Salmonella endophthalmitis simulating retinoblastoma

C Suvarnamani, SW Ku, G Chan, S Farzavandi, KC Yau

We report an unusual presentation of Salmonella endophthalmitis in a two-month-old Chinese girl with unilateral leukocoria. Ultrasonographic and neuroradiologic studies revealed an enlarging retinal mass, and for this reason, enucleation was performed. Histopathology of the globe revealed endophthalmitis. Vitreous and stool cultures grew *Salmonella typhimurium*. Clinically, it is very difficult to differentiate this condition from retinoblastoma. Systemic salmonellosis and endophthalmitis may progress slowly. This condition should be added to the differential diagnosis of leukocoria simulating retinoblastoma.

HKMJ 1995;1:319-321

Key words: Salmonella infections; Endophthalmitis; Retinoblastoma

Introduction

Endogenous endophthalmitis in the paediatric population is now considered to be a rarity.[1] Hence, it is unusual for it to be included in the differential diagnosis of lesions simulating retinoblastoma. A case of an infant with unilateral leukocoria caused by endophthalmitis due to *Salmonella typhimurium* is presented.

Case report

A systemically healthy two-month-old Chinese girl was admitted to Queen Elizabeth Hospital in October 1994 with symptoms of low-grade fever, cough, and redness of the left eye of two weeks' duration. Her fever had been intermittent for two weeks prior to admission. Examination of the left eye revealed conjunctival infection, corneal haziness, iris neovascularisation, and leukocoria with a fixed pupil (Fig 1). The right eye was normal.

Department of Ophthalmology and Visual Sciences, The Chinese University of Hong Kong, Hong Kong Eye Hospital, Kowloon, Hong Kong
C Suvarnamani, MD
G Chan, MD, FACS
S Farzavandi, DO(Ire), FRCS(Edin)
Department of Paediatrics, Queen Elizabeth Hospital, Wylie Road, Kowloon, Hong Kong
SW Ku, DCH(Ire), MRCP
Department of Health, Kowloon Hospital, 147A Argyle Street, Kowloon, Hong Kong
KC Yau, MB, BS
Correspondence to: Dr C Suvarnamani

The results of the physical examination were unremarkable, with no fever, lymphadenopathy, or meningeal signs. A B-scan ultrasound examination of the left eye revealed a retinal mass with high internal

