

## Ophthalmological study of epidemic dropsy

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**SUMMARY** An ophthalmological study of a series of cases of epidemic dropsy in a recent outbreak in Madhya Pradesh was carried out. The present communication reports superficial retinal haemorrhages in epidemic dropsy, an observation believed not to have been previously reported.

Although epidemic dropsy was recognised in 1877 when it appeared as an epidemic outbreak in Calcutta, it came to the attention of ophthalmologists only in 1909, when Maynard<sup>1</sup> reported the occurrence of glaucoma in cases of the disease.

Epidemic dropsy is an acute toxic disease characterised initially by gastrointestinal disturbances, low-grade fever followed by oedema of the extremities, especially of the lower limbs (Fig. 1), with redness of skin, pain, and burning sensation over the oedematous part, symptoms of cardiac decompensation and breathlessness, and glaucomatous changes in the eyes. In some cases renal failure and cardiac failure may lead to death.

It is well established that contamination of cooking oil with seeds of *Argemone mexicana* is the cause of this toxic state. The seeds contain sanguinarine hydrochloride, an alkaloid of the benzphenathrine subgroup of the isoquinoline group.<sup>2</sup>

The mode of action of sanguinarine is not clearly understood. It appears to depress the action of sympathetic stimulation and of adrenaline. It also decreases to some extent the action of acetylcholine. In epidemic dropsy it is thought to block the sulphhydryl radical of the main enzyme (co-ASH) responsible for pyruvate oxidation, thereby increasing the amount of pyruvate in blood.

Pathologically sanguinarine hydrochloride gives rise to dilatation and engorgement of capillaries in various tissues of the body. Gross capillary dilatation is seen in the uveal tract, particularly in the ciliary body.

### Patients and methods

Fifty eyes of 25 clinically proved cases of epidemic dropsy were studied in an outbreak in June-July 1980. All of them belonged to the Bengali colony of Itarsi, a



Fig. 1 Epidemic dropsy: oedema of lower limbs.

city in Madhya Pradesh, which was the only affected area. Bengalis who mainly consume mustard oil (which is readily contaminated with the seeds of *Argemone mexicana*) suffered from the disease, while the rest of the city's population remained unaffected. Oil samples taken from some of the affected families were positive for the presence of sanguinarine.

Ophthalmic examination carried out in the affected colony included recording of visual acuity, external ocular examination, measurement of intraocular

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tension with Schiøtz tonometer, and fundus examination.

## Results

**Sex distribution.** A nearly equal incidence of the disease was observed in each sex (Table 1).

Table 1 Sex distribution of cases

	No.	%
Male:	13	52
Female:	12	48
Total:	25	

Table 2 Age distribution of cases

Age (years)	No.	%
Up to 10	1	4
11 to 20	8	32
21 to 40	10	40
41 to 60	5	20
Above 60	1	4

Table 3 Visual acuity in 50 eyes

VA	No. of eyes	%
6/6-6/12	47	94
6/18-6/36	0	0
6/60 or less	3	6

Table 4 Intraocular pressure in 50 eyes

Pressure (mm.Hg)	No. of eyes	%
Below 22	48	96
23 to 50	0	0
Above 50	2	4

Table 5 Fundus findings in 50 eyes

Fundus findings	No. of eyes	%
Normal	8	16
Retinal venous engorgement without any haemorrhage	32	64
Retinal venous engorgement with haemorrhage	10	20
Disc changes	0	0

**Age distribution.** Adolescents and young adults were relatively more affected. No case was seen below the age of 4 years, and the incidence was again less above the age of 60 years (Table 2). Similar observations were made by Sainani.<sup>3</sup>

**Visual acuity.** Most of the cases had normal visual acuity without glasses or with pin hole. Three eyes had visual acuity of less than 6/60. The cause of

