Ophthalmology

The cornea continuation

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Learning objectives:

At the end of lecture, students should be able to:

1. Understand outlines regarding keratoconus: causes, diagnosis, prevention and treatment.

2. Indications of penetrating keratoplasty as an outline should be knows by students.

3. Understand the basic knowledge regarding anatomy, histology& main diseases of sclera.

4. Outline systemic association of scleral diseases & how to treatment different types of scleritis .

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Keratoconus

It is a progressive disorder in which the cornea assumes an irregular conical shape. The onset is at around puberty with slow progression thereafter and become stationary at any time (age).

***** the cornea has two surfaces; anterior and posterior, & the thickness of the cornea at the center is 0.5mm and about 1mm at the periphery. In keratoconus, there is progressive and irregular changes in the cornea making it more convex and make it have a more conical shape, also there is severe thinning of the cornea that the cornea may reach 1/3 its original thickness (about 0.16mm). These deformities will affect the visual acuity (as the cornea is the most important focusing power) leading to myopia and irregular astigmatism.

Presentation:

1- Unilateral impairment of vision due to progressive myopia and regular astigmatism, which subsequently becomes irregular.

2- Frequent changes in spectacle prescription or decrease tolerance to contact lens (due changes in the shape of cornea).

3- The fellow eye usually has normal vision with negligible astigmatism at presentation because of the asymmetrical nature of the condition.

Signs of keratoconus:

The hallmarks are: **1-** Central or paracentral stromal thinning.

2- Apical protrusion.

3- Irregular astigmatism.

1- Direct ophthalmoscope from a distance of one foot shows an oil droplet reflex.

2- Retinoscpoy (used for diagnosis of refraction errors) shows an irregular reflex.

3- Slit-lamp shows very fine, vertical, deep **stromal** striae "Vogt's lines" due to protrusion of cornea.

4- Later, there is progressive corneal thinning as little as one third of normal thickness, associated with poor visual acuity (irregular myopic astigmatism).

5- Bulging of the lower lid in down gaze "Munson sign".

6- Acute hydrops: It is an acute influx of aqueous into the cornea as a result of a rupture in Descemet's membrane →sudden decrease in visual acuity associated with discomfort and watering (lacrimation).

The break usually heals within 6-10 weeks and the corneal oedema clears.

Management:

Eye rubbing should be avoided

1- Spectacles: In early cases to correct regular and mild irregular astigmatism.

2- Rigid contact lenses: For higher degree of astigmatism, they only reshape the cornea, there refractive power is zero.

3- Corneal collagen cross-linking CXL.

4- Intracorneal ring segment implantation

5- Keratoplasty: In advanced progressive disease, especially with significant corneal scarring.

Keratoplasty (Corneal transplantation, Grafting)

It is an operation in which abnormal corneal host tissue is replaces by healthy donor cornea, it is either ***Full-thickness*** (Penetrating keratoplasty) or ***Partial thickness*** (Lamellar keratoplasty).

Penetrating keratoplasty:

Indications:

1- Optical keratoplasty: To improve visual acuity indicated in e.g. keratoconus, dystrophies, degenerations, scarring of cornea and pseudophakic bullous keratopathy (oedema due damage of the endothelium after implantation of a prosthetic lens).

***** The most common indication in western countries is pseudophakic bullous keratopathy.

2- Tectonic keratoplasty: To restore corneal integrity, indicated in stromal thinning and descemetoceles (A **descemetocele** is an outward displacement of Descemet's membrane in an area where the overlying corneal stroma has been destroyed by inflammation).

3- Therapeutic keratoplasty: Removal of infected corneal tissue in eye unresponsive to antimicrobial therapy.

4- Cosmetic keratoplasty: Rare indication, to improve the appearance of the eye.

Sclera

The scleral stroma is composed of collagen bundles of varying size and shape that are not uniformly orientated as in the cornea, and so are not transparent. The inner layer of the sclera (lamina fusca) blends with the uveal tract. Anteriorly the episclera consists of a connective tissue layer between the superficial scleral stroma and Tenon capsule..

Scleritis & episcleritis

Episcleritis

Episcleritis is a common, usually idiopathic and benign, recurrent and frequently bilateral condition. Females may be affected more commonly than males.

a- Simple episcleritis

Common, benign, self-limiting but frequently recurrent, typically affects young adults & Seldom associated with a systemic disorder

Treatment
Topical steroid
If unresponsive systemic ibuprofen 200 mg tid

b- Noduler episcleritis

Localized nodule which can be moved over sclera, may take longer to resolve, less common than simple episcleritis.

Treatment - similar to simple episcleritis

Scleritis

A- Anterior scleritis

1 • Non-necrotizing

a • Diffuse

Relatively benign - does not progress to necrosis , widespread scleral and episcleral injection.

Treatment : Oral NSAIDs, if unresponsive Oral steroids..

b • Nodular

More serious than diffuse scleritis & on cursory examination resembles Nodular episcleritis, Scleral nodule cannot be moved over underlying tissue.

Treatment - similar to diffuse non-necrotizing scleritis

2 • Necrotizing

a. with inflammation

• Vaso-occlusive : like RA.

• Granulomatous: like polyarteritis nodosa

• Surgically induced (can also be infective)

Painful and most severe type of scleritis.

Treatment :

Oral steroids, if unresponsive must start with Immunosuppressive agents (cyclophosphamide, azathioprine, cyclosporine), & lastly we can use

Combined intravenous steroids and cyclophosphamide

b• necrotizing without inflammation called it (Scleromalacia perforans)

Associated with rheumatoid arthritis, Asymptomatic and untreatable

Characterized by Progressive scleral thinning with exposure of underlying uvea.

B- Posterior scleritis

About 30% of patients have systemic disease & represent about 20% of all cases of scleritis

Diagnosed by imaging technique like B scan.

Treatment : similar to necrotizing scleritis with inflammation.