Evaluation and Treatment of Impotence—Where Are We Going?

IMPOTENCE is a complex syndrome involving the interaction of psychological, hormonal, neurological, arterial, venous and sinusoidal factors. For socioethical reasons, the physiology of penile erection was not investigated and remained speculative and controversial for years. Consequently, most cases of impotence were regarded as a psychological disturbance and patients were ashamed to seek help.

In their article appearing in this issue, Davis and colleagues undertook the exhaustive task of investigating all the factors currently believed to cause impotence in aged patients and have demonstrated that the majority of their series of 93 are indeed suffering from a physical disease, not a psychological disorder. They have pointed out the inadequacy of traditional diagnostic studies, including nocturnal penile tumescence (NPT) monitoring, peripheral nerve conduction studies, psychological testing and Doppler penile brachial pressure index. They have also concluded that their extensive hormonal studies could not definitively establish a relationship between endocrine abnormality and impotence in the absence of a hormonal evaluation of age-matched potent men. They are to be congratulated for this undertaking. In this age of dollar consciousness, their costly study has disproved the merit of such an extensive investigation in every patient and has relieved us all of the guilt we might feel in using simpler approaches. (The total cost per patient for two nights’ mercury strain-gauge NPT monitoring and evaluation of liver, renal and thyroid function, as well as measurements of fasting glucose, testosterone, estradiol, estrone, luteinizing hormone, follicle-stimulating hormone, prolactin and sex-hormone-binding globulin is about $1,200 in San Francisco.)

Fortunately, recent knowledge of penile vascular anatomy, neuroanatomy, pharmacology and hemodynamics has provided better insight into erectile function and dysfunction. Investigations of the detailed anatomy of the pelvic and cavernous nerves have elucidated the cause of impotence after pelvic, rectal, prostatic and urethral operations, and hundreds of patients have already benefitted from nerve-sparing techniques.1,2

Hemodynamic studies in human volunteers3 and in animals4,5 in which electrodes were implanted around the cavernous nerves have shown that erection involves the active increase of arterial flow, the active decrease of venous flow and sinusoidal relaxation. The relative contributions of the cavernous and pudendal nerves have been determined. Impulses from autonomic nerves (cavernous) will induce a full erection, with intracorporeal pressure around 80 to 100 mm of mercury; contraction of bulbocavernous and ischiocavernous muscles from somatic (pudendal) nerve impulses can further raise the intracorporeal pressure to 200 to 400 mm of mercury, resulting in the rigidity common to masturbation or sexual intercourse.

Most recently, the ability to induce penile erection by the intracorporeal injection of phenoxybenzamine and papaverine has further advanced the diagnosis and treatment of impotence.6-8 Evaluation of the functional capability of penile arteries and veins is now possible. With duplex sonography and pulsed Doppler analysis before and after papaverine injection, the degree of arterial dilation and the amount of blood flow through individual cavernous arteries can be accurately measured.9 In our preliminary studies with this technique, more than 75% of patients were found to have compromised arterial capability. Venous competence can also be assessed by erection cavernosography after either saline infusion or papaverine injection.

The advantage of papaverine injection is its ability to work locally, affecting the cavernous muscles and arterioles directly and bypassing neural influences. Our animal experiments10 have shown that it fulfills all three requirements for penile erection: increased arterial flow, decreased venous flow and sinusoidal relaxation. It causes full erection when injected into the penises of normal volunteers as well as patients with psychogenic and neurogenic impotence. Those with neurogenic impotence can be differentiated by a characteristically hypersensitive and prolonged response. When used strictly for diagnostic purposes, papaverine injection is a safe procedure. Priapism has developed in none of our more than 200 patients studied thus far. However, several cases of priapism have been observed by others when papaverine was given therapeutically before sexual intercourse.

For the treatment of impotence, new methods of pharmacologic manipulation are being tried in several major centers in the United States, Canada and Europe: (1) intermittent papaverine injections, (2) self-injection of papaverine and phentolamine before intercourse, (3) self-injection of phenoxybenzamine before intercourse and (4) oral administration of yohimbine. It is hoped that these new advances will bring us a simpler and more physiologic approach to this puzzling problem.

TOM F. LUE, MD
Assistant Professor
Department of Urology
University of California, San Francisco,
School of Medicine

REFERENCES

Food for Thought

KRONLUND AND PHILLIPS, elsewhere in this issue, report a survey of 128 physicians and surgeons to test their knowledge of the rates of death and major complications for ten common procedures and found that the overall accuracy of their knowledge of these rates was considerably lower than one might expect. Their results were a surprise and even somewhat of a

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