

SHORT COMMUNICATIONS & CASE REPORTS

Shaken baby syndrome: Intending to harm or attempting to help?

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PURPOSE. *To describe the role of ophthalmologists in shaken baby syndrome evaluation.*

METHODS. *Case report.*

RESULTS. *A 3.5-month-old girl was admitted to the Pediatrics Clinic with lethargy. The mother, who brought in the baby, claimed that the baby had fallen from her cradle 6 hours ago. Clinical examination showed signs of head injury. Ophthalmologic examination was requested and revealed extensive retinal hemorrhages bilaterally covering the whole fundus, and retrohyaloid hematoma in the right eye. Computerized tomography neuroimaging documented large subdural hematomas exerting force on the brain parenchyma. The sum of the results of the clinical and neuroimaging examination—retinal hemorrhages and subdural hematomas—was indicative of violent shaking of the baby. Coronal evaluation was unable to determine whether the baby was abused by her parents or whether she was accidentally hurt.*

CONCLUSIONS. *Ophthalmologic examination is necessary to document shaken baby syndrome since it reveals the retinal hemorrhages which together with the neuroimaging findings are almost always present in such cases. However, even when all the signs of shaken baby syndrome are present, it is difficult and sometimes destructive for a parent to be falsely accused of abusing his or her own child. (Eur J Ophthalmol 2008; 18: 819-21)*

KEY WORDS. *Retinal hemorrhages, Shaken baby syndrome*

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INTRODUCTION

More than 10% of traumatic injuries in children are not accidental. More than 20% of those injuries prove fatal. Almost 15% of the children who survive carry permanent physical abnormalities (1). Shaken baby syndrome (SBS) is a form of child abuse which is caused by vigorous shaking of infants and young children (usually younger than 3 years) (2, 3). SBS is a common cause of serious neurologic impairment, and almost one third of these children die (4). Perpetrators rarely admit or may not remember the exact type of traumas inflicted; therefore, uncertainty as to the exact mechanism exists. Multiple

episodes of abuse commonly occur before SBS is discovered, so early recognition can be life saving.

Case report

A 3.5-month-old girl was admitted to the hospital for lethargy. The baby was brought in by her mother, who claimed that the baby fell off the cradle, around 6 hours ago.

The physical examination revealed ecchymoses on both cheeks, on the external femoral surfaces bilaterally, periorbitally on the right eye, on the left temporal bone, and

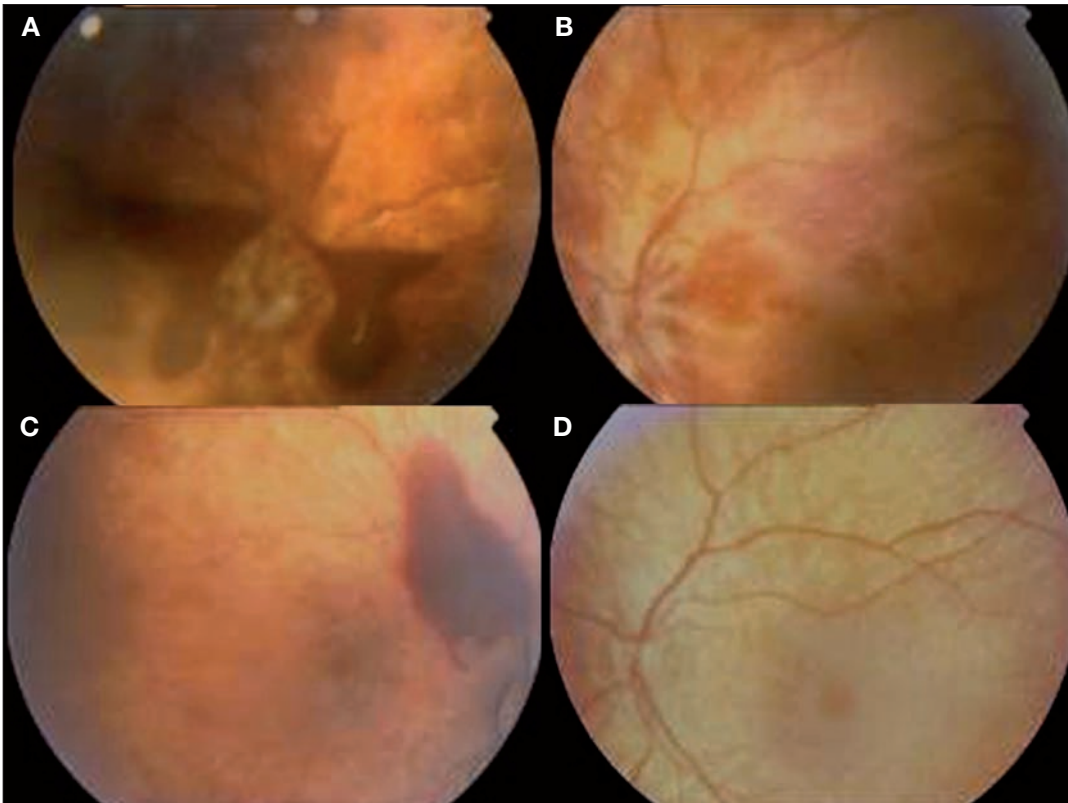


Fig. 1 - Fundus photograph of right and left eyes of the infant on the night of the incident (A, B) and 3 months later (C, D).

