

Peyronie's disease

A common cause of erectile dysfunction, Peyronie's disease is a connective tissue disorder associated with penile deformity and can cause considerable emotional distress for both men and their partners. Although not an uncommon problem in elderly men, familiarity with the causative factors, diagnostic aspects and treatment modalities is often lacking. We describe the condition along with the clinical aspects and current management options.

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François de la Peyronie, a French surgeon, is credited with the first description of Peyronie's disease in 1743.¹ Peyronie's is an inflammatory disorder affecting the tunica albuginea of the penis and is characterised by the formation of localised plaques. The inflammatory process often leads to penile pain with erection. Fibrotic scarring of the tunica usually, but not always, results in penile deformity, which is exaggerated in the erect state. The condition can cause distress and performance related anxiety and all of these issues can manifest as secondary erectile dysfunction.

The triad of penile pain and deformity along with the presence of a palpable tunical plaque is almost diagnostic of Peyronie's disease but may not be present in all patients.

Epidemiology

The peak age of presentation is between 50–55 years,² although men between the age 30 to 80 years may be affected. The prevalence increases with age, is predominant amongst Caucasians³

and has been found to exhibit a familial predisposition, but the exact mode and penetrance of inheritance is unclear.⁴

Almost certainly, the actual prevalence of Peyronie's disease is greater than that reported in the literature due to a significant feeling of embarrassment that results in under reporting. Epidemiological data suggest a prevalence in the region of 3%, equivalent to that of diabetes and urolithiasis.⁵ Autopsy series, however, suggest that the true prevalence may be as high as 23%, even though a great number of patients may be asymptomatic or suffer from a subclinical phase of the disease process.⁶

Aetiology and pathogenesis

The cause of Peyronie's has been a focus of extensive research, with repeated microtrauma being the most commonly implicated factor. The following theories have been proposed:⁷

- Trauma during penetrative sex causing microvascular injury and bleeding in the

subtunical spaces causes tunical delamination and fibrin deposition resulting in plaque formation

- Genetic and autoimmune factors—linked with HLA B27; autoimmune reactions subsequent to trauma leads to increased fibrosis, scarring and plaques formation
- Molecular theories postulate that the over-expression of fibrogenic cytokines, TGF- β 1 and aberrant p53 function lead to cellular over-proliferation. Free radicals generated from nitric oxide increase oxidative stress and are also considered fibrogenic.

Clinical evaluation

The natural history of Peyronie's disease is variable, ranging from gradual progression to, less commonly, spontaneous resolution.

Symptomatology of Peyronie's disease consists of early and late phases. Appearance of a plaque or nodule, pain or penile deformity on erection and erectile

dysfunction are features of the early phase. As the disease progresses into the late phase, patients present with a harder plaque, a stable penile deformity and erectile dysfunction. In one study 16% of men presenting with erectile dysfunction were found to have features of Peyronie's disease.⁸

The clinical evaluation should include subjective and objective assessment. A detailed history of symptoms is an essential part of the subjective assessment and should focus on the following:

- Presenting complaint including presence of plaque, pain, deformity and erectile dysfunction
- Duration and onset of symptoms to establish stability of disease
- Degree and direction of curvature; shaft narrowing; indentation; hinging; distal softening; penile shortening
- History of associated pathology and risk factors (see boxes 1 & 2)
- Presence of erectile dysfunction, the ability to perform penetrative sexual intercourse and the degree of psychological distress

Patient questionnaires including the International Index of Erectile Function (IIEF) are used in some specialist ED clinics.

Physical Examination and objective assessment of the patient includes:

- General examination for evidence of Dupuytren's contractures
- Size and location of plaque
- Measurement of penile length
- Degree and direction of curvature.

In an ED clinic, these

parameters are also assessed following the administration of oral or intracavernosal prostaglandin to induce erections. During the erect state the convex and concave lengths of the penis are measured to allow the patient to be counselled regarding the possible loss in penile length to be expected in the event of a tunical shortening procedure being performed. As a general rule, the degree of loss of penile length is the difference in the lengths of the convex and concave aspects of the erect penis.

Further evaluation using imaging modalities such as ultrasound, CT scan or MRI can be undertaken to assess the plaque size and morphology. High resolution ultrasound scan is used to demonstrate plaque calcification and thickening of tunica, whereas inflammation is only evident on nuclear magnetic resonance imaging. CT demonstrates calcification, but does not always detect thickening or inflammation and is hence less routinely used.⁹

Treatment options¹⁰

It is very important to consider the aim of any treatment option offered to the patient and management should be directed by both clinician and patient with careful and realistic consideration of the patient's individual expectations.

Conservative management and reassurance is all that is required when there are minimal symptoms, minimal reduction in quality of life and an absence of erectile dysfunction. For more advanced and problematic cases, options vary from pharmacotherapy to surgery.

