

A Witnessed Short Fall Mimicking Presumed Shaken Baby Syndrome (Inflicted Childhood Neurotrauma)¹

Horace B. Gardner

Manitou Springs, Colo., USA

Key Words

Shaken baby syndrome · Inflicted childhood neurotrauma · Fall · Trauma · Subdural hematoma · Retinal hemorrhage

Abstract

A witnessed fall backwards of an infant from a sitting position resulted in the subdural hematoma and retinal hemorrhages characteristic of presumed shaken baby syndrome. Violent shaking is not necessary to produce these findings.

Copyright © 2007 S. Karger AG, Basel

An 11-month-old Asian infant was witnessed by a 5-year-old sibling to fall backwards from a sitting position, the head striking a carpeted floor. The infant immediately cried, vomited and exhibited some seizure-like activity including tongue biting and curling in of the right hand. The infant was seen within the hour by the emergency room physician, who noted hypertonicity, gaze deviated to the left and responsiveness to noxious stimuli. Three hours later a large acute left frontal temporoparietal subdural hematoma was removed surgically. Although the preoperative CT scan was read as an ‘acute on

chronic subdural hematoma’ with ‘no hydrocephalus’, both the operating surgeon and a second pediatric neurosurgeon asked for a second opinion, felt the subarachnoid spaces were enlarged, consistent with benign external hydrocephalus, and only fresh blood was noted at surgery. Thirty-one hours after the fall, an ophthalmologic exam by a pediatric ophthalmologist revealed ‘diffuse pre-/intraretinal hemorrhages, mostly posterior pole’, with a fundus drawing depicting multiple hemorrhages. One week later, repeat ophthalmologic exam by the same examiner noted ‘4 quadrants of bilateral pre- and intraretinal dot, flame-shaped and white-centered hemorrhages OU – hemorrhages extend beyond equator – difficult to ascertain whether they extend to ora serrata’ (fig. 1 and 2). ‘No disc edema’ was recorded on both exams. In deposition, the hemorrhages were mentioned to be ‘at different levels’ (also stated as ‘multiple layers’) that ‘extend to periphery’. The infant did well following the surgery and was returned to the parents. Further history revealed 2 previous falls while learning to stand, a common occurrence in this age group.

Due to the presence of both intracranial and intraocular hemorrhage, abuse was suspected and a skeletal survey done, which was normal. Referral to social services found the family to be a stable one. The witness gave the same description of the fall to the mother in the mother’s native language and to 2 separate social workers (first on the day of the incident and then 2 days later) in English,

¹ As mentioned in the Editorial, this article should be read in conjunction with the other two papers dealing with child abuse.

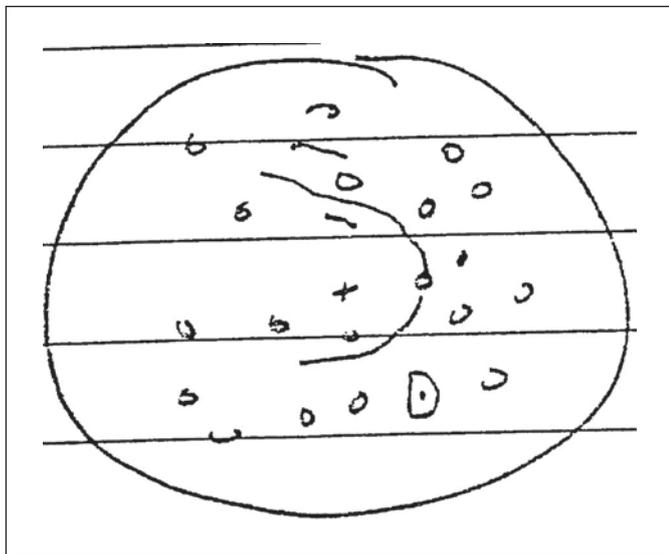


Fig. 1. Fundus drawing, right eye, 7 days after surgery. + is the fovea, dots represent intraretinal hemorrhages, short lines represent flame-shaped hemorrhages, circles represent superficial (pre or sub internal limiting membrane) hemorrhages and double circles white centered hemorrhages.