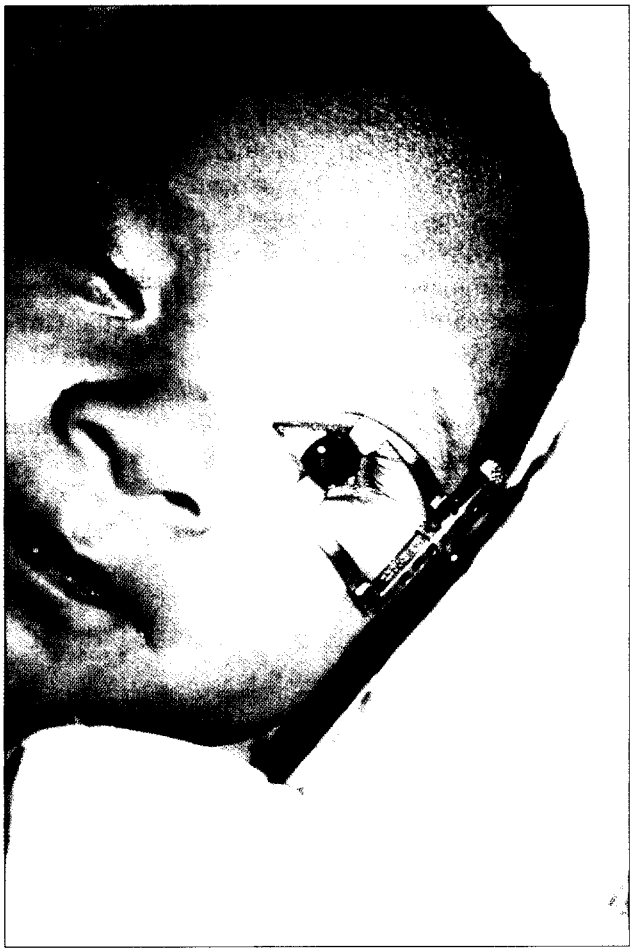

Fig 1. Two-month-old girl with a leukocoria in the left eye

reflectivity. There was no evidence of a solid tumour or calcification on the B-scan ultrasound, computed tomography (CT) or magnetic resonance imaging (MRI) scans. Admission laboratory values showed the following: haemoglobin 10 mg/dL, white blood cell count 14.7 x 109/L, and a normal differential count. Tumour markers including CA-125 and β-HCG were not raised. The serum α-fetoprotein level was 123 mg/ml. Viral studies revealed no increased titres for rubella, toxoplasma, cytomegalovirus, herpes simplex, varicella-zoster, chlamydia, or adenovirus. Repeated blood cultures for bacteria were negative.

Two weeks following admission, the left eye developed a yellowish nodule at the superior limbus which gradually increased in size over a three-day period (Fig 2). Serial ultrasonograms revealed a concomitant increase in size of the retinal mass. Because of the poor visual prognosis, extrascleral extension of the lesion, and our being unable to exclude the possibility of malignancy, we decided to enucleate the left globe. Two days prior to the enucleation the child developed diarrhoea, although other systemic parameters remained stable.

Gross and histopathological examination of the eye revealed an inflammatory infiltrate in the anterior and posterior chambers with destruction of the lens. The exudate was composed of abundant polymorphonuclear leucocytes, small lymphocytes, plasma cells, foamy histiocytes, and fibroblasts (Fig 3). The optic nerve showed focal inflammation. There was no evidence of malignancy. A *Salmonella typhimurium*, sensitive to ampicillin was cultured from both the vitreous and the conjunctival nodule. Stool culture also yielded a positive growth for *Salmonella typhimurium*. The final diagnosis was *Salmonella typhimurium* endophthalmitis.

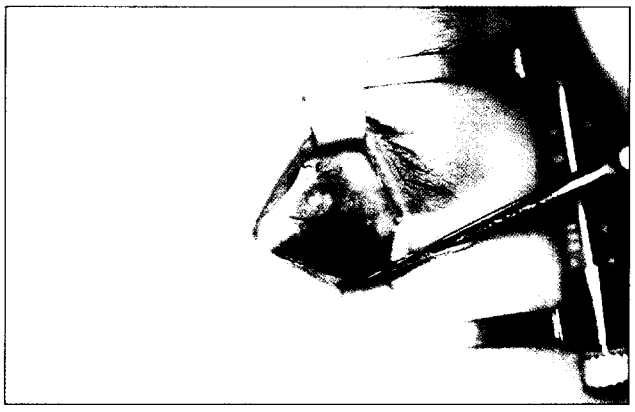

Fig 2. Yellowish nodule at the superior limbus of the left eye indicating extrascleral extension

The child received prompt full treatment for salmonellosis with a course of intravenous ampicillin and cloxacillin. The child remained afebrile, the diarrhoea subsided, and a repeat stool culture was negative. Six months later, the child was well with no signs of ocular or systemic infection.

Discussion

The differential diagnosis of lesions simulating retinoblastoma is varied.[2] The three most common entities that can be confused clinically with retinoblastoma are persistent hyperplastic primary vitreous, Coats' disease, and ocular toxocariasis.[3] However, endogenous endophthalmitis—especially in the paediatric age group—is rare today. It occurs primarily in adults who have underlying systemic disorders, such as immunosuppression, diabetes, cardiovascular, or gastrointestinal diseasse.[4,5] In two large series of lesions simulating retinoblastoma, only 1% of the pseudoretinoblastomas were due to infectious endophthalmitis.[3,6]

Infectious endophthalmitis is generally associated with lid oedema, prominent ciliary congestion, and a red hot eye with hypopyon. However, in our case the eye was relatively quiet throughout, suggesting an organism of low virulence and simulating the clinical picture of retinoblastoma. Secondly, posterior synechiae frequently develop early in patients with endophthalmitis but this was absent in our case. Thirdly, the ultrasound and CT scan show diffuse, faint, vitreal echoes in endophthalmitis, in contrast to retinoblastoma cases in which a distinct intraocular mass pattern (usually with calcification) is present.

