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Review Article

Erectile Dysfunction: An Update Review

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Abstract

Erectile Dysfunction (ED) is a very important health issue that has a significant negative impact on the quality of life and life satisfaction of both the affected individual and his partner worldwide. Recently, advances in basic sciences have been instrumental in the evolution of the male sexual health treatment paradigm from a psychosexual model to a new model, which includes oral and intracavernosal injection pharmacotherapy, vacuum constriction devices, and penile prostheses for the treatment of ED. This progress has coincided with an increased understanding of the nature of male sexual health problems. Epidemiological data confirming these problems are widely prevalent and reveal the source of considerable morbidity, both for individuals and within relationships. In this research we have investigated the updated treatments and the recent studies about ED.

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Introduction

Epidemiological studies suggest that Erectile Dysfunction (ED), the persistent inability to achieve or maintain penile erection sufficiently rigid for achieving a satisfying sexual intercourse is a very common disorder in men between the ages of 40 and 70 years. This problem affects up to 52% of them and reduces their quality of life.(1) A penile erection is the hydraulic effect of blood entering and being retained in the sponge-like bodies within the penis. The most important organic etiologies are diabetes, cardiovascular disease and neurological disorders (for example, trauma of prostatectomy surgery), hormonal problems (hypogonadism) and drug side effects. Erectile dysfunction has severe psychological consequences as it can be tied to relationship difficulties and masculine self-images generally (2). This clinical disorder was described in early historical records, with descriptions of poor penile erection in men found in ancient Egyptian scriptures that are more than 5000 years old (3). Managing ED was directed largely towards psychosocial or hormonal factors, according to the presumption that these were causative conditions for this disorder. Treatments were generally administered in the forms of psychoanalysis, hormonal interventions and sex therapy. If these managements did not work out, other strategies were used, ranging from herbal supplements presumed to enhance sexual performance to mechanical devices. In other words, early penile implants of the 1950s and vacuum-pump technology of the late 1960s were affirmed to create penile rigidity, obviating the necessity for complete knowledge or application of the physiology or biochemical properties of the erectile response.

Epidemiology:
The prevalence rate of ED in the Asian population:

The prevalence of ED in Asia was recently analyzed by-Cheng et al(4). They performed a review study through PsycINFO, MEDLINE, PubMed and other search engines for articles documenting the prevalence of ED in Asian countries between 1986 and 2006. Among the 219 relevant articles initially identified, 34 articles were retrieved, 18 of which were analyzed as general population studies. The overall reported prevalence rate of ED in Asia ranged widely, from 2% to 81.8%.(5)
Data from Australian, US and UK studies are the same, estimating the prevalence of complete ED about 5% among 40-year-olds, 10% among men in their 60s, 15% among men in their 70s and 30–40% among men in their 80s. It is projected that, by 2025, 322 million men worldwide will have ED. Clearly, erectile dysfunction is now regarded as a major health problem for the increasingly healthy ageing population.(6)

Pathophysiology:
Penile erection is a neurovascular phenomenon which increases intracavernosal blood flow, requires dilation of the penile vasculature, relaxes smooth muscles, and normal veno-occlusive functions. Penile vascular disorders are the most common cause of organic ED and can involve several pathophysiological mechanisms, including impaired arterial inflow, impaired smooth-muscle cavernosal relaxation, chronic ischaemia-induced increased cavernosal smooth-muscle contraction, cavernosal fibrosis, veno-occlusive dysfunction and chronic or episodic hypoxemia. Endothelial dysfunction is the common pathway for many cases of ED. (7) ED can be an early manifestation of generalized endothelial dysfunction, and a predictor factor of other forms

of cardiovascular problems.(8) About 50% of the men with ED who have no cardiac symptoms have an abnormal stress test, and 40% have been found to have significant coronary artery diseases when studied. Apart from age, the major risk factors are those for vascular diseases (lack of exercise, diabetes, smoking, hypertension, abnormal lipid profile and obesity). In general, any condition that damages the endothelial function can result in ED. Other factors include depression and endocrine disorders (Table 1).

