

Finding the Real Cause of Shaken Baby Syndrome

Based on several online reports,¹⁻³ on July 27, 2012, Mr. Malcolm Ricketts of Toronto was found guilty of assaulting (i.e., violently shaking) his then three-and-a-half-month-old infant daughter. Justice Bonnie Croll asserted this was the “only possible explanation” for the injuries sustained by the girl. While Mr. Ricketts awaits a hearing for sentencing scheduled this September 27, his family and loved ones remain steadfast about his innocence. While being escorted from the courtroom, he shouted, “I didn’t do nothing, I didn’t do nothing.” Did Mr. Ricketts violently shake his daughter causing permanent injuries “in a misguided effort to quiet her” as Justice Croll stated, or are there alternative explanations to clarify what might have happened to this infant?

All we know is that on March 6, 2010, Mr. Ricketts’ daughter was rushed to Toronto’s world-renowned Hospital for Sick Children, where the doctors involved found evidence to support shaken baby syndrome (SBS) because they discovered bleeding within the infant’s brain, two broken legs, 10 healing rib fractures, and haemorrhaging retinas. They did not find any evidence of neck injuries, which typically accompanies SBS. While the almost three-year-old toddler is alive, she will have to contend with a very a difficult life as a result of being mostly blind, unable to walk and talk, and having cerebral palsy.

While no reasonable human being would ever condone child abuse, all possible causes of injury need to be analyzed before convicting a parent of this most heinous crime. The typical diagnosis of SBS is based on the clinical triad of encephalopathy, retinal haemorrhage, and subdural haemorrhage in infants, usually less than six months of age, who die unexpectedly or survive with greater or lesser degrees of neurological damage.⁴

In this case, the infant had no evidence of neck injury when she was evaluated at the

hospital despite this being typical of SBS. It is likely that neck injuries are underreported among infants dying after severe abuse.⁵ Although Mr. Ricketts’ daughter did not die, infants are more vulnerable to injury due to the hinging of the head on their weak necks, compared to adults with developed musculature and complete head control.⁶ It does seem strange that she did not have evidence of neck injury, and yet the doctors and Justice were convinced that the infant’s condition was reflective of SBS. There is a substantive body of literature that undermines the hypothesis that shaking per se causes this triad.⁶

If shaking a baby is a questionable cause of SBS, even though Mr. Ricketts was found guilty based on the assumption that he violently shook his daughter, then other factors ought to be considered in the differential diagnosis of any infant presenting with clinical features suggestive of abuse or unexplained trauma. One such neglected cause might be vitamin C (i.e., ascorbic acid) deficiency, also known as Barlow’s disease variant, advanced by the late Dr. C. Alan B. Clemetson.⁷ Barlow’s disease, resulting from vitamin C deficiency and characterized by bruises, broken bones, and sores that don’t