Fig 3. Histopathology revealed an inflammatory infiltrate composed of abundant neutrophils, lymphocytes, plasma cells and histiocytes with total destruction of the lens (H&E, x 40)

Endophthalmitis is a rare and important extraintestinal complication of non-typhoidal salmonellosis. From a review of the literature, there appear to be only four reported cases of ocular infection as a complication of systemic salmonellosis.[7-10] All four cases had systemic involvement on presentation. Two cases were infants with bloody diarrhoea as the initial complaint. The third was an adult with chronic lymphocytic leukaemia on immunosuppressive therapy who suffered an episode of *Salmonella* cystitis two weeks before any visual symptoms became apparent. The fourth was an infant who had presumed retinopathy of prematurity.

We have reported this case to show that *Salmonella* infection may have an insidious onset with systemic involvement appearing at a later stage, with ocular involvement severe enough to mimic an intraocular malignancy. This mode of presentation of *Salmonella* infection is unusual, even for an endemic region such as Hong Kong. Shields et al have reported six cases of endogenous endophthalmitis simulating retinoblastoma.[1] None of their cases were due to *Salmonella* infection. Because of the potentially serious consequences of opening an eye with retinoblastoma, it is unwise to perform a vitreous tap or vitrectomy in a child with signs of endophthalmitis until retinoblastoma has been excluded. The clinical differences between the two entities are only relative and exceptions do occur.

This case reports one such unique presentation which, in addition to increasing awareness of the disease entity, should also serve to alert paediatricians and ophthalmologists as to the varied clinical picture of endogenous endophthalmitis.

References

1. Shields JA, Shields CL, Eagle RC Jr, Barrett J, De Potter P. Endogenous endophthalmitis simulating retinoblastoma. Retina 1995;15:213-9.
2. Shields JA, Shields CL. The differential diagnosis of retinoblastoma. In: Zorab R, editor. Intraocular tumors: a text and atlas. Philadelphia: Saunders, 1992:341-62.
3. Shields JA, Parsons HM, Shields CL, Shah P. Lesions simulating retinoblastoma. J Pediatr Ophthal Strabismus 1991;28:338-40.
4. Greenwald MJ, Wohl LG, Sell CH. Metastatic bacterial endophthalmitis: a contemporary reappraisal. Surv Ophthalmol 1986;31:81-101.
5. Okada AA, Johnson RP, Liles C, et al. Endogenous bacterial endophthalmitis: report of ten-year retrospective study. Ophthalmology 1994;101:832-8.
6. Howard GM, Ellsworth RM. Differential diagnosis of retinoblastoma: a statistical survey of 500 children. I. Relative frequency of the lesions which simulate retinoblastoma. Am J Ophthalmol 1965;60:610-8.
7. Weinstein JM, Elliot J, Tilford RH. Metastatic endophthalmitis due to *Salmonella typhimurium*. Arch Ophthalmol 1982;100: 293-5.
8. Shohet I, Davidson S, Boichis H, Rubinstein E. Endogenous endophthalmitis due to *Salmonella typhimurium*. Ann Ophthalmol 1983;15:321-2.
9. Corman LI, Poiries RH, Littlefield CA, Sumaya CV. Endophthalmitis due to *Salmonella enteritidis*. J Pediatr 1979;95:1001-2.
10. Senft SH, Awad A, Bartholomew L. *Salmonella* endophthalmitis in an infant with presumed retinopathy of prematurity. Eye 1993;7:190-1.