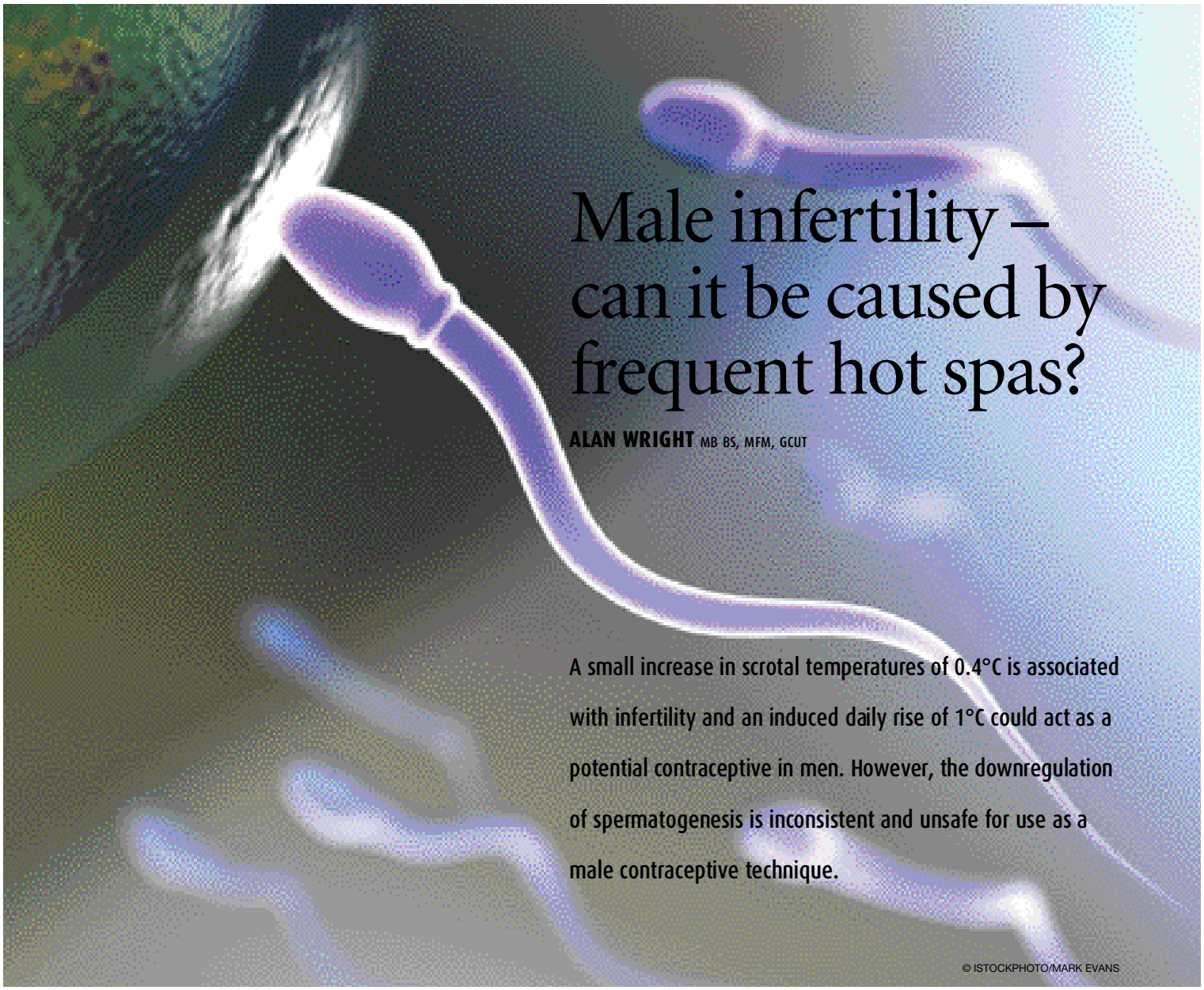

Male infertility – can it be caused by frequent hot spas?

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A small increase in scrotal temperatures of 0.4°C is associated with infertility and an induced daily rise of 1°C could act as a potential contraceptive in men. However, the downregulation of spermatogenesis is inconsistent and unsafe for use as a male contraceptive technique.