Table 1: Causes of erectile dysfunction

Psychogenic
. Performance anxiety
. Loss of attraction
. Relationship difficulties
. Stress
Psychiatric
. Depression
Neurogenic
. Spinal cord injury
. Pelvic surgery
. Pelvic radiotherapy
. Multiple sclerosis
. Diabetes mellitus
. Intervertebral disc lesion
. Alcohol
Endocrine
. Hormonal deficiency
. Testosterone deficiency
. Raised sex hormone-binding globulin
. Hyperprolactinaemia
Arteriogenic
. Hypertension
. Smoking
. Diabetes mellitus
. Hyperlipidaemia
. Peripheral vascular disease
. Metabolic syndrome
Venous
. Functional impairment of the veno-occlusive mechanism
Drugs
Central and/or direct effect, most commonly
. Antihypertensives
. Antidepressants
. Luteinizing hormone releasing hormone analogues

Treatment

Oral PDE5-Is (phosphodiesterase type 5 inhibitor) are the main treatment of the erectile dysfunction. Other treatments include lifestyle modification, injection therapies, testosterone therapy, penile devices, and psychotherapy.(9-11).

Psychosexual, couple, and partner therapy

Psychosexual therapy is indicated when significant psychological problems are recognized. It is best in men with predominantly psychogenic erectile dysfunctions. Techniques of psychosexual therapy include sensate focus, sex education, and interpersonal therapy.

Lifestyle modification

Lifestyle modification Findings from recent basic and clinical studies showed that targeting several lifestyle factors commonly associated with erectile dysfunction, such as obesity, smoking, alcohol consumption, and limited physical activity, can have significant effects on the improvement of erectile functions. (12-15) Mannino et al(16) reported that men who quit smoking had a lower erectile dysfunction rate compared with present smokers (2•0% vs 3•7%). Guay et al(17) reported a significant and rapid improvement in the erectile function upon smoking cessation in patients who had smoked over 30 pack-years (calculated by multiplying the number of cigarette packs a person smokes per day by the total number of years this person smoked; i.e., 30 pack-years means the person smoked a pack of cigarettes every day for 30 years). The present published work is not absolutely clear on whether or not alcohol consumption adversely affects the erectile function.(15, 18, 19)

In another study, 110 obese men with erectile dysfunction were randomly assigned to either an extensive weight loss program with dietary counselling and exercise advice or to educational guidance on weight loss only. 2 years later, the former group weighed significantly less, practiced more physical activities and had a significant improvement in their erectile dysfunction scores compared with the latter group. These data were further confirmed by later studies.(20, 21) Even though the present evidence suggests that modifying certain lifestyle factors can lead to significant improvements in men with erectile dysfunction, solid conclusions cannot be reached without several properly designed, prospective, and large-scale controlled studies. Also, the present research suggests that lifestyle modification can positively affect erectile function but after at least 2 years, which is considered a considerably long time.(22) Conversely, a combined approach of oral PDE5-Is and lifestyle modifications can improve the results after 3 months. (23) Finally, successful available treatments for erectile dysfunction should not be suspended awaiting lifestyle modifications.

Psychosexual therapy

Psychosexual therapy for ED cannot be standardized because the source of anxiety varies between patients. Relationship difficulties, depression, guilt, problems with intimacy and lack of sexual experiences may all increase anxiety and/or conflict, which may then manifest as ED.

Psychosexual treatments range from simple sex education through improved partner communication to cognitive and behavioral therapy and are often combined with ED pharmacotherapy. Results of psychosexual therapy are relatively good in the short term, but long term results are disappointing.(24, 25)

Pharmacotherapy

Most patients suffering from ED will respond to the safe, effective oral pharmacological agents now available. These include the PDE5 inhibitors sildenafil, tadalafil and vardenafil. Other physical treatments, such as:

vacuum devices and intracavernosal drugs, are used 'on demand'; however, the rates of discontinuation with these treatment alternatives are high owing to side effects, dislike of needles and unwillingness of the partner to participate. A large proportion of patients have a combination of psychogenic and organic ED. Organic ED may be associated with progressively worsening performance anxiety, which further worsens the erectile function. To treat these men holistically, the physician and psychotherapist may need to collaborate and combine counselling with a physical therapy, such as an oral pharmacological agent.

