Ocular effects of antifreeze poisoning

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Human poisoning by antifreeze mixture has been known for many years and its formula, $\text{HOC H}_2\text{—CH}_2\text{OH}$, occupies a position between ethyl alcohol and glycerol. Mostly it has been drunk by mistake, but sometimes it has been ingested as a substitute for alcohol (Ross, 1956).

The minimum lethal dose was regarded by Hunt (1932), as 100 ml., but complete recovery after drinking 250 ml, has been reported by Kahn and Brochner (1950). Brain, lungs, liver, and the kidneys are the main organs affected by systemic intoxication and renal failure is the usual cause of death. There is no specific antidote. Treatment is as for oxalate poisoning, because ethylene glycol is metabolized to oxalic acid which is deposited in various organs as calcium oxalate crystals.

Few ophthalmological cases have been reported. Sykowski (1951) described the topical effects of ethylene glycol on the human eye, chemosis, keratitis, and acute iridocyclitis with dust-like keratic precipitates and exudate in the anterior chamber being the main features.

Friedman, Greenberg, Merrill, and Dammin (1962) reported four cases of antifreeze poisoning. Two patients, each 17 years of age, had ingested 3 to 4 oz. of ethylene glycol. Dilated pupils with loss of light reflexes and bilateral papilloedema were noted in one patient, who died 47 hours after ingestion of the mixture. The other patient, who developed bilateral ophthalmoplegia and blurring of the optic discs, died on the 17th day. Those who drank 1–2 oz. had no eye lesions and recovered completely.

Case report

A 58-year-old man drank about half a pint of antifreeze mixture in divided doses over a period of 48 hours. He claimed that he had mistaken it for whisky, but the fact that he drank it in repeated small quantities shows that it could not have been accidental.

About 16 hours after the last drink he noticed great difficulty in seeing; he became extremely depressed and was admitted to hospital for psychiatric care.

EXAMINATION

- 14.3.69 The patient was depressed but conscious and co-operative. The pupils were dilated and nonreactive to light. There was no perception of light in either eye. The optic discs were of normal colour.
- 15.3.69 The optic discs became blurred.
- 18.3.69 The pupils reacted sluggishly to light and near reflex. Visual acuity was hand movements in the right eye and counting fingers at 30 cm. in the left. The optic discs were blurred.
- 31.3.69 The pupils were normal, and the visual acuity was counting fingers at 1 m. in each eye. Temporal pallor of the optic discs was developing.

- 1.4.69 The visual acuity had recovered to 3/60 in the right eye and 2/60 in the left. The discs were pale and the patient was unable to recognize blue, green, and red.
- 21.5.69 Visual acuity 6/18 in the right eye and 4/60 in the left. Colour vision was still defective.
- 20.8.69 The visual acuity had deteriorated to 4/60 in the right eye and counting fingers in the left. There was marked bilateral optic atrophy. No further improvement occurred.

Summary

A case is described in which bilateral optic atrophy developed as a consequence of drinking antifreeze mixture.

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