

STUDY EFFECT THE DEXAMETHASONE FOR LONG TERM IN EYE RABBITS

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ABSTRACT

To study the effect of over dosages of dexamethasone on eye rabbits; a total of 20 healthy adult rabbits were used. Rabbits were equally divided in to 4 groups, the rabbit in each group was treated with dexamethasone intramuscular twice daily for 30 days. The dexamethasone doses were 10, 20, 30, and 40 mg/kg/day, for group 1, 2, 3, and 4 respectively. After that the animals were sacrificed, histological sections of cornea samples were prepared using hematoxylin and eosin staining. The entire experiment was completed in the animal facility at Veterinary Medicine College, University of Basrah. Rabbits in Group 1 and 2 remain healthy and there are no side effects of dexamethasone while group 3 and 4 the side effects of dexamethasone were cataract and emaciation. The cataract was clear clinically and histologically. The development of dexamethasone-induced cataract need much work to elucidate the mechanism.

INTRODUCTION

Glucocorticoids are steroid hormones that play a role in physiological processes and are widely used as immunosuppressive and anti-inflammatory agents in the treatment of many clinical conditions, including rheumatoid arthritis, asthma, autoimmune diseases, and various ocular diseases¹. However, their clinical use is restricted due to a wide range of complications associated with their long-term topical and systemic use. Corticosteroids have serious side effects, such as retarded wound healing, corneal melting with perforation, ocular hypertension and cataracts. One of the ocular complications of glucocorticoid toxicity is the development of cataracts²⁻⁴.

The direct link between steroids and cataract is now generally accepted. One of the most useful tools in biological research is an animal model². This paper

attempts to establish model systems for studying cataracts that give chance to expert different drugs or surgical operation methods to treat the cataract also can expert different drugs gives with dexamethasone to prevent the side effects of dexamethasone (cataract) as a future work.Aim of this study to study effect the dexamethasone for long term on eye rabbits.

Materials and Methods

Dexamethasone injection

Twenty adult local breed ,ranging from 1–2 kg weight, from both sexes, were used in this study. The rabbits were divided in to 4 groups; each group was given dexamethasone intramuscular twice daily for 30 days. The normal dose of dexamethasone was 1 mg/ml/day⁵. Overdoses of dexamethasone were given as following:

Group 1 was given 10 mg/kg per day

Group 2 was given 20 mg/kg per day

Group 3 was given 30 mg/kg per day

Group 4 was given 40 mg/kg per day

Clinical evaluation

Daily Rabbit examination was done to show any clinical signs and symptoms. Also each eye was examined grossly and by ophthalmoscope (figure 1) over the entire course of the study.



Figure 1 ophthalmoscope

Histological examination

After one month of treatment the animals were sacrificed humane by air bubbles injection in rabbit's heart. Rabbit's eyes were immediately place in 10% formalin. Following fixation, routine tissue processing, the tissues section were stained with hematoxylin and eosin⁶. The entire experiment was completed in the animal facility at Veterinary Medicine College, university of Basrah.

RESULTS

Clinical evaluation: After one month of treatment the clinical signs were as the following: in group 1 and 2 remained healthy and there were not showed any physical side effects following the thirty days course of dexamethasone (Figure2)



Figure 2 show rabbitof group 1 and 2 without side effects of dexamethasone

Rabbits in group 3 and 4 the side effects of dexamethasone were loss of appetite, emaciation and vision loss ;the ability to see objects were reduced and an affected rabbit started to hop furniture or any object that was on its way due to bilateral cataract development (figure 3 and 4).

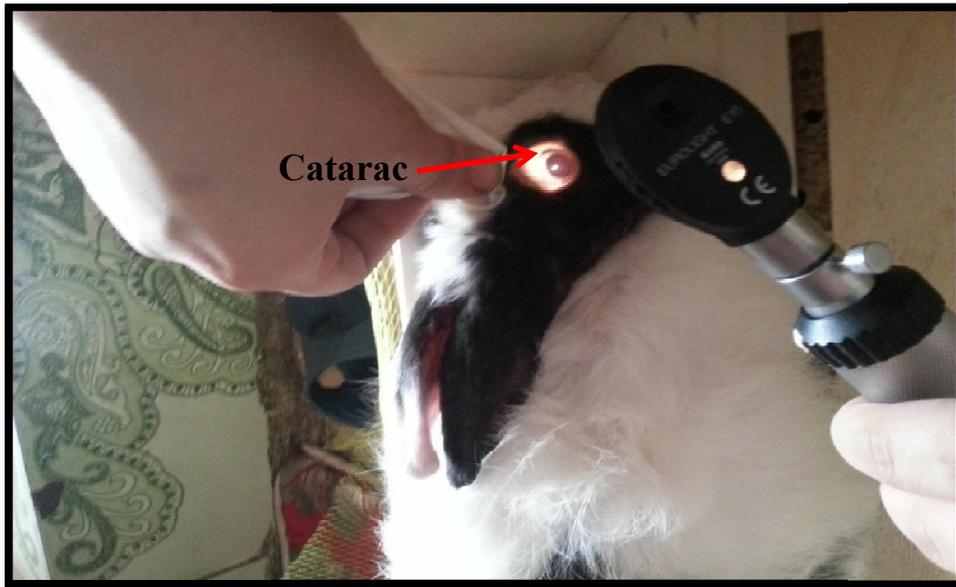


Figure 3 show rabbit of group 3 and 4 with clear cataract



Figure 4 show rabbit of group 3 and 4 with clear cataract

Histological study show hyperplasia of the corneal epithelium which showed increase thickness of the stratified squamous epithelium also there was hyperplasia in the iris (Figure 5 and 6) with congestion in the blood vessel in the iris stroma (Figure 7)