Pharmacological treatment

Oral pharmacological therapy

PDE5 inhibitors are a dramatic therapy in the treatment of ED. The PDE5 inhibitors selectively inhibit PDE5 and increase the amount of cGMP available for smooth-muscle relaxation, inducing vasodilatation, increasing corporal blood flow and erection. Numerous studies showed the efficacy, safety and tolerability of the potent, competitive on-demand PDE5 inhibitor drugs sildenafil (Viagra, Pfizer, Inc., New York, NY, USA), tadalafil (Cialis, Eli Lily and Company, Indianapolis, IN, USA), vardenafil (Levitra, Bayer Schering, Pharma AG, Leverkusen, Germany), and a daily dosing of tadalafil in the treatment of ED in a wide range of patients, including those with hypertension, diabetes, spinal cord injury, other concomitant medical conditions and in those patients taking a wide variety of concomitant medications.(26-28) The overall efficacy for the different PDE5 inhibitors appears similar with 65–70% of the men achieving completion of sexual intercourse. Efficacy is related to the extent and severity of ED, with significantly reduced efficacy demonstrated in patients with severe vascular ED, diabetic ED and post-radical prostatectomy ED. Data indicate that there are differences among sildenafil, tadalafil and vardenafil in pharmacokinetic properties, efficacy, potency, half-life and adverse effect profiles. Food high in fat delays and reduces the absorption of sildenafil and vardenafil, but does not affect the rate or extent of the absorption of tadalafil. The mean time to maximum plasma concentration of sildenafil and vardenafil is 1 h and for tadalafil is 2 h, while the half-lives of sildenafil and vardenafil are 4–5 h and that of tadalafil is 17.5 h. Daily dosing with tadalafil (Cialis 2.5, 5 and 10 mg) results in efficacy and side-effect rates comparable with those of on demand application of the highest doses of either tadalafil or other PDE 5 inhibitors, and can be considered first-line therapy, especially in men who engage in frequent intercourse or regard spontaneity of sexual intercourse as a key treatment goal.(29) Daily dosing may improve the endothelial function and improve or restore the erectile function.

Intracavernosal injection (ICI) therapy

Treatment with ICI therapy with using vasodilator drugs, such as single therapy of alprostadil (Caverject Impulse, Pfizer), or in combination with papaverine and phentolamine, which relax the arterial and trabecular smooth muscle, is an effective treatment for ED.(30) ICI therapy can be used in most the men who are struggling with ED but it's most useful in men who fail to respond to oral therapy. (31)

Vacuum constriction devices

The vacuum constriction device involves the application of a vacuum to the penis in a vacuum cylinder causing tumescence and rigidity, which is sustained using a constricting ring at the base of the penis. Blood is simply trapped in both the intracorporal and extracorporal compartments of the penis distal to the constricting ring.

Surgical treatment

Surgical treatment of ED has been reserved in patients who conservative therapy has failed or for whom conservative therapy is contraindicated. Most of these patients will have significant arterial or venous diseases, penile corpus cavernosum fibrosis or Peyronie disease. While the outcome of surgical intervention may be more reliable in certain selected patients, the incidence of morbidity and complications is significantly greater than with medical treatments.

Conclusion

ED is a common problem and is almost time associated with a reduced quality of life for the sufferer and the partner. ED is associated with many risk factors, such as diabetes mellitus, hypertension, hyperlipidemia and smoking. ED may be the first manifestation of generalized endothelial dysfunction and is a predictor of overall cardiovascular health and silent myocardial infarctions. In most men, treatment with ED pharmacotherapy alone or in combination with graded psychosexual therapy is effective in improving and/or restoring sexual functions.

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