SUBFERTILITY AND MALE SEXUAL DYSFUNCTION

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Subfertility

Contribution to subfertility

Female factors	50%
Male factors	20%
Both male and female factors	30%

As many as 15% of couples fail to conceive a child after a year of unprotected intercourse. It is important to investigate both partners fully to evaluate properly where the problem lies. This article considers only the male factors in subfertility.

Important factors

- Undescended testes
- Testicular torsion (and atrophy)
- Mumps orchitis
- Drug history/lifestyle
- Generalised illness
- Previous surgery
- Sexual habits

Factors in male subfertility

Men in whom one or both testicles were undescended at birth have lower semen quality than normal, regardless of whether an early orchiopexy was performed. Spermatogenesis can also be impaired if a patient has had testicular pain in childhood or adolescence (signifying an episode of torsion); has had mumps orchitis after puberty; or has used certain prescribed drugs or has misused drugs. As spermatozoa take up to three months to mature fully, seminal analysis may also yield abnormal results for a while if a patient has had a fever.

Drugs that may inhibit spermatogenesis

- Alcohol
- Nicotine
- Caffeine
- Marijuana

Several surgical operations may also impair fertility. Retrograde ejaculation may occur in about 40% of men after a bladder neck incision and is even more common after transurethral prostatectomy. The vas deferens and the testicular blood supply may both be damaged during repair of inguinal hernia. Dissection of retroperitoneal lymph nodes may affect the emission and ejaculation of semen by interrupting the sympathetic nervous system.

Frequency of sexual intercourse

- The timing and frequency of sexual intercourse may contribute to a woman's failure to conceive
- Couples should be reminded that a woman's most fertile time is mid-cycle and that intercourse should take place every two days during this time
- Wide deviations from this frequency will mean either that concentrations of spermatozoa are reduced or that the critical fertile phase may be missed
- Instruction should be given on how the mid-cycle period can be identified with temperature fluctuation in the morning

Initial assessment

A general physical inspection will confirm that a patient has normal secondary sexual characteristics. Abnormalities such as hepatomegaly or gynaecomastia may suggest hypogonadism or hormonal abnormalities.

The testes should be confirmed to lie vertically in the scrotum and be assessed for size and consistency. The vas deferens, reported to be absent in 2% of infertile men, should be carefully palpated. Finally, the patient should stand while the scrotum is examined for the presence of a varicocele.

Characteristics of normal semen

- Semen volume >1.5 ml
- Sperm concentration >20 million/ml
- More than 70% of spermatozoa should be motile
- Motile grade >2 (0=no movement, 4=excellent forward movement)
- More than 60% of sperms should have normal morphology
- Presence of fructose in semen

Leydig's cells, which produce testosterone. A low concentration may indicate hypogonadism, which may be treatable.

Varicocele.

Spermatozoa penetrating an ovum during fertilisation.

Investigations

Semen analysis—Most men referred to urology clinics because of presumed subfertility will already have had one or more analyses of their semen. An understanding of the meaning of the results is necessary as they will largely dictate the treatment offered. When the results are abnormal it is worth ensuring that the specimens were obtained correctly—that is, after an abstinence from intercourse or masturbation for three to five days and with no delay before the analysis of the sample in the laboratory. Definitions of a normal result from semen analysis vary widely. Men cannot be segregated into fertile or infertile groups on the basis of the analysis, and substandard results merely lessen the statistical chances that a man will father a child.

Hormonal evaluation—Hormonal evaluation is seldom diagnostic in subfertility because less than 3% of men investigated for subfertility have hormonal abnormalities as a primary cause. Follicle stimulating hormone is normally regulated by a negative feedback by inhibin, a product of the seminiferous tubules. Thus in cases of testicular failure, concentrations of both follicle stimulating hormone and luteinising hormone will be raised because that feedback loop is broken. Testosterone concentrations in this instance may remain normal. Azoospermia with a normal concentration of follicle stimulating hormone needs further investigation by testicular biopsy and vasography to differentiate testicular failure from vasal obstruction. Hypothalamic or pituitary disorders present a different picture. Failure of production of follicle stimulating hormone or luteinising hormone by the pituitary leads to reduced production of testosterone by the Leydig's cells of the testis. The finding of a low testosterone concentration is a good indication of hypogonadism due to a pituitary or hypothalamic disorder, which may be treatable.

