

# BILATERAL CONVERGENT STRABISMUS WITH EXOPHTHALMUS IN A COW

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Bilateral convergent strabismus with exophthalmus (BCSE) is a heritable eye defect prevalent in many cattle breeds and known worldwide. The defect is of relatively high incidence, particularly in Holstein and German Brown cattle (Distl and Gerst, 2000; Holmes and Young, 1957 and Power, 1987). Reports of BCSE among cattle in India are lacking. The present paper reports a case of bilateral convergent strabismus and exophthalmus in a 3-year-old Jersey-Brown Swiss crossbred high yielding cow.

The owner reported that the strabismus was present since birth, which gradually progressed to the present condition. The owner could not notice any problem with vision. The cow had a moderately disoriented and insecure gait and handling was difficult. Examination revealed bilateral, symmetric rotation of eyeballs in an antero-medial direction with severe latero-dorsal exophthalmus and epiphora. The cow was able to move the eyelids over the cornea. Cornea was moist and normal in appearance. Menace and pupillary light responses were normal. The optic axis was clear and transparent, along with a good fundic reflection. The axial length, measured using A-Scan ultrasonography, was 32.83 mm for the left eye (OS) and 33 mm for the right eye (OD). The rotation of eye balls was approximately 70 degrees antero-medial, which could be rotated to central by traction on the dorso-lateral bulbar conjunctiva. The visible sclera of both eyes had dark brown pigmentation. The vision for each eye was good, but the visual field of the animal was considerably reduced. No further investigations were done, due to poor compliance of the owner, but he was

informed about the possibility of inheritance of this disorder.

Momke and Distl (2007) had reviewed the clinical signs and genetic traits of bilateral convergent strabismus with exophthalmus in cattle. Strabismus is defined as the permanent or temporary deviation of the eyes from their normal visual axis. The signs of strabismus can manifest congenitally or later in life. The most frequently observed manifestation of strabismus is convergent strabismus (esotropia), with eyes deviating medially. Though the reported animal had latero-dorsal exophthalmus, the axial lengths of the eyeballs as measured by A-Scan ultrasonography, were near the normal value of 35.34 mm as mentioned by Samuelson (2007). The degree of deviation of both eyes from the normal visual axis can be determined by the amount of sclera permanently visible in the temporal corner of the eye. In many cases, the visible sclera shows a secondary dark pigmentation. A four-stage scale for classifying affected animals is also reviewed (Momke and Distl, 2007): Stage 1, with < 25% of the visible eyeball filled with sclera; Stage 2 from 25% to 50%; Stage 3 from 50% to 75%; and Stage 4, with > 75% filled. The animal's sense of orientation may be intact in mildly affected individuals in spite of the limited field of vision, but animal showing Stage 3 or 4 BCSE are generally disoriented and have an insecure gait. Epiphora is often seen, particularly in cattle

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with advanced BCSE. This defect can become a significant problem because of its progressive course, which most often leads to blindness due to antero-medial rotation of both eyeballs and, as a consequence of this rotation, the pupils disappear at the inner angle of the orbits. Handling of these animals becomes difficult due to their limited vision and there will be changes in the behavior of the affected animals, such as aggressiveness or panic

**Fig 1. Left Eye**



in everyday situations, as noticed in the reported case. Farmers describe affected cows as 'shy', 'leery', 'jumpy' and 'wild'. Although there is an indirect selection for BCSE caused by higher milk performance in affected cows, it appears unlikely that there is a close genetic linkage of the defect allele for BCSE and a major gene for milk yield (Distl and Gerst, 2000). Since BCSE is caused by an autosomal dominant major gene in bovine, this

**Fig.2.Right Eye**



inherited eye disease cannot usually be diagnosed in calves, heifers or young bulls, so these animals may spread the defect in cattle population before they can be excluded from breeding. So far, there are no known reports on treatment of BCSE.

In the light of the published literatures, we conclude this case as a congenital bilateral convergent strabismus with exophthalmus, probably inherited in nature. Since approximately 70% of the visible eyeball was sclera, we classify this as Stage 3 BCSE. No treatment was attempted, but the owner was informed about the possibility of inheritance of this defect and was advised to take extra care in preventing injuries to the eye.

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