as a refugee from Nazi Germany and where my chief had been in general practice. They had become good friends and corresponded for many years.

He recounted the time Einstein found himself alone in the house when the local fuel merchant telephoned. A decision was needed on the amount of oil to be ordered for the forthcoming winter. The great man did not know but said he would call back. He then proceeded to calculate the cubic capacity of the house, the estimated heat loss from roof, windows, and walls, the temperature range required per month, and, after a supplementary telephone call, the heat producing capacity of the oil in standard units. The subsequent arithmetic was child's play to him. He contacted the dealer and placed the order.

When his wife returned home she listened patiently to his explanation, but as soon as he had finished she picked up the phone. "For goodness sake," she said crossly to the oil dealer, "what made you ask the professor? He knows nothing about things like that. I think this winter will be colder than the last one, so just add 100 gallons to last year's order – and pay no attention to him!" She hung up and went about her business, leaving a somewhat crestfallen Einstein behind. It would seem that genius, like prophecy, has but limited respect around its own fireside.—WILLIAM THOMSON, chief administrative medical officer, Lanarkshire.

Punctured, but not deflated

That evening I chose the "quick" route home, a journey of thirty miles along the back roads of Perthshire from the Pitlochry teaching practice. The snow plough had cleared the road earlier and it seemed passable—just. Progress was slow as I peered through the blizzard, occasionally stopping the car to clear the misfiring engine. After one of those occasions I felt the car veer to the right, even when I had dug out the packed ice from between the wheel and the wing. It was during the third "clearing attempt" that I realised I had a more fundamental problem on my hands—a puncture.

It was dark as I walked around to the boot, and before I could find the torch both feet were immersed in four inches of ice cold water. Recrimi-

nations were rife as I recalled which silly so and so (myself) had blocked the exit route of the spare wheel with the children's car seat attachment. And, either through those efforts to extract the wheel or with the thought of being stranded in the middle of nowhere, my glasses steamed up. Being unable to see, I laid them down in the boot. Unfortunately, uncorrected myopia and relative darkness hindered my finding them again, a job entailing several minutes of searching amongst the would be mechanic's accoutrements.

With spare wheel out and myopia corrected, I lay on the spare wheel and slid the jack under the car. It was after the fourth or fifth attempt to keep the car jacked up that closer inspection with torchlight revealed a buckled jack. My nerves steadied, however, as I recalled possession of a second jack. Soaked to the skin, my by then numbed body heaved and strained at the wheel nuts, nuts which must have been tightened by some aspiring Charles Atlas, and it must have occurred as I contemplated hernias—that is, I slipped and wrenched my ankle. However, the damned wheel nuts eventually succumbed and, with spirits creeping higher, I bent down on my good ankle to put on the spare wheel. Alas, my torch, precariously balancing in my pocket, slipped out and smashed on the road. With the hysterical cackling of geese from a nearby field (can they really see in the dark?) I sat down on the spare wheel in the middle of the now darkened road and contemplated the ill fates that can befall a medical student.—JOHN R PATERSON, final year student, Dundee.

What analgesic drugs are advised for a patient who has severe pain as a result of bilateral above knee amputation of the legs necessitated by a war injury?

Treatment will depend on the origin of the pain. If stump osteomyelitis is the cause I would favour using whatever analgesia is necessary to control this pain, including opiates such as morphine salts. Addiction and tolerance are not generally a problem in the treatment of acute pain. Hip block with bupivacaine may provide useful temporary analgesia which can carry forward for several weeks. Phantom pain after amputation is best considered as a variety of deafferentation pain. It can be chronic and extremely difficult to treat. Opiates are best avoided here, although control of acute pain may favourably influence the course of chronic pain. If drug therapy is unsuccessful referral to a pain clinic may help as many procedures including guanethidine blocks or neurosurgical intervention might prove useful. Psychological aspects should never be forgotten; tricyclic drugs may be tried empirically anyway in chronic pain as they have non-specific analgesic effects.—C G CLOUGH, senior neurological registrar, Birmingham.