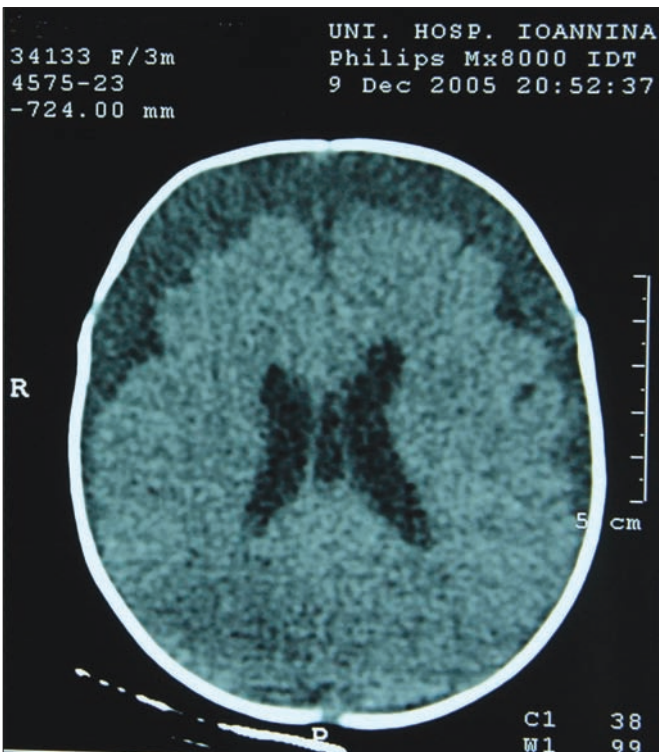


Fig. 2 - Computerized tomography scan of the infant's brain showing the hematoma exerting force on the brain parenchyma.

bruised fingers of the upper limbs. The anterior fontanel was large and bulging. Both pupils were symmetric and responding well to light. Skeletal radiographic survey showed no signs of fractured bones.

Dilated pupil fundus examination revealed extensive retinal hemorrhages bilaterally covering the whole fundus, and retrohyaloid hematoma in the right eye (Fig. 1, A and B). Computerized tomography (CT) revealed large subdural hematomas exerting force on the brain parenchyma (Fig. 2). These findings, confirmed by magnetic resonance imaging (MRI), were attributed to sudden acceleration-deceleration mechanism. The baby was taken to a pedoneurosurgical hospital where she underwent neurosurgery. A dilated pupil fundus examination 3 months later showed that most of the retinal hemorrhages and retrohyaloid hematoma had been resolved (Fig. 1, C and D).

The sum of the results of the clinical and neuroimaging examination (retinal hemorrhages and subdural hematomas) was indicative of violent shaking of the baby. A forensic science expert was consulted and the mother and father underwent questioning regarding the circumstances of the abuse. The case history given by both parents revealed that the mother had indeed vio-

lently shaken the baby's head, grabbing her by the cheeks, in an attempt to revive the baby after loss of consciousness when she fell off the cradle. Even though the story could not be confirmed, there was no further evidence that the infant was victimized and no legal actions were taken.

DISCUSSION

In 1967, Gilkes and Mann (4) recorded a high incidence of retinal hemorrhage in children who have been abused. In 1974, Caffey (5) introduced the term "whiplash infant shaking syndrome" to describe cases where an infant is subjected to a repetitive angular acceleration-deceleration motion similar to that on the end of a whip, causing extremely high gravitational forces to be exerted on the infant's head.

Babies are vulnerable to violent shaking forces because of their relatively large head, weak cervical muscles, incomplete fused sutures, and large volume of cerebrospinal fluid (2). The term SBS is manifested as a combination of cranial, ocular, and skeletal injury (2). The commonest forms of cranial injury are subdural hematomas, subarachnoid hemorrhage, intraparenchymal hemorrhage, and edema, while the most common ocular manifestation is retinal hemorrhages (2, 3, 6). Other ocular findings include retrohyaloid hematoma, vitreous hemorrhage, retinoschisis, retinal detachment, optic nerve hemorrhage, papilledema, optic nerve atrophy, anterior lens opacity, periorbital edema and ecchymoses, cortical blindness, and hemianopsia (3, 6).

Studies have shown that the magnitude of acceleration and deceleration is 50 times greater than when the head is forcefully struck against a surface. This is due to the fact that forces are exerted from the inside out without being dissipated through the skull, as do impact injury forces (1). Furthermore, rotational forces induce direct brain parenchymal damage through diffuse axonal injury while causing rupture of the brain vessels and of the vessels of the optic nerve.

Many different theories have been proposed to explain the development of retinal hemorrhages, such as increased intracranial pressure, increased intrathoracic pressure, direct tracking of blood through the optic nerve, and the theory of the rapid acceleration-deceleration forces that are exerted on the vitreous gel, causing vitreoretinal traction, hemorrhages, and detachment

as well as shear force upon veins and axonal damage (3, 7).

CONCLUSIONS

Apart from clinical findings and possible mechanisms, it is important to always have in mind the devastating effect of abuse on young patients. However, equally important is the caution with which such cases must be dealt with, since a false accusation may be catastrophic for a parent. Experts must always be consulted and social services must intervene only when a child abuse case is undoubtedly established.

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