Eye injury with mercuric chloride

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With the advent of modern ophthalmic treatment the use of mercury preparations in ophthalmology has almost been relegated to past history, but mercurous chloride (calomel) is still occasionally used as an insufflation into the eyes, especially in such conditions as phlyctenular keratoconjunctivitis. Recently we saw a case wherein mercuric chloride (HgCl_2) was mistaken for calomel and dusted into the right eye of a young woman suffering from phlyctenular keratoconjunctivitis with disastrous results.

Case report

A 19-year-old married woman came to the eye out-patients department on September 16, 1971, of Snowden Hospital, Simla, with the complaint of photophobia and the presence of a nodule at the lower limbus of the right eye of one week's duration. The junior casualty officer noted a large phlycten at the limbus at the 6 o'clock position and inadvertently dusted mercuric chloride into the eye after putting in a drop of xylocaine.

The patient immediately complained of severe pain in the eye and although the eye was thoroughly flushed with normal saline within a minute the whole cornea became opaque, and the conjunctiva, especially on the globe, lost its lustre and became whitish with widespread necrosis.

The eye was dressed with atropine 1 per cent. and hydrocortisone eye ointment and the patient was admitted to hospital. Within 2 hours gross oedema of the lids necessitated examination with lid retractors (Fig. 1). The conjunctiva was extensively necrosed and blanched and in places markedly chemosed and ballooned, thus hiding the cornea, which was oedematous, cloudy, and denuded of epithelium; the anterior chamber, iris, pupil, lens, and fundus could not be seen because of the opaque cornea.

The patient was given oral prednisolone 10 mg. 4-hrly and chloramphenicol 250 mg. 6 hrly. Betamethasone eye drops were given hourly, with atropine, terramycin, and cortisone eye ointment every 4 hours.

By the evening the pain was relieved and the palpebral and conjunctival oedema became a little less. By next morning the oedema was considerably less while the cornea showed signs of clearing (Fig. 2). The frequency of local corticosteroid drops was reduced to six times a day while the rest of the regime was continued.

FIG. 1 Gross oedema of lids and face immediately after insufflation with mercuric chloride

FIG. 2 Regression of oedema after 24 hrs of intensive treatment

After 72 hours the cornea became clear enough to permit examination of anterior chamber and pupil. The iris pattern was lost and it appeared yellowish-brown. The aqueous was turbid and dirty and white exudates completely occluded the small irregular pupil. On the fifth day a thick fibrinous hypopyon appeared, filling the lower quarter of the anterior chamber (Fig. 3). The cornea was clearer in the centre with a white ring-shaped limbal opacity.

After 2 weeks the lower lid developed moderate cicatricial entropion (Fig. 4). The cornea was dull and insensitive and the peripheral limbal opacity became vascularized. Organized hypopyon filled the lower sixth of the anterior chamber; the pupil was well dilated with brownish-white exudates on the anterior surface of the opaque lens (Fig. 4), and the vitreous and fundus were not visible. Vision was reduced to perception and projection of light.

FIG. 3 *Hypopyon and scorched conjunctiva*

FIG. 4 *Moderate entropion, hazy cornea, peripheral corneal opacity, and organized hypopyon*

Discussion

According to Duke-Elder (1954), mercury perchloride (HgCl_2) is particularly toxic to the ocular tissues; apart from its affinity for sulphhydryl groups and its power of precipitating proteins, it is lipoid-soluble (Heilbrunn, 1928, 1943; Wilbur, 1941), and thus readily penetrates the cells, at the same time altering the permeability of their membranes (Houck, 1942).

Duke-Elder (1954) cited a case reported by Schmelzer (1933) wherein mercury perchloride inadvertently dusted into an eye in place of calomel in a case of phlyctenular conjunctivitis resulted in gross palpebral oedema, marked chemosis, and widespread necrosis of the bulbar conjunctiva with clouding of the cornea. No similar case of accidental application has since appeared in the literature.

In our case, although the eye was very thoroughly irrigated almost instantly after the accidental application of mercuric chloride, the corneal surface resembled ground-glass in a matter of seconds and the conjunctiva appeared blanched and scorched, indicating rapid penetration of the cell membranes. The development of severe exudative iridocyclitis and later of a thick fibrinous hypopyon confirms its rapid penetration through the corneal membranes and its severe toxicity. The salt also appears to have disturbed the lens metabolism resulting in loss of transparency. The vitreous could not be examined but it is probable that it too was seriously damaged.

Although mercuric chloride was given inadvertently, it is to be remembered that at body temperature mercurous chloride (calomel) is an unstable compound (Mellor, 1923) and that in the presence of light and moisture it tends to change into mercury and mercuric chloride; this process is favoured by the presence of sodium chloride, citric acid, and sugar (Hoglan, 1880a, b). Since commercial calomel is rarely free from impurities, caution should always be exercised in its ophthalmic application and any quantity stored in the open for a long period should be discarded.

Summary

A case is reported wherein the accidental insufflation of mercuric achloride in place of mercurous chloride produced serious ocular complications with loss of vision.

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