



Lipid keratopathy in a rabbit

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Lipid keratopathy is a rare disorder in rabbits. It is characterized by an excessive deposition of lipids under the surface of the cornea, the iris and in the ciliary body.

Lipid keratopathy - also called corneal dystrophy or corneal lipidosis, is a rare corneal disorder characterized by excessive deposition of lipids (e.g. cholesterol esters)

under the surface of the cornea, iris and anterior portion of the ciliary body. The infiltration starts at the periphery of the cornea and, with time, spreads to the more

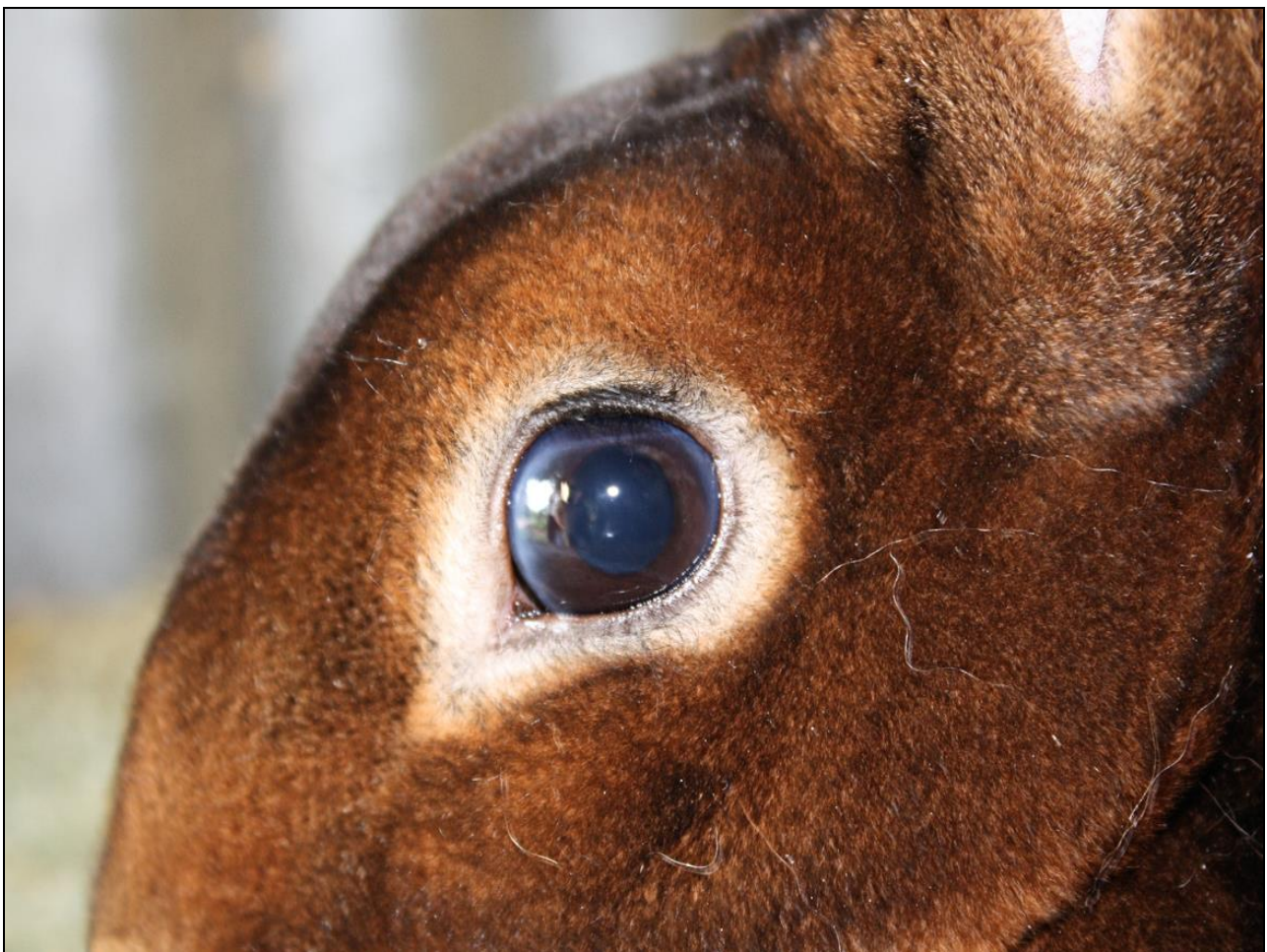


Figure 1: Rex rabbit with an opacity in the shape of a circle at the periphery of the cornea, a characteristic sign of lipid deposits.