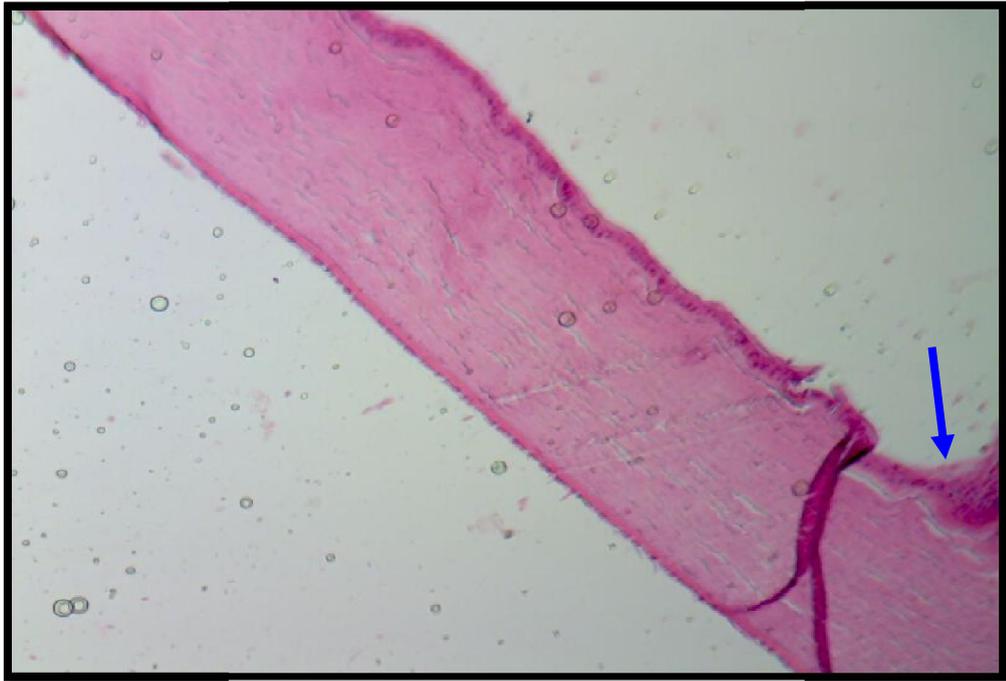


Figure (5): Cornea; Hyperplasia of the corneal epithelium which showed increase thickness of the stratified squamous epithelium (→).

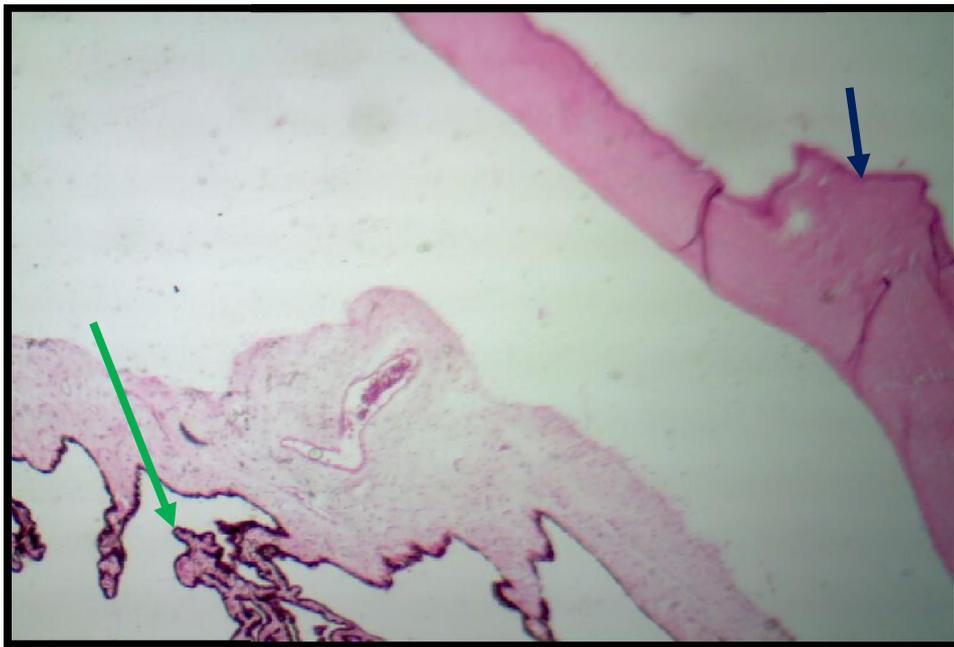


Figure (6): Cornea; Hyperplasia of the corneal epithelium which showed increase thickness of the stratified squamous epithelium (→). Also there is a hyperplasia in the iris (→).

