Review on healing eye disease using deproteinized calf blood extraction

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Abstract. Deproteinized calf blood extractive is a cellular respiration activator. Its main role is to enhance the cellular pharmacology of oxygen and glucose which is to be uptaked and utilization. It enhanced ATP synthesis and promote the delivery of nutrients to promote tissue repair and regeneration. The drug has been used in the clinical treatment of cerebrovascular disease. In recent years, with further research, the drug started for the treatment of eye diseases, and achieved good results. This study make a review on the deproteinized calf blood extractive has been applied in the clinical treatment of four types eye diseases.

Introduction

Eyes are the most vulnerable parts of the body, they are often susceptible to damage by many factors of physical, chemical, microbiological, parasites, etc..The damage of eyes often delayed healing ,and its complications can cause severe eye ulcers, so the clinical treatment of eye disease is more difficult. In addition, the ophthalmic surgical and the rapid complete restoration trauma normal vision is necessary. In recent years, the basic fibroblast growth factor (bFGF), epidermal growth factor (EGF) and other drugs which are in the clinical application promote corneal epithelial healing, and achieve good effect, but there are still deficiencies. In vivo conditions, bFGF stimulate corneal fibroblasts into newly formed collagen fibers and loss of the normal arrangement structure, in addition to this it also promote angiogenesis [1]. The adhesion between EGF stimulation epithelial and matrix is not strong. Nerve growth factor (NGF) eye drops cure neurotrophic corneal ulcer, 10 days to 6 weeks, all cases healed. But it has not been commercially available products in the clinical application of NGF [2]. Fibronectin (FN) is used to treat persistent corneal epithelial defects and it is successful. In recent years, FN has been reported at home and abroad. But it also has unstable nature, not easy to store and use, so it is not widely used in clinical practice. Corneal nutrient is represented by autologous serum (AS) and Solcoseryl ointment, and improve the nutritional status of the corneal surface and thus promote corneal epithelial healing. But AS need to drawn outer peripheral blood of patients , as well as it is difficult to save. Therefore, it is limited in clinical and looked for an effective treatment of eye diseases is necessary [3,4].

Research show that deproteinized calf blood extractive is biologically active substances which is extract from one to six months qualified quarantine calf blood. It is also a cellular respiration activator, excluding proteins and antigens, and its molecular weight between 250-700. It mainly comprise small peptides, amino acids, nucleotides, sugars and organic matter. The main pharmacological effects of amino acids and nucleotides are to enhance the cells uptake and utilization the oxygen and glucose, to enhance ATP synthesis, to promote the delivery of nutrients, to promote the repair and regeneration of tissue [5,6]. Sugar and organic matter can improve tissue nutrition, stimulate cell regeneration and accelerate tissue repair. Deproteinized calf blood extractive is made for ointment and it is represented by swiss plain tall pharmaceutical factory developed Solcoseryl. It also has been widely used in ophthalmology, and its effect which promotion of corneal epithelial defect repair is good , but in recent years it has stopped imports. The water-soluble ophthalmic gel formulation of domestic deproteinized calf blood extractive has not been reported in ophthalmic applications. The deproteinized calf blood extractive eye gel which is researched by Hefei Zhaoke Pharmaceutical utilize sodium carboxymethyl cellulose as a carrier. It make deproteinized calf blood extractive active ingredients evenly distributed keratoconjunctiva

surface, extend the contact time of the drug with the surface of the eyes, improve the utilization of oxygen and nutrients corneal tissue. The sodium carboxymethyl cellulose can also be used as a lubricant cornea, the corneal surface lubrication can reduce eyelid on the cornea surface friction, and make the new growth of corneal epithelium not falling. This study has been applied to research on the deproteinized calf blood extractive heal four types of eye disease in the clinical.

Deproteinized calf blood extractive heal corneal epithelial defects.

Corneal epithelium is often susceptible damage by the physical and chemical and biological agents, and it leads to its inflammation delayed healing or unhealing, at the current the clinical routine treatment is so few, and good effect drugs are even less. In recent years, the clinical application of basic fibroblast growth factor, epidermal growth factor and other drugs, which promote corneal epithelial healing, have yielded some effects, but still not ideal. Basic fibroblast growth factor stimulate the new collagen fibers corneal stromal fibroblasts losing the normal arrangement structure, and in addition it can promote the new blood vessels formation in vivo conditions. The adhesion of epithelial and stromal are not strong， and the epithelial and stromal are stimulated by epidermal growth factor. Research show deproteinized calf blood extractive can promote corneal epithelial repair. Tinggang Wang which worked at Third Military Medical University and other study found that[7], Deproteinized calf blood extractive eye gel can cure trauma, surgical and chemical, mechanical damage caused by corneal epithelial, its defects efficiency 91.3%. Deproteinized calf blood extractive eye gel defects lesion efficacy and bFGF eye drops for treatment of corneal epithelium are basically the same, and the differences are not statistically significant ($P > 0.05$), and the course of treatment find no significant adverse local irritation and systemic. This shows that the deproteinized calf blood extractive eye gel, treatment of corneal epithelial defects, is a effective and safe drug.