Figure 2: Detail of the eye of a rabbit with lipid keratopathy of the cornea

central regions of the eye (Figure 1, 2). It is visible in the front of the stroma, the basal epithelial membrane and the epithelium (Figure 3).

Etiology

This condition is not associated with a disease, to a specific rabbit breed or gender. It seems rather the consequence of a very high level of lipids and cholesterol in the blood and/or is due to the accumulation of fat along the arteries (atherosclerosis), as a result of a diet rich in fat, or that includes products of animal origin (cheese, butter or cow milk).

Induced keratopathy experiments in rabbits have shown that endothelial cells,

pericytes, and keratinocytes take up increased amounts of LDL cholesterol and cholesterol esters. Their cellular metabolism is unable to metabolize these large amounts of lipids and cells die, leading to the deposition of lipids and proteins in the corneal stroma. Macrophages – cells of the immune system, try to phagocyte lipids, causing the appearance of clusters of foamy cells.

A hereditary origin cannot be excluded; it has been observed in Watanabe rabbits (Watanabe heritable hyper-lipidemic rabbit, rabbits rabbit = FH model). The latter have only few LDL receptors, which results in an elevated level of cholesterol in the blood as well as lipid deposits along blood vessels. If

no dietary modification is made, Watanabe rabbits suffering from lipid keratopathy will develop a retinal detachment.

Iatrogenic disease (drug) can also lead to corneal lipidosis. It was thus observed that a single injection of gentamicin in the vitreous humor of the rabbit eye induces lipid accumulation in the epithelium of the retinal pigment, accompanied by retinal necrosis. Finally, a corneal injury may also lead to an abnormal accumulation of lipids in the eye.

Clinical signs

Both eyes are usually affected (bilateral), but to varying degrees. The fat deposits are visible first in the periphery of the cornea, near the nictitating membrane (third eyelid),

then it spreads around the corneal limbus (border between the white of the eye and the cornea). More central areas of the cornea can also be affected when the rabbit continues to be fed a high fat diet.

Deposits at the periphery of the eye appear opaque, raised, they may be barely visible and pale, or they have a white, gray or silver shine.

At an early stage, deposits may be transient and disappear when the diet is corrected. Vascularization and inflammation of the affected region of the cornea is often observed. Lipid keratopathy is mainly observed around the cornea, but deposits were also noted in the iris, the ciliary body and the lens in a Dutch belted rabbit. When

