Overview

-How I approach these cases

-What can we learn from the scientific literature

-Example cases

-How to find expert witnesses

Read the Discovery

Most of the shaken baby cases involve a brain injury.

If you accept one of these cases, you must possess a basic understanding of the brain anatomy

You must understand how a diagnosis is made

You must have a basic understanding of the medical model

You need to understand the importance of radiology which includes x-rays, CT scans, MRI

You need to obtain medical records independently of those provided to you by the prosecution

Discovery – We normally think of that as what is provided to us by the prosecutor. In a shaken baby case you will likely receive many, many pages of medical reports.
You need to understand that what you receive from the State is inadequate to defend the case.
Instead, Rule #1: Obtain your own medical records.

There are 2 ways to do this:

If you represent a parent of the injured or deceased child, you can have them sign medical authorizations.

If the accused is not a parent, you must prepare subpoenas for the Court to sign.

What Records Are Needed?

In a nutshell:

Each and every piece of paper in any medical file for that baby since before birth:

1. Mom's prenatal records
2. Baby's birth records from hospital
3. Mom's records from baby's birth – these are different
4. Pediatric records
5. Any record from any hospital visit
6. Any record from any urgent care visit
7. Current hospital record
8. EMT/ambulance records

9. Sometimes a child is first taken to a local hospital and then transported by flight for life or ambulance to a children's hospital. In that case, be sure to obtain the records from both hospitals and the transport company.

10. Copies of all radiology on the child. This is a separate department and the films must be requested separately from the regular medical records department.

11. When asking for medical records, ask for a copy of each and every piece of paper, whether typed or handwritten. Those handwritten notes have been important in several cases.

12. In a death case, a copy of the preliminary and completed autopsy. In a death case, it is important to be in touch with the Medical Examiner early on to coordinate the ability of your pathologist to be present at the autopsy or if that is not possible, to have tissue samples and organs preserved for the use of your expert(s).

WHAT IS SHAKEN BABY ANYWAYS?

Also sometimes called Battered Child Syndrome.

In the "traditional" literature, it was based on what is called the Triad. If the triad is present in the child, medical providers are taught to suspect NAI (non accidental injury).

Shaken Baby Syndrome (SBS) is a form of physical non-accidental injury (NAI) to infants, characterized by

a. Acute encephalopathy with subdural and retinal hemorrhages (i.e. the Triad),
b. Occurring in the context of inappropriate or inconsistent history and
c. Commonly accompanied by other apparently inflicted injuries (e.g. fractures.

Am AcadPeds. Pediatrics 1993;92:872; Brit Med J 2004; 328:720

When the cause of death is due to brain injuries, the standard of practice requires an independent forensic examination of the brain and spinal cord by a board certified neuropathologist who is experienced in forensic medicine and pathology.

The State's medical experts typically state that shaking alone in an otherwise healthy child can cause SDH leading to death.
That the injuries are never due to short falls.
That the baby is immediately symptomatic, i.e. no lucid interval.
Symptoms in a child with a prior head injury means this was newly inflicted injury and not a spontaneous rebleed.
The last caretaker is always guilty if unwitnessed.

Oftentimes the prosecution's experts state that the force necessary to cause these injuries is equivalent to a high speed motor accident or a several story fall.

Many biomechanical experts have concluded that while it is possible to produce trauma in an infant by

shaking, the injuries would include the cervical cord and spine.

“Furthermore, the head acceleration and velocity levels commonly reported for SBS generate forces that are far too great for the infant neck to withstand without injury…and can potentially cause severe, if not lethal, spinal cord or brain stem injury…at levels well below those reported for the SBS.”

Bandak.Shaken Baby syndrome: a biomechanical analysis of injury mechanism.Forensic SciInt 2005; 151:71 (plus commentaries & replies).

Look at your medical records closely to see if there is any evidence of spinal or cervical injury.

Furthermore, despite the opinions that short falls cannot cause brain injury, they can and have been witnessed and reported in the literature.

Suggested Reading:

Barnes P, Krasnokutsky M. Imaging of the CNS in Suspected or Alleged NAI. Topics Magn Res Imag 2007:18:53-74.

Sirotnak A. Medical disorders that mimic abusive head trauma. In Frasier L et al, Abusive Head Trauma in Infants and Children, GW Medical Publishing, St. Louis, 2006, 191-226.

INVESTIGATION

Determine the basic age of the brain injury

-HYPERACUTE: Less than 3 hrs old. However, some experts say less than 24 hours old

-ACUTE:3 hrs to 7-10 DAYS OLD

-SUB-ACUTE:2-3 weeks

-CHRONIC: Greater than 3 weeks. Old injury and new combined – consider re-bleed?

There are mimics to NAI. Consider dural venous sinus thrombosis.
Meningitis
Benign Extracerebral collections
Re-hemorrhage may occur in an old SDH without recent trauma and be associated with a lucid interval.
Old SDH may date back to birth.

Suggested Reading:

Steinbok P, Singhal A, Poskitt K, Cochrane D. Early hypodensity on CT scan of the brain in accidental pediatric head injury. Neurosurgery 2007;60:689-695.

Geddes J et al. Dural Haemorrhage in Non traumatic Infant Deaths: Does it Explain the Bleeding in Shaken Baby Syndrome? Neuropath and Applied Neurobiol 2003; 29:14-22

Hymel K, Jenny C, Block R. Intracranial hemorrhage and rebleeding in suspected victims of abusive head trauma: addressing the forensic controversies. Child Maltreatment 2002; 7:329-348.

Determine the basic age range of the fractures

-Consider a child who has alleged NAI, but history is also consistent with congenital rickets.

The radiologists will agree that imaging alone cannot distinguish nonaccidental injury from accidental injury, or from predisposing or complicating medical conditions, including the Bone Fragility Disorders.