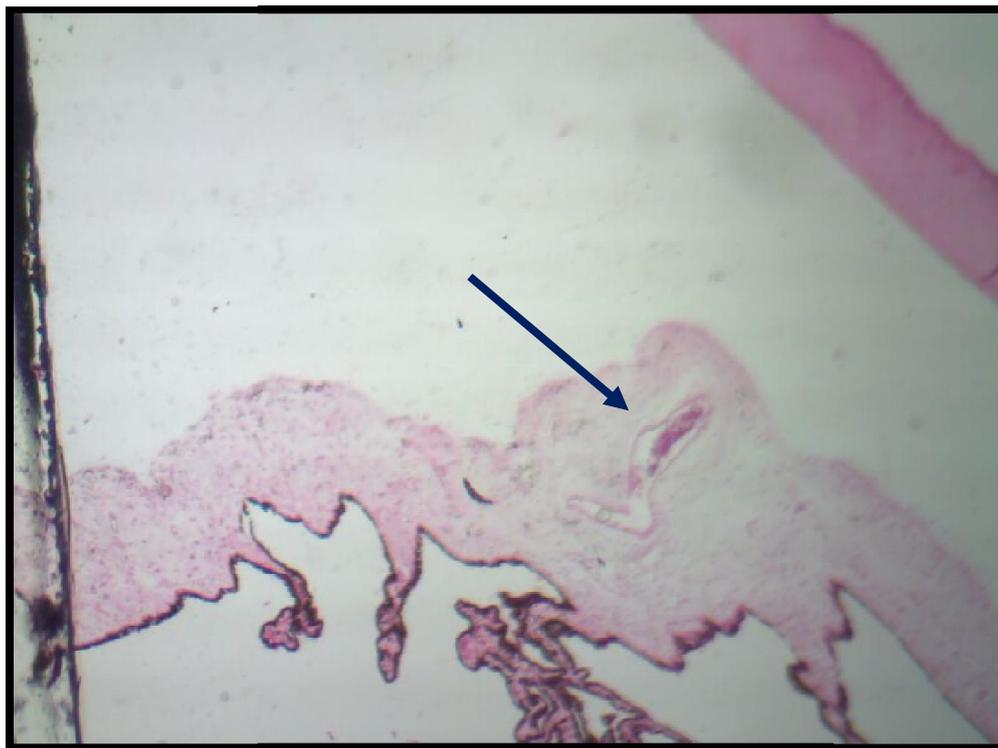


Figure (7):Congestion in the blood vessel in the iris stroma (→)

DISCUSSION

Only a small number of investigators have succeeded in producing cataract in laboratory animals. Tarkkanen and coworker⁷ observed cataract after 41 weeks sub conjunctival injection of betamethasone in two out of four rabbits that survived out of an original cohort of seven while, in this study all animals remained survived and cataract observed after 4 weeks that might be due to the difference in route of injection and/or the drug used. Bucala and colleagues⁸ also succeeded in producing steroid-induced cataract in rabbits by intravitreal injection of glucocorticoids. Cataract can also be induced in the chicken, mouse, rabbit and rat by prenatal administration of glucocorticoid⁹⁻¹¹.

Dexamethasone induced cataract formation is directly attributed to oxidative stress that occurs within the lens. Oxidation, which can be caused by an overabundance of oxidative stress generators, such as molecular oxygen, hydrogen peroxide, and free radicals, produces a major insult upon the lens, which can lead to decrease in antioxidant enzyme activity¹²⁻¹⁴. From our study we conclude that

dexamethasone as systemic are more producing cataract. The development of steroid-induced cataract need much work to elucidate the mechanism.

دراسة تأثير جرعات عالية من الدكساميثازون على العين في الأرانب

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الخلاصة

لدراسة تأثير الجرعات العالية من الدكساميثازون على عين الارانب، تم استخدام ٢٠ ارنب سليم وبالغ. قسمت الارانب الى ٤ مجاميع، كل مجموعة اعطيت ديكساميثازون داخل العضلة مرتين باليوم لمدة ٣٠ يوم. جرعات الدكساميثازون كانت ١٠، ٢٠، ٣٠، و ٤٠ ملغم/كغم/يوم للمجاميع ١، ٢، ٣، و ٤ على التوالي. بعد ذلك اعدمت الحيوانات، المقاطع النسيجية لعينات القرنية حضرت باستخدام طريقة التصبغ بالهيموتوكسلين والايوسين. التجربة اجريت بالكامل في البيت الحيواني لكلية الطب البيطري، جامعة البصرة. الارانب في المجموعة ١ و ٢ بقيت سليمة ولا توجد اي تأثيرات جانبية للدكساميثازون بينما المجموعة ٣ و ٤ كانت التأثيرات الجانبية للدكساميثازون ماء ابيض وهزال. الماء الابيض كان واضح سريريا ونسجيا. لتوضيح الية تكون الماء الابيض المستحدث بالدكساميثازون يحتاج عمل اضافي.

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