PROPTOSIS AS THE FIRST SIGN OF ORBITAL SEPSIS IN THE NEWBORN*

BY

E. D. BURNARD

Paediatric Unit, St. Mary's Hospital Medical School, London

THREE cases are reported in which infection in the deep orbital tissues caused proptosis before there were signs of local inflammation and led to difficulty in diagnosis.

Case Reports

Case 1, a 14-day-old female European infant, was admitted to hospital with a history of swelling of the right eye for 3 days. She was the third child of healthy parents. Labour had been induced by rupture of membranes 3 weeks after the the expected date of delivery and was uneventful (birth weight 8 lb. 2 oz.). The baby was taken home on the eighth day and 2 days later the mother noticed that the right eye was protruding. This increased in the next 2 days although the child seemed quite contented and was feeding at the breast.

On admission the baby looked healthy and was vigorous (weight 8 lb. 2 oz.). Proptosis was present (Figure), and there was slight redness of the surrounding lid. The globe was displaced slightly downwards and moved in all directions. The fundi were normal. White cell count 24,000 per c.mm. with 13,000 polymorphs. The appearances of the skull on x-ray examination suggested widening of the zygomatico-frontal suture or alternatively a small area of bone destruction. The mother was noticed to have a pustule on one hand. Treatment was started with chloramphenicol 250 mg. daily.

FIGURE.—Appearance of Case 1 on admission.

After 3 days, during which time there was a slight fever (temperature 99.6°F. on two evenings), a canthotomy was performed. On reflecting the right external rectus and passing a probe backwards and inferiorly, thick yellow pus welled up, which grew *Staphylococcus aureus*, coagulase positive.

In the opinion of an ear, nose, and throat consultant who saw the baby at this time, the source of the pus could not have been an ethmoid abscess, which would be expected to

* Received for publication March 5, 1958.

produce an outward displacement of the globe, nor was there any sign of maxillary sinusitis. Penicillin and streptomycin were added to the treatment. During the next 3 days the right eye-lid became oedematous, but the globe receded and within 9 days of admission the eye had returned almost to normal. An x-ray examination no longer showed any abnormality. The baby was discharged 3 days later. The reactions to visual stimuli were normal at follow-up.

Case 2, a male Negro infant, the ninth child of Jamaican parents, was admitted in a collapsed state with bilateral proptosis, at the age of 14 days. The mother had been treated with penicillin during pregnancy as her Wassermann reaction was positive. Delivery had been normal and at full-term (birth weight 5 lb. 6 oz.). A Wassermann test of the cord blood was negative. The baby fed at the breast and was discharged on the tenth day weighing 5 lb., but 4 days later he was brought back to hospital gravely ill. The mother said that his eyes seemed a little swollen soon after he got home but she thought he was fit for the next 2 days because he fed well and cried strongly.

However, on arrival at hospital, he was a feeble, shrunk baby with bilateral proptosis, conjunctival oedema, and swelling of both upper and lower lids, signs that were more pronounced on the right. The pupils reacted to light and the movement of the eyes were present. The fundi were normal. There were no physical signs in the other systems. White cell count 3,500 per cu.mm., Hb 17 g. per cent. A provisional diagnosis was made of retro-orbital cellulitis and probable septicaemia. Penicillin, streptomycin, and intravenous fluid were given. On the following day there were left-sided convulsions. Swabs from the nose and conjunctivae had by this time grown a coagulase-positive *Staphylococcus aureus*, sensitive to streptomycin but not to penicillin. A lumbar puncture was done but only two drops of fluid, sterile on culture, were obtained. The baby's condition deteriorated and he died 48 hours after admission.

The *post-mortem* examination showed pyaemia with patches of haemorrhagic consolidation throughout the lungs, a single small abscess in the myocardium, and another in the left kidney. There was meningitis with thin purulent exudate surrounding the basal region. There was no thrombosis in either cavernous sinus, although a little thin purulent material was seen in the left. Pus was present in the retro-orbital tissues of both sides, and there was osteitis of the right petrous temporal bone. Swabs from the lungs and brain grew staphylococci in pure culture. In the pathologist's opinion the respiratory tract had been the origin of the septicaemia.

Case 3, a female infant, was the second child of healthy Jamaican parents. The pregnancy had been normal. There was slight asphyxia after delivery with grunting breathing for 30 minutes (birth weight 8 lb. 3 oz.), and after 24 hours proptosis of the right eye was noticed.