Are there varying ages in the skeletal survey?

If you have a possible congenital rickets case, you need to read the literature on Vitamin D Deficiency and Congenital Rickets.

Suggested Reading:

Bishop N et al. Unexplained fractures in infancy: looking for fragile bones. Arch Dis Child 2007; 92:251-256.

Keller K, Barnes P. Rickets v. abuse: a national and international epidemic. PediatRadiol 2008; 38:1210-1216.

Keller K, Barnes P. Rickets v. abuse – the evidence: Reply. PediatrRdiol 2009; 39:1130.

Dawodu A, Wagner C. Mother-child vitamin D deficiency: an international perspective. Arch Dis. Child 2007; 92:737-740.

Kleinman P. Problems in the diagnosis of metaphyseal fractures. Pediatric Radiology 2008; 38:S388-S394.

There are many more but this is a good starting point.

If you have a case of femoral fractures, which are reported in 12% to 29% of physically abused children, you need to read *Pediatrics 2001; 108:1009-1012 Femur Fractures in Infants: A Possible Accidental Etiology.* That particular study reported 2 nonambulatory infants who sustained identical oblique distal femoral metaphyseal fractures extending through the growth plate after playing in an infant stationary activity center called an Exersaucer. The authors concluded that it was possible that the twisting motion of the Exersaucer might be consistent with the generation of forces necessary to cause these fractures.

Retinal Hemorrhages

Can be caused by trauma (accidental and nonaccidental)
Hypoxia-Ischemia
Venous thrombosis
Apnea/choking/respiratory arrest
Infection & post-infections
Vitamin deficiency (C, D & K)
Metabolic disorders
Vascular/Connective Tissue Disease
Congenital Heart Disease
Spinal cord Injury
CPR
Nobody knows

Suggested Reading:

Lantz P, et al. Perimacular retinal folds from childhood head trauma: evidence-based case report. BMJ 2004; 328: 754-756.

Aryan H et al. Retinal hemorrhage and pediatric brain injury: etiology and review of the literature. J Clin Neuroscience 2005; 12:624-631.

Gardner H. Retinal folds. Arch. Ophthalmology 2007; 125:1142.

Kirshner R, Stein R. The mistaken diagnosis of child abuse.A form of medical abuse?Am J Dis Child 1985; 139: 873-875.

DIFFERENTIAL DIAGNOSIS

Any and all doctors who give an opinion on this child need to provide a differential diagnosis. The doctor should be able to objectively tell you what possible diagnosis were and should be considered.

If they ruled them out, make them explain how and why they were ruled out.

Look closely at the differential diagnosis and then consider how the symptoms fit in?

A differential diagnosis is not when a doctor gives a statement that “I know child abuse when I see it”; or “whenever I see SDH, I consider it non accidental until I see evidence to the contrary.”

Example Cases

Jefferson County – 2 week trial. Not guilty verdict. Unmarried father accused of SBS, his 5 month old baby died. Dad had fed the baby and had him on his lap to burp. The baby suddenly sucked in air, gurgled and his feet and arms shot out and he fell hard on the floor with a seizure. EMT's called and inserted the wrong size breathing tube in the baby and inserted it too far. Oxygen saturation way too low and tube repositioned. Last man standing (dad) accused. Mom said the baby was healthy. A thorough investigation of the medical records revealed that the baby had a traumatic birth and was not healthy. Cord entanglement, scalp injuries from birth trauma, given oxygen at birth, had a hematoma on his head. Mom breastfed while taking Prozac for severe depression.Caused the baby to be jittery at the hospital.
Pediatric records showed the child was brought in several times for a hoarse voice, hiccups, hard breather, snores, clicky sound in throat and diagnosed with bronchiolitis and colic. At autopsy it was found that the baby had acute pneumonia. All

doctors agreed it was impossible to date the baby's brain bleeds. The child abuse "expert" at CHW concluded SBS without all the medical evidence. Baby's brain findings were consistent with CVT (cerebral vascular thrombosis). An infection of the brain that can lead to seizures.

Milwaukee County – ongoing case. Police reports and "confession" were terrible. Dad supposedly threw tiny infant in the air and let him drop on the basement concrete floor. However, medical records were so revealing. The child was born premature and actually had a CT at birth which showed SH's. He remained in ICU for about a month and during that month, dad was his constant visitor, took all parenting classes and every note in the file showed him to be extremely attentive and loving to his son. CHW radiology reports concluded SH's and numerous rib fractures. Preliminary autopsy report showed no SH's and no rib fractures but still concluded child abuse. Ordered all films from CHW and had them reviewed by a radiologist out of Hershey Medical Center. She told us that the bones show grossly demineralized skeleton with some of the most impressive radial and ulnar cupping she's

ever seen. She thinks metabolic bone disease. Also the appearance, amount, and location of the blood in the brain caused her to believe the child had venous thrombosis. I contacted a doctor in England who is a specialist in this disorder who has agreed to take a look at this case. The child might further have a clotting disorder and we have found a doctor in the United States who is a specialist in missed clotting disorders. We don't know how this case will turn out, but we do know that this was a very sick baby. This confession, like so many others, was phony. And that, ladies and gentleman, is a subject for a different lecture!

I hope these two cases briefly illustrate the importance of obtaining medical experts in these most difficult cases.

Remember: short falls kill. Don't be afraid to ask for help. Unlike other types of cases, it is a tremendous mistake to approach the trial with the traditional thoughts that you will win through your cross examination of the State's experts. You cannot win without locating and retaining defense medical experts to review the evidence in your case.

Imaging cannot distinguish nonaccidental injury from accidental injury, or from predisposing or complicating medical conditions.