Recent developments

Varicocelectomy—Varicoceles are present in 40% of men referred to subfertility clinics and occur bilaterally in about half of cases. It remains unclear, however, how varicoceles reduce fertility. The temperature of the testicle may be raised by close proximity to venous blood, but recent reports have suggested that the testicular temperature is higher in all men with subfertility regardless of whether a varicocele is present.

There are two indications for varicocelectomy—subfertility and scrotal pain, although before surgery other causes of these conditions must be ruled out. The standard procedure remains surgical ligation, although other treatments are available. Radiological embolisation of the main gonadal vein with use of steel coils has been shown to improve the sperm count in cases of subfertility and to reduce the size of the varicocele substantially. The recent enthusiasm for laparoscopic surgery has led to an interest in laparoscopic varicocelectomy. As with other laparoscopic techniques the morbidity associated with the procedure is low and the recovery quick.

Assisted fertilisation techniques—The past few years have seen a rapid advance in techniques designed to help men with obstruction of the reproductive tract. During their passage through the normal epididymis spermatozoa develop motility and the ability to penetrate the ovum. Spermatozoa retrieved from the epididymis of men without abnormalities are therefore usually less capable of fertilising the egg than those ejaculated. The situation seems to be reversed in men with obstruction of the reproductive tract. Fertile spermatozoa can therefore be retrieved from the epididymis in these men. Advances in the techniques of in vitro fertilisation have improved the chance of conception in cases of severe male subfertility. Insertion of spermatozoa has been shown in some studies dramatically to improve the pregnancy rates associated with in vitro fertilisation. High success rates have also been reported with the technique of injection of a single spermatozoon into an ovum retrieved for in vitro fertilisation—intracytoplasmic sperm injection.

Initial assessment

- A concise sexual history should be obtained, with the key points outlined
- Impotence arising suddenly during periods of major financial, marital, or work related stress may be psychological in origin
- Impotence of more insidious onset is more likely to be of organic origin
- Erections that a patient cannot sustain for long may suggest venous leakage

Penile Doppler ultrasonogram showing left cavernosal artery.

Normal male erection depends on three integrated processes. Arterial inflow to the penis increases, filling the sinusoids of the corpora cavernosa. This process is aided by the relaxation of cavernosal smooth muscle. Then passive occlusion of the venous plexus, which lies within the tunica albuginea of the penis, provides increased resistance to venous outflow, which aids rigidity. Recent studies have confirmed the role of prostaglandins (which are both synthesised and broken down by penile tissue) and nitric oxide. Nitric oxide is believed to be the final chemical modulator of non-adrenergic non-cholinergic transmission, and it aids erection by its ability to relax penile smooth muscle.

Investigation

Hormonal evaluation is often requested, although erectile dysfunction is seldom due to hormonal problems. The finding of an elevated prolactin concentration should prompt referral to an endocrinologist for exclusion of a prolactinoma. Testing of nocturnal penile tumescence can provide important evidence in doubtful cases. Good quality erections suggest that the nerves and vessels supplying the penis are working normally and implies that the impotence is due to a psychological cause.

Colour Doppler ultrasonography, combined with an injection of a vasoactive substance such as papaverine or prostaglandin E₁ into the corpus cavernosum, is used to identify abnormalities of vascular inflow. The presence of veno-occlusive disease is assessed by cavernosometry. Saline is infused under pressure into the corpus cavernosum with a butterfly needle, and the flow rate needed to maintain an erection indicates the degree of venous leakage. The leaking veins responsible may be visualised by infusing a mixture of saline and x ray contrast medium and performing a cavernosogram.

Treatment

For most patients with erectile failure treatment is (a) intracavernous pharmacotherapy, (b) use of a vacuum device, or (c) insertion of a penile prosthesis.

Intracavernous pharmacotherapy—This has revolutionised the treatment of impotence. Originally papaverine was used, but more recently preparations of prostaglandin E₁ have been developed that have fewer side effects—most notably, they are less likely to induce priapism. This treatment is most suitable for patients with good penile arterial inflow—that is, neurogenic or psychogenic impotence—but patients with poor arterial inflow may also benefit. Once the correct dose has been established by titration against the desired effect, the patient should be taught the correct injection technique. The injection is placed laterally into the base of the penis, avoiding the urethra ventrally and the neurovascular bundle dorsally. Potential complications, including pain and fibrosis at the injection site and priapism, should be outlined to patients. The patient should be told to attend the hospital for assessment if detumescence does not occur within four hours. Although treatment with intracavernous pharmacotherapy is effective, many couples find it difficult or disagreeable, and a drop out rate of up to 50% has been reported.

