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CLINICAL FEATURES AND COMPLICATIONS AFTER CORNEAL TRANSPLANTATION

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Abstract

Corneal transplantation is currently used to treat certain eye diseases. This operation is sometimes called keratoplasty. The cornea is the transparent, dome-shaped surface of the eye. Light enters the eye through the cornea. It plays a major rolein the eye's ability to see clearly.

Key words

transplant success, immunological rejection,main complications, clinical observation, restoration of vision.

Introduction: Causes of Corneal Graft Failure It is known that the outcome of keratoplasty largely depends on the etiology of the corneal disease. There is evidence that patients with keratoconus, with primary keratoplasty, without pronounced vascularization of the bed have a high probability of a positive outcome of graft engraftment: it is almost 90%. In patients with high-risk factors for rejection, it decreases to 35-70% [93, 99, 195, 250]. A complex case is "high-risk keratoplasty", in which recipients have systemic diseases, secondary immunodeficiencies, hormone-dependent diseases, vascularized leukomas and a decrease in the rate of epithelialization. In patients in this group, in 18-79% of cases, keratoplasty ends in opacity or rejection of the graft. This phenomenon can be explained by pre- and postoperative complications, as well as purely clinical factors (graft quality, choroidal inflammation, vascular ingrowth into the graft), and a pronounced immune response resulting in an immune conflict between the donor and recipient . Graft disease or corneal graft failure is an irreversible loss of the optimal refractive properties of the graft, which can be caused by immune or non-immune mechanisms. Signs of a destructive immune response are observed in 30% of corneal transplants. The primary target of the allogeneic response is the corneal endothelium, which plays a crucial role in maintaining corneal transparency. Other causes of corneal graft failure include glaucoma (10%), nonviral infections (10%), endothelial cell failure (8%), and viral herpes infections (7%). The causes of the remaining cases often remain unclear.

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Graft failure manifests as swelling, opacification, and cellular infiltration of the corneal graft. Patients typically complain of severe pain and decreased vision. Objectively, there is marked mixed injection and swelling of all graft layers, and thickening of the transplanted cornea is observed. In addition, precipitates on the endothelium and cellular infiltration of the graft stroma are possible. On biomicroscopy, the pupillary response to light is sluggish or absent. Two forms of graft failure are distinguished: early (1-5 days postoperatively) and late (up to 1 year, most commonly in the first two months postoperatively). In the late stage, conservative treatment is possible, unlike in the early stage, for which rekeratoplasty is the only recommended treatment.

Impaired graft epithelialization. Epithelialization of the anterior wall of the corneal graft is achieved by replacing the defect with mature corneal epithelial cells migrating from the edges of the epithelial defect. Moreover, the epithelialization process is already active within the first day after corneal transplantation. In the initial stages of epithelial defect closure, irregularly polygonal dendritic cells are observed. During the process of corneal graft re-epithelialization, periodically recurring erosions or replacement of corneal epithelium with conjunctival epithelium may occur.

Clinical features after corneal transplantation include gradual improvement in vision (usually over several months), photophobia and possible distortions initially, and the need for vision correction with glasses or lenses after complete healing. The main complications are transplant rejection (approximately 20% of cases, manifested by redness and clouding), infection, increased intraocular pressure (glaucoma), cataracts, and suture problems. Clinical Features Photophobia and visual distortion: Photophobia and visual distortion may occur immediately after surgery, so wearing sunglasses is recommended. Gradual improvement in vision: Vision may change over several months as the natural healing process occurs. Vision recovery: Complete healing of the cornea may take a year or more. Sutures: Sutures are usually removed about a year after surgery, but the exact timing is determined by your doctor. Need for vision correction: Myopia or astigmatism may develop after surgery, which will require wearing glasses, contact lenses, or laser vision correction. Complications Graft rejection: The most common complication caused by the body's immune response to foreign tissue. Symptoms: Intense redness of the eye, clouding of the transplanted cornea. Treatment: Often controlled with medication, especially in the early stages. Infection: As with any surgery, there is a risk of eye infection. Glaucoma: Increased intraocular pressure. Cataract: Clouding of the lens. Suture problems: Problems may occur with the sutures used to secure the donor cornea. Corneal edema: Impaired corneal clarity due to

swelling. Intraocular inflammation: A possible complication, especially with a rejection reaction. Aqueous fluid leakage: Risk of fluid leaking outward due to exposure of the eyeball during surgery.

Clinical manifestations include conjunctival hyperemia, edema and loss of graft transparency, opalescence of the anterior chamber fluid, and precipitates on the endothelium. The precipitates are randomly distributed or form a pathognomonic chain—the Chodadoust line—of leukocytes. The line begins at the vascularized edge of the graft and extends toward the center. Stromal edema may be diffuse or segmental, and folds of Descemet's membrane are observed. Endothelial cells become larger, acquire a more rounded shape, and disruption of intercellular connections occurs. They are later replaced by mononuclear leukocytes and fibroblasts. Another common cause of graft failure is late endothelial failure. Glaucoma-associated endothelial failure is the most common cause of failure in opaque grafts. The rate of endothelial cell density (ECD) decline varies among recipients: for example, a rapid decline in ECD has been observed after penetrating keratoplasty in recipients with severe iris atrophy after penetrating keratoplasty, compared with recipients with healthy irises. It follows from the above that future ECD also depends on the preoperative condition of the recipient's iris. Intensive therapy for the corneal endothelial reaction is necessary to prevent irreversible graft opacification. Late endothelial failure (decreased ECD), which can occur several years after corneal transplantation, is also mediated by immune system factors. Numerous studies have shown that the surface of transplanted corneal endothelium contains dendritic cells, CD4+ T-helper cells, CD8+ cytotoxic T-cells, CD20+ B-lymphocytes, CD68+ macrophages, and neutrophils. In an experiment on rabbits, scanning confocal contact mirror microscopy revealed the main cause of late endothelial failure: immune cells producing proinflammatory cytokines, in particular TNF-α and IFN-γ. Moreover, some corneal endothelial cells located near these immune cells showed signs of apoptosis.

The depth of the corneal damage determines the type of ALK surgery that is right for you. Superficial anterior lamellar keratoplasty (SALK) replaces only the front layers of the cornea. This leaves the healthy stroma and endothelium intact. Deep anterior lamellar keratoplasty (DALK) is used when the corneal damage extends deeper into the stroma. Healthy donor tissue is then attached to replace the removed portion of the cornea. This process is called a transplant. Artificial corneal transplant. If you are not a candidate for a corneal transplant with a donor cornea, you may be given an artificial cornea. This surgery is called keratoprosthesis. Most people who undergo a corneal transplant will regain at least partial vision. What you can expect after a corneal transplant depends on your health and the reason for

the surgery. The risk of complications and corneal rejection persists for many years after a corneal transplant. Therefore, see your ophthalmologist annually. Corneal rejection can often be treated with medication.

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