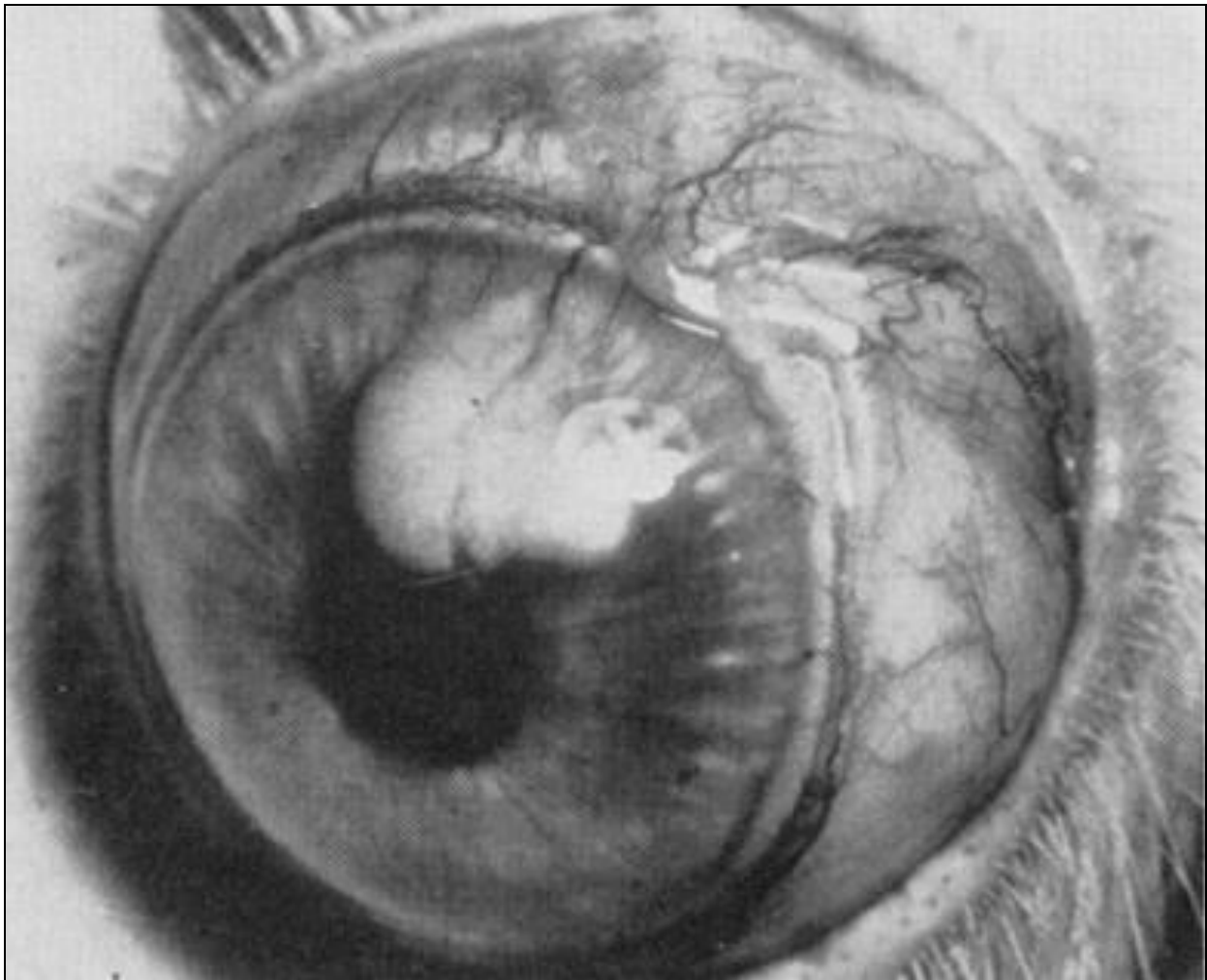


Figure 3: Lipid plaque with vascularization of the hypercholesteric cornea in a rabbit (Cogan and Kuwabara, 1958).

fat deposits become excessive, ulcers of the cornea or retinal detachment may develop.

At an advanced stage, the cornea becomes cloudy and there is a gradual loss of vision.

Lipid keratopathy is painless.

Diagnostic and differential

A complete biochemistry panel will show elevated levels of lipids and cholesterol in the blood. The ratio of LDL and HDL levels in the blood is similar to that found in the eye.

A complete examination of the eye will confirm the diagnosis.

The diet of the rabbit should be reviewed and changes need to be imperatively made.

Corneal lipidosis must be differentiated from:

- Retinal lesions if vision loss is diagnosed.
- Neoplasia.
- Uveitis.
- Brain damage, even when these are usually accompanied by other neurological signs while the persistence of pupillary response (or pupillary light reflex - PLR) is not affected.

Treatment

There is no treatment against lipid keratopathy.

It is necessary to modify the food given to the rabbit and a diet rich in fat or feeding dairy products (cheese, butter, yogurt) must be avoided.

The effect of superficial keratotomy is not known.

If blood cholesterol is high, treatment with a cholesterol-lowering drug can be attempted. Administration of atorvastatin (2.5 mg/kg, QD) reduces the level of cholesterol and, thus, reduces the side-effects on endothelial cells of blood vessels

as well as the risks of corneal opacity and retinal detachment.

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