Non-surgical management

Oral therapy

Vitamin E

Vitamin E is a tocopherol with anti-oxidant properties, the recommended dose is 200–300mg daily. It has shown to have no effect over the natural progression of the disease, but significantly reduces the pain associated with the early phase of the disease. It is, however, unpalatable and hence compliance remains poor.¹¹

Potassium aminobenzoate (POTABA)

It is thought that POTABA, (R) reduces fibrinogenesis by decreasing serotonin as a result of increased tissue oxygenation and reduced monoamine oxidase activity. Reduction of plaque size and stabilization of the deformity are seen with a dose of 20gm a day for three months when used in early stages.¹²

Tamoxifen

Tamoxifen facilitates the release of TGF- β from fibroblasts, which help regulate the immune response and thus the inflammatory process. It is administered in a dose of 20mg twice a day. Although reduction of pain and to some extent deformity has been demonstrated in uncontrolled studies, a randomised placebo-controlled trial showed that it was statistically ineffective.¹³

Acetyl-L-carnitine

Acetyl-L-carnitine is uncommonly used. The usual dose is 1gm twice daily. It has only been compared to tamoxifen in a randomised trial and showed better efficacy

Box 1: Conditions associated with Peyronie's disease

- Dupuytren's contracture
- Plantar fasciitis
- Tympanosclerosis
- Diabetes
- Gout
- Paget's disease
- β -blocker therapy

in reducing pain, curvature and disease progression.¹⁴

Colchicine

An antimicrotubule agent, colchicine inhibits secretion of collagen from fibroblasts. The dose is 0.6 to 1.2mg daily for one week followed by 1.8 to 2.4mg daily for three months. In a randomised placebo-controlled trial, colchicine was found to be ineffective.¹⁵

Intralesional therapy**Calcium channel blockers**

Verapamil acts by increasing cytokine expression and improving the proteolytic activity of collagenase. Although improvement in curvature and pain was seen in an uncontrolled study,¹⁶ a randomised, placebo-controlled double-blind trial showed no significant benefit.¹⁷

Steroids

Hydrocortisone and betamethasone have been used but are ineffective and hence not recommended.¹⁸

Topical therapy

Extracorporeal shock wave therapy (ESWT) has been used for reduction of pain and improvement in curvature with reported success of

50% in some studies, although these studies were poorly designed and at present there is no robust evidence to suggest that this therapy should be performed outside of a well conducted randomised controlled trial. NICE guidance states that although ESWT is a safe procedure with low complication rates, its efficacy still remains unproven.¹⁹

Surgical management

Surgical options should only be considered after the disease has stabilised, usually after 12 to 18 months. This option should be reserved for patients with severe deformity or an inability to perform penetrative sexual activity. Thorough evaluation and careful counselling is necessary for those who elect to have operative correction to ensure that expectations are realistic. Corrective surgery falls into three broad categories:

Tunical shortening procedures^{20,21}

The pre-requisite for undertaking tunical shortening procedures are an adequate penile length and the ability to achieve and sustain an erection of sufficient rigidity to enable penetrative sexual intercourse. Circumferential deformities are a contraindication. Techniques include excision of an ellipse of the tunica albuginea opposite the plaque (including the operation first described by Nesbitt) and plication of the corpora directly opposite to the plaque.

Complications include penile shortening, which may be estimated as the difference in length between the concave and convex aspects of the erect penis, erectile dysfunction,

Box 2: Risk factors associated with Peyronie's disease

- Hypertension
- Hyperlipidaemia
- Urethral catheterisation
- Radical prostatectomy
- Cystoscopy
- Genital trauma
- Urethritis
- Uric acidemia
- Atherosclerosis

(5%) and penile paraesthesia. The patient should be counselled that the stitches will be palpable as a ridge beneath the skin and that the aim of the procedure is to attain a functionally straight rather than an anatomically straight penis. Unless the foreskin is completely healthy and fully retractable over the glans penis, a circumcision is usually performed during the procedure to allow degloving of the penis and adequate exposure of the operative field.

Tunical lengthening procedures²²

These involve excision or incision of the plaque and placing a graft over the defect thus resulting in increased length of the tunica and correction of the penile deviation during the erect state (Lue procedure).

Graft materials may be autologous (saphenous vein, tunica vaginalis, dura mater and temporalis fascia), cadaveric (pericardium, dermis, fascia and porcine small intestinal submucosa) or synthetic (polyester and polytetrafluoroethylene).

Success rates reported with this method are as high as 95% with erectile dysfunction being

the commonest complication, at approximately three times higher than that experienced with tunical shortening procedures. The great advantage of this technique is that penile length is not lost and as such this is the operation of choice for patients with severe deformity over 60. Rather than a palpable ridge at the site of stitches as is the case for tunical shortening procedures, patients usually feel a raised bleb at the site of the graft during erection.

Penile prosthesis²³

Insertion of a penile prosthesis is indicated in patients with Peyronie's disease and erectile dysfunction or in patients suffering from circumferential plaques. Inflatable penile prostheses are used as a standard. High success rates and excellent results are reported.

Summary

Peyronie's disease is a common condition in older men with an increase in incidence with age and is characterised by formation of plaques in the tunica albuginea of the penis that can lead to pain, deformity and erectile dysfunction. It is associated with conditions including Dupuytren's contracture, plantar fasciitis, diabetes, gout and Paget's disease, with microtrauma being the most common causative factor, and risk factors include hypertension, hyperlipidaemia and urethral instrumentation.

Evaluation should include subjective and objective assessments of the condition. Treatment options include conservative measures in the initial stage and surgical correction once the disease has stabilised wherein the aim is to

achieve a functionally straight penis to facilitate penetration.

Conflict of interest: none declared

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Further Reading

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