Deproteinized calf blood extractive repair corneal damage after LASIK.

The excimer of laser in situ keratomileusis (LASIK) for cornea is an invasive surgery. Traumatic injuries include that: microkeratome has injury in the corneal subcutaneous plexus and the corneal epithelium; negative pressure ring damage on conjunctival epithelium and goblet cells; postoperative ocular surface drugs damage for ocular surface microenvironment. Above all damage will result in patients foreign body sensation, dry eyes and other symptoms. Severe cases can cause dry eye syndrome after LASIK. Deproteinized calf blood extractive eye gel is extracted from a healthy calf serum. It has no protein and low-molecular biologically active substances, and there is a strong pro-cell growth and regeneration ability. Guangzeng niu [8] researched 114 LASIK patients to find that LASIK postoperative early use of deproteinized calf blood extractive eye gel is conducive to the corneal surface damage repair, relieve postoperative dry eye symptoms. But it has no significant effect for repairing corneal nerve damage.

Deproteinized calf blood extractive is good for Postoperative vitrectomy tear film.

Vitrectomy is microsurgery surgery which developed in early 1970. It become a common method of the diagnosis and treatment for vitreoretinal diseases, and save a lot of vision in patients with complex vitreoretinal disease, cure so many eye disease which in the past was considered incurable. However, in clinical work, vitrectomy surgery can cause tear film stability decreased and eye discomforted. To a certain extent, they affected the results of operations. It is the one of main reason that the patient are not satisfied postoperative. Deproteinized calf blood extractive eye gel can promote eye tissue and cell uptake and utilization the glucose and oxygen, increase the rate of ATP synthesis, maintain the normal physiological function of the enzyme, promote cellular energy metabolism. Thus deproteinized calf blood extractive eye gel improve tissue nutrition and stimulate cell regeneration and accelerate tissue repair. Sodium hyaluronate eye drops don’t have the antigen, and it is not allergenic and no immune response. Sodium hyaluronate eye drops can also improve

the patient's corneal surface regularity, thereby improving visual function and reduce photophobia phenomenon. Xiaorui Liu [9] combination deproteinized calf blood extractive and sodium hyaluronate eye drops for researching 120 postoperative vitrectomy patients, and find that early combination with sodium hyaluronate eye drops and deproteinized calf blood extractive eye gel can accelerate the recovery of the tear film function. That combination can enhance immune function, get good moisture and lubrication. After using for a long time, it cover the wound, and repair the ocular surface epithelium to a certain degree, and promote the recovery of the tear film stability.

Deproteinized calf blood extractive cure children dry eye syndrome.

Dry eye is a disease which is because of quantity or quality of the tear and fluid dynamics caused by abnormal and (or) ocular surface damage, leading to ocular discomfort and visual dysfunction in a class of diseases. Previous studies suggest that dry eye syndrome occurs in adults, but in recent years more and more children are also found considerable proportion of dry eye syndrome. At present the treatment for adult dry eye is sodium hyaluronate eye drops in clinical, and it is also applied to children. But clinical observation that many children tingle obvious after point sodium glass drops and occurs crying phenomenon in tears, most of the drops in the conjunctival sac residence are too short and flowe with tears. Parents often give up because of difficulties dropping continue to use, thus this affects the therapeutic effect. Jun Ouyang[10] studies 100 cases of children dry eye syndrome, he prove deproteinised calf blood extractive eye gel can be effective in treating children dry eye syndrome. Deproteinized calf blood extractive eye gel is a corneal epithelial healing drugs. It is extracted from one to six months quarantine calves biologically active substances in the blood, low molecular weight peptides, oligosaccharides and amino acids to promote inner mitochondrial oxygen and glucose uptake and utilization. It enhance ATP synthesis, accelerate energy metabolism, cytokines stimulate cell regeneration and epithelial tissue repair. And it enable the transformation of granulation tissue hyperplasia, collagen reorganization to reduce or avoid scarring. Because the gel is to stay in the eye a long time, and has good comfort, and drop few times a day, children and parents easily accepted. So good adherence of treatment can be persist, and lead to obvious treatment effect.

Eye disease is due to its site of action which is extremely sensitive and nerve-rich, medication is extremely cautious. Some strong potency and fewer side effects drugs will be prohibited. The main role of deproteinized calf blood extractive is to enhance the cellular pharmacology of oxygen and glucose which is to be uptaked and utilization. It enhanced ATP synthesis and promote the delivery of nutrients to promote tissue repair and regeneration. And because its role is almost no side effects, good efficacy and its action are all fast, so it was widely used in the treatment of ocular diseases. This article only make a simple discussion on deproteinized calf blood extractive in the clinical application of four types of eye disease as an example, we want to play a supporting role for related research personnel.

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