The Distribution of Sulphanilamide in the Eye.

Chemotherapy for certain inflammatory diseases of the eye such as ophthalmia neonatorum, some forms of chronic conjunctivitis including trachoma and pemphigus, and endogenous infections such as uveitis and panophthalmitis is at present *sub judice*.

The experiments of Bellows and Chinn* have made an interesting contribution to this matter. Their work has shown the distribution of sulphanilamide in the various ocular tissues after the administration of a single dose by the mouth and following divided therapeutic doses; the action of heat and other chemicals on the concentration of sulphanilamide in the aqueous humour and the effects of local application of this drug to the eye by dusting it on to the conjunctiva and cornea and by subconjunctival injection of it in solution.

From the results in experimental animals it seems that the ocular tissues are rapidly penetrated by the drug, traces of which are found throughout the eye 15 minutes after oral administration. The rapidity of penetration depends upon the relative vascularity of the tissue; for instance the concentrations of sulphanilamide in the various ocular tissues occur in the following order: chorio-retinal tissues, corneo-scleral tissues, aqueous, lens and vitreous. The maximum concentrations were reached in the corneo-sclera at the end of four hours; in the blood, aqueous and vitreous at the sixth hour; and the lens, choroid and retina at the twelfth hour. The most rapid rise of tissue concentration was between the second and third hours after injection, with the exception of the lens, in which this occurred between the fourth and sixth hours. The fall in concentration was the most precipitious in those tissues which contained a relatively considerable amount of the drug, but the lens in which there was a low distribution retained at the end of 48 hours more than three times the amount of sulphanilamide in each of the other ocular tissues.

Animals' eyes were removed for estimation of the content of the drug in various ocular tissues at the end of one, two, four and six days during the administration of therapeutic doses of sulphanilamide, 0.075 gm. per kilo. of body weight given daily in four divided doses at 8 a.m., 12 noon, 6 p.m. and 10 p.m. The highest concentration was 3.5 mgm. per 100 c.c. of blood at 10 p.m. and the lowest 1.4 at 8 a.m., the latter being the time at which the eyes were excised. These readings are below the blood level of 5-10 mgm. per 100 c.c. advocated for therapeutic action. The estimations of the tissue concentrations of sulphanilamide showed that the fall

from 6 to 12 hours after administration was very slight, a fact which suggests that the administration of the drug in doses twice daily (at 9 a.m. and 5 p.m.) as advocated by Bellows and Chinn would be as effective as four times a day.

The administration of heat and such chemicals as ethyl morphine hydrochloride, atropine and physostigmine had no effect on the concentration of sulphathiazole in the aqueous but acetyl—β—methylchlorine chloride (mecholyl) caused through its power to alter capillary permeability, an increased concentration of the drug over the control values. Paracentesis of the anterior chamber followed half-an-hour later by another paracentesis also leads to an increased concentration of sulphathiazole in the aqueous.

Sulphathiazole dusted on to the conjunctiva and cornea lead to some irritation without any appreciable penetration of the drug into the ocular tissues. After subconjunctival injection of a solution of the drug the aqueous concentration was far below that which followed oral administration.

Bellows and Chinn found sulphathiazole in the tears of two patients who were receiving 3 grm. a day. In one instance the tears contained 1·5 mgm. in 100 c.c., 3 hours after the administration of 1 grm. and in the other 17 hours after a similar dose, the concentration was 0·8 mgm. per 100 c.c.

It is evident from these experimental and clinical findings that the ocular tissues are penetrated by sulphathiazole.

ABSTRACTS

I.—OPERATIONS


(1) The first part of this paper is a short review of the various measures which have been taken to correct the deformity of ptosis; Valerio points out that if the superior rectus is undeveloped, the frontalis may be employed to help to raise the lid but that the relation between movement of the eye and lid will not be normal; there must, therefore, be different methods employed according to the state of the external ocular muscles. Motais was the first to bring the superior rectus into play when the levator palpebrae is wanting; his operation is not very easy to perform and the author