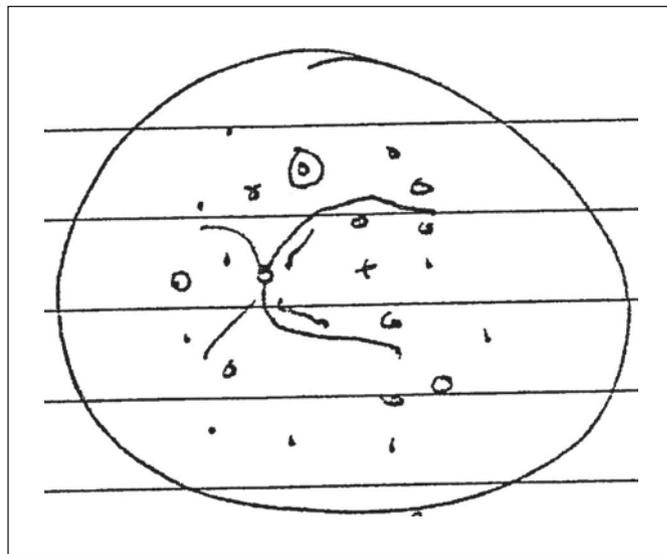


Fig. 2. Fundus drawing, left eye, 7 days after surgery. For explanation of symbols please see legend of fig. 1.

even reenacting the fall with a stuffed animal, showing it to be a fall backwards from a sitting position with the child striking the occiput. Of 5 treating physicians, 3 agreed this was accidental trauma consistent with the history (the operating neurosurgeon, a neurologist and the ICU pediatrician), while 2 felt it was non-accidental (a pediatrician and the pediatric ophthalmologist) and the court dismissed all charges. The child is doing well over 2 years following the surgery.

Pittman [1] has noted 'in the absence of other evidence of inflicted injury, the presence of a subdural hematoma in a child with external hydrocephalus is, by itself, insufficient to prove abuse'. Although Piatt [2] has cautioned (also 'in the setting of external hydrocephalus') 'retinal hemorrhage may not be pathognomonic of abusive injury', ocular findings are often accepted as such 'other evidence'. This is based on a 'shearing' theory with eye and brain findings being independent evidence of trauma with infants only suffering from the ocular findings of retinal hemorrhage, retinoschisis and perimacular retinal folds if they have been violently shaken. However, if the ocular findings can occur without such shaking, indeed if they may be secondary to the intracranial pathology, they are of no value in determining etiology.

The combination of intracranial bleeding and intra-ocular hemorrhaging has been noted to occur with wit-

nessed short falls, including one recorded on videotape [3] and with massive head injury without acceleration/deceleration [4], the latter case including retinoschisis and perimacular folds, findings promulgated as even more diagnostic of shaking. The description of the fall and subsequent clinical course in this case are remarkably similar to the 3 cases of the 26 described by Aoki and Masuzawa [5], where an occipital impact after a fall backwards from a sitting position was followed shortly by generalized tonic convulsive activity.

External hydrocephalus is unlikely to have existed in all 40 Japanese cases under the age of 2 reported by Aoki and Masuzawa [5] and Ikeda et al. [6] as well as the cases witnessed by Lantz et al. [4] and Plunkett [3]. It was thought to be present in this case by the operating surgeon and by a pediatric neurosurgeon asked for a second opinion but was said not to be present by the radiologist. Unless and until the ocular findings of presumed shaken baby syndrome are shown to occur with and only with severe ocular shaking, they should not be considered independent evidence of abuse in cases of subdural hemorrhage in infants nor pathognomonic of such abuse.

References

- 1 Pittman T: Significance of a subdural hematoma in a child with external hydrocephalus. *Pediatr Neurosurg* 2003;39:57–59.
- 2 Piatt JH Jr: A pitfall in the diagnosis of child abuse: external hydrocephalus, subdural hematoma and retinal hemorrhages. *Neurosurg Focus* 1999;7:e4.
- 3 Plunkett J: Fatal pediatric head injuries caused by short-distance falls. *Am J Forens Med Pathol* 2001;22:1–12.
- 4 Lantz PE, Sinal SH, Stanton CH, Weaver RG Jr: Perimacular retinal folds from childhood head trauma. *BMJ* 2004;328:754–756.
- 5 Aoki N, Masuzawa H: Infantile acute subdural hematoma. *J Neurosurg* 1984;61:273–280.
- 6 Ikeda A, Sato O, Tsugane R, Shibuya N, Yamamoto I, Shimoda M: Infantile acute subdural hematoma. *Child's Nerv Syst* 1987;3:19–22.