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Case scenario

Gavin is a 35-year-old married teacher at the local school. When he was 29 years of age, after two years of unsuccessfully trying to conceive with his wife of the same age, the couple underwent investigations and Gavin was found to have very few and very poor-quality sperm. His wife had no obvious fertility problems. They sought help from an IVF clinic and, with use of the technique intracytoplasmic sperm injection, became the proud parents of twin girls.

Three years later, during which time they did not use contraception, the couple moved to a different home in the same district. Within six months of being in the new house, Gavin's wife spontaneously became pregnant. When this baby was 9 months old, she became pregnant again.

Gavin had apparently had a spa in his first home and had been in the habit of taking frequent and very hot spa baths

after work. The new home did not have a spa, so this habit had stopped after the move. His friend, the local vet, was very aware of the disastrous effect of testicular heat on breeding animals. He was convinced that the frequent spas would have been the cause of Gavin's sperm abnormalities found at the time of initial testing.

What research has been conducted on heat damage to human sperm? What temperatures are harmful, and for how long do they have to be present? How long does it take for a new population of healthy sperm to emerge after transient damage?

Commentary

What research has been conducted on heat damage to human sperm?

The effect of scrotal hyperthermia on male fertility has been known since at least the time of the Roman Republic with historians of the time describing how Roman men took hot baths to reduce the chance of unwanted pregnancies. Scientific research is of course a different matter. The research that has been carried out has been in the areas of male infertility and contraception.

Undertaking a PubMed search using the key phrases 'testicular hyperthermia' and 'human spermatogenesis' produced only 19 results covering the period 1987 to 2010. A further search using the key phrases 'male contraception' and 'testicular hyperthermia' produced only two results and these were in the original 19. This research has been conducted in many parts of the world including France, India, China and the USA.

What temperatures are harmful and for how long do they have to be present?

In 1987, Mieusset and colleagues studied 150 infertile, nonazospermic men and compared them with 37 fertile men.[1] They found that the mean scrotal temperature values of the infertile men were 0.4°C (for the right) and 0.5°C (for the left) greater than those of the fertile men. They found that the higher the scrotal temperature, the more altered the sperm characteristics.

In 1995, Bujan and Mieusset reported that high immobilisation of the testes by wearing specific underwear raised the testicular temperature by approximately 1°C.[2] This was found to be enough to be a potential contraceptive method for men.

In 2007, Jung and Schuppe found that contraception can been demonstrated via genital heat stress using hot sitting baths or insulating suspensors.[3] However downregulation of spermatogenesis is inconsistent and unsafe. Furthermore, in 2010 Liu reported that a single exposure of monkey and rat testes to 43°C for 30 minutes over two consecutive days decreased the sperm count by up to 80% at 28 days and was completely reversible after two to three months.[4] Adding testosterone to the heat treatment reduced the sperm count to zero after two months.

In summary, a small heat increase in scrotal temperatures of 0.4°C is associated with infertility and an induced daily rise of 1°C could be a potential contraceptive in men. When heat stress is combined with testosterone the reduction in spermatogenesis is further increased. It should, however, be reiterated that the downregulation of spermatogenesis is inconsistent and unsafe.

How long does it take for a new population of healthy sperm to emerge after transient damage?

In 2007, Wang and colleagues conducted a study where they immersed the scrotums of 18 men in 43°C water for 30 minutes a day for six consecutive days.[5] They found that this manoeuvre suppressed sperm counts by increasing germ cell apoptosis. They also found that recovery began at week 9, but that combining the hyperthermia with testosterone undecanoate injections initially at a dose of 1000 mg and then 500 mg every six weeks prolonged the suppression of spermatogenesis.

Summary

Was the vet correct? Possibly, but the populations studied in these research studies were small and some of the populations were already known to be infertile. Wang and colleagues describe their populations as 'healthy' but they make no comment about the sperm counts prior to immersion in the hot baths.[5] Jung and Schuppe in their review make the comment that the downregulation of spermatogenesis from scrotal hyperthermia is inconsistent and unsafe for use as a male contraceptive technique.[3]

It would be interesting to assess Gavin's current sperm parameters to determine whether his sperm parameters have become normal or whether they are still impaired and, if so, how impaired. MT

References

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COMPETING INTERESTS: None.