Correct technique for intracavernosal therapy. Top: Grey area shows muscle revealed by squeezing penis between finger and thumb—muscle is site of injection. Centre: Needle at correct angle for injection into muscle. Bottom: Diagram showing position for injecting.

Vacuum device, with constriction ring for maintaining erection.

Vacuum device—This treatment is less invasive than intracavernous pharmacotherapy, and results are good. The patient places his flaccid penis into the device and air is withdrawn, creating a vacuum that draws blood into the penis to bring about an erection. The erection is maintained by placing a constriction band around the base of the penis. The complications of this technique are minimal but include bruising.

Penile prosthesis—For most patients a penile prosthesis is tried only after vacuum devices and intracavernosal pharmacotherapy have both failed. Prostheses may be rigid or inflatable. Insertion requires strict asepsis under a general anaesthetic. The most important complication is infection—the prosthesis then has to be removed—though erosion of one or other corporal cylinders may occur.

Peyronie's disease

Treatment

- The Nesbitt procedure is performed either by plicating the tunica of the penis on the contralateral side to the deformity or by excising a small ellipse of tunica and closing the defect
- The deviation must not be overcorrected, and patients must be warned of some loss of length and girth in the erect penis
- Potaba, a potassium based preparation, has been advocated for use in Peyronie's disease, but no objective evidence exists that it is beneficial

Key references

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Peyronie's disease is a poorly understood condition affecting less than 1% of men, usually during middle age. The typical features are of a painful penile plaque of tissue and a deviation of the erect penis towards the side of the plaque. The cause is unknown, but some specialists believe that trauma during intercourse in a susceptible man may play a part.

Clinically the disease undergoes two distinct phases. The acute phase can last between one and a half and two years. During this phase the erectile deformity may worsen so it is important to resist surgical intervention during this time. Once the acute phase has finished the deformity usually remains the same with time. The patient should be seen together with his partner, and if intercourse is possible without difficulty or discomfort then surgery may not be needed.

The ABC of Urology is edited by Chris Dawson, a senior registrar in urology at the Edith Cavell Hospital, Peterborough, and Hugh Whitfield, a consultant urologist at the Central Middlesex Hospital and the Institute of Urology and Nephrology, London.

The source of the illustrations of Leydig's cells, varicocele, and spermatozoa penetrating an ovum was the Science Photo Library and of the ultrasonogram was Mentor Medical Systems. The diagrams showing technique for intracavernosal therapy were adapted with permission from a leaflet published by Pharmacia and Upjohn.

A MEMORABLE PATIENT

Thankless surgery

A few years before the second world war I was acting as a house surgeon. A patient was admitted with a hand injury. He was a manual worker, right handed. He had tried to catch a falling carving knife with his right hand. All the fingers were deeply cut at the base of the fingers. The resident surgical officer told me to cut the fingers off, keeping a good flap of skin so that I could sew and leave the scar away from the metacarpal heads.

I had to be quick and have the theatre clear within 15 minutes as there was a report of a multiple car accident likely to produce several casualties. On inspection I found that the dorsal tendons, the arteries, and the nerves were all still intact. I have always had a dislike of the knife and decided that the hand could be saved. I sewed the tendons to their respective cut ends, reconstructed the joints, and sewed the wound up. This took about two hours. The patient was kept on the ward for nearly two weeks and had to have intensive physiotherapy for two months and further supervision for another four months. At the end of six months he was able to return to his original work and original pay. He refused to come to the hospital any more so I was unable to follow up the recovery.

The resident surgical officer was cross with me for disobeying an

order. The theatre sister was cross because I kept the theatre in use when it might have been needed for the accident cases. The anaesthetist was cross because it meant that a patient who had not been starved for six hours had to have a two hour anaesthetic. The ward sister was cross because I kept a person on the ward who was cross and ill at ease. The consultant was cross because I kept a bed occupied which could have been used for getting someone off the waiting list. The hospital secretary was cross for the same reason. The patient was cross because I had caused him pain and discomfort during the healing process and had stopped him going to work even though he would have had a fingerless hand. His wife was cross because I caused her husband to be out of work with no dole or NHS sick pay. Yet I felt that I had done the correct thing in saving a right hand and enabling the man to return to his work.—R G CRAWFORD is a retired senior clinical medical officer in Shipley

We welcome filler articles of up to 600 words on topics such as *A memorable patient, A paper that changed my practice, My most unfortunate mistake*, or any other piece conveying instruction, pathos, or humour. If possible the article should be supplied on a disk.