The pupils reacted normally to light and movements of the globe were present and normal as far as could be ascertained. There was no oedema or swelling and the baby was afebrile. The fundi were normal. White cell count 11,300 per c. mm., polymorphs 54 per cent., lymphocytes 27 per cent., monocytes 15 per cent. No other investigation was undertaken at this point and in view of the experience with the previous two cases treatment was started with chloramphenicol 125 mg. 6-hrly. The proptosis became more pronounced and there was slight oedema of the lids in the next 2 days. The baby continued to feed well at the breast and on the fourth day was transferred to an ophthalmic hospital, where chemotherapy was continued for a total of 12 days. No abnormality was seen in an x-ray of the orbits.

She was examined by an ear, nose, and throat consultant, who could find no sign of infection of maxillary or ethmoid sinuses. On the twelfth day the proptosis was less and by the sixteenth the appearance of the eye was normal. The mother in the meantime

had been treated for puerperal pyrexia, although no specific infecting organism was discovered. She made a good recovery and rejoined the baby to resume breast feeding.

Discussion

The interest in these patients lies in proptosis as the first sign of infection in babies who, as far as the parents had observed (Case 1), and, in the opinion of the hospital staff attending Cases 2 and 3, seemed otherwise normal and healthy. It is true that the second baby succumbed rapidly with bilateral signs that pointed to generalized disease, but judging from the history there was a period of 3 or 4 days when he seemed to be healthy despite the developing proptosis. It is also apparent that weight gains had been unsatisfactory in Cases 1 and 2. In none of them, however, was anything thought to be wrong before the proptosis was noticed, so that in Cases 1 and 3 a diagnosis of retro-orbital neoplasm was first considered.

The nature of the illness in Case 1 was disclosed by surgical exploration, the leucocytosis and equivocal x-ray findings having already provided grounds for antibiotic therapy. In Case 3 there was no such confirmatory evidence and the diagnosis rests on the course of the illness and the good response to antibiotic treatment.

It seems likely that in the absence of much visible oedema the site of infection must have been far back in the retro-orbital tissues. The path by which they were invaded is uncertain. Spread from purulent sinusitis of the ethmoids or antra is a possibility (Duke-Elder, 1949), but in none of the babies was there any of the signs of sinus infection which in the newborn causes great swelling of the face (Parsons and Barling, 1954), nor had there been a predisposing lesion such as conjunctivitis or rhinitis. Osteitis was present as part of the widespread sepsis in the basal skull region in Case 2, having probably arisen from a staphylococcal pneumonia. The way this baby's illness developed may provide a clue to the course of events in the other two. Four days before admission, at a time when staphylococci must have been disseminating, the baby was feeding well and behaving vigorously. The fact that newborn babies may not react acutely to staphylococcal invasion, preserving their normal behaviour as a state of septicaemia is developing, was remarked upon by Sir James Spence, and several such instances are reported by Cass (1940). It seems possible that Cases 1 and 3 were in a phase of generalized staphylococcal invasion which had just localized either as an osteitis in the region of the sphenoidal fissure or perhaps as a cellulitis deep in the retro-orbital fat.

The pustules on the mother's hand may have some significance as the original source of infection in the first patient. The second was presumably an example of cross-infection in the nursery. The same may have been true of the third, despite the short latent period, or alternatively the mother's puerperal illness might have begun with infection during labour when it could have passed to the baby.

Summary

Three cases of proptosis in the newborn are described. Deep-seated retro-orbital sepsis was proved to be present in two and presumed in the third. In the early part of the illness local signs of inflammation were absent and the babies were not sick. Treatment directed to an infective cause resulted in rapid recovery in two of the babies.

My thanks are due to Mr. J. P. Erskine and Miss Amy Fleming, Maternity Department, Paddington General Hospital; Mr. A. G. Cross, Western Ophthalmic Hospital; Dr. T. Stapleton, Paddington Green Children's Hospital; and to Dr. J. Guthrie for the *post-mortem* report on Case 2.

REFERENCES

- CASS, J. (1940). *Arch. Dis. Childh.*, **15**, 55, 85.
DUKE-ELDER, S. (1949). "Text-book of Ophthalmology", vol. 5, p. 5427. Kimpton, London.
PARSONS, L., and BARLING, S. (1954). "Diseases of Infancy and Childhood". Oxford University Press, London.