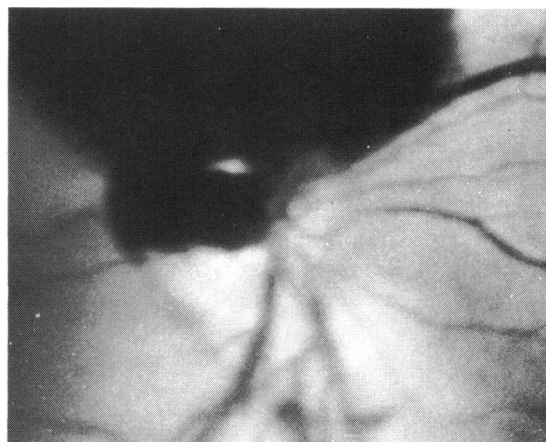


Fig. 2 Right eye: superficial blot haemorrhage over the disc in case of epidemic dropsy.

defective vision in 2 of them was lenticular opacities. In one patient who had macular haemorrhage the visual acuity was reduced to finger counting at 1 foot (30 cm) (Table 3).

**Intraocular pressure.** In most of the eyes (96%) this was within normal limits (Table 4). Only one case had an intraocular pressure of 64 mmHg, but even with this pressure there were no congestive features.

**Fundus findings.** Fundus examination showed features of toxic vasculitis and venous engorgement in 84% of the eyes. 20% of them had superficial retinal haemorrhages of variable size scattered over the fundus (Table 5) (Figs. 2, 3). It was also observed that the severity of the epidemic dropsy (generalised symptoms and signs) was fairly closely related to retinal venous engorgement. Cases with mild or low-grade symptoms had no venous engorgement, while

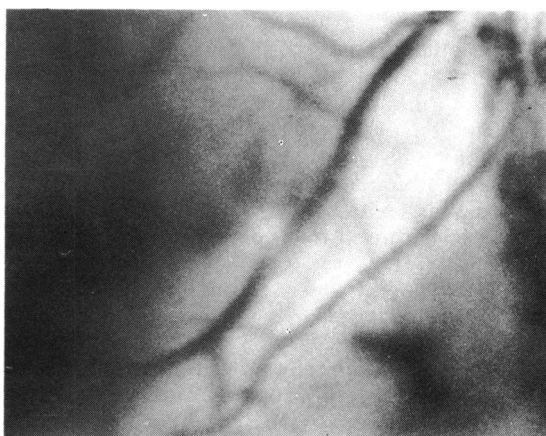


Fig. 3 Inferotemporal area of same eye as in Fig. 2: congested retinal veins and superficial haemorrhages.

subacute type of cases showed engorgement of the retinal veins. Acute fulminating cases had venous engorgement together with haemorrhages.

In 2 eyes initially there was only venous engorgement, but after 2 weeks, when they were admitted in the Medical College Hospital for symptoms of toxic myocarditis, they further showed retinal haemorrhages.

### Discussion

The incidence of glaucoma in cases of epidemic dropsy is variable. In some epidemics it has been the dominating feature—10 to 12%<sup>4,5</sup>—while in other epidemics clinical findings other than glaucoma were noted.<sup>3,6,7</sup> In our series the incidence of glaucoma was relatively low, namely 4%. The mechanism of its production is not clearly understood. Hakim<sup>8</sup> in his experimental studies found ocular changes similar to those in chronic simple glaucoma. Leach<sup>9</sup> found proliferation of the endothelial lining of trabeculae in monkeys. Some other workers consider that the rise in ocular tension is due to the action of sanguinarine on the central nervous system.<sup>10</sup>

Shah<sup>7</sup> observed early venous congestion in 10 cases out of 67 (15%). A very high incidence of venous congestion was seen in our series (84%), probably as a part of generalised telangiectatic dilatation of capillaries which may be due to a histamine-like action of sanguinarine hydrochloride.

Superficial retinal haemorrhages occurred as a result of toxic vasculitis in 20% of cases. They appear

to be due to toxic action of sanguinarine on blood vessels, particularly on veins. A similar type of haemorrhages was seen in liver, kidney, and other organs of the body on necropsy in some cases and experimentally in monkeys (Mishra N.P., personal communication). Papilloedema has been reported in 2 out of 119 (1.7%) cases<sup>3</sup>; it was not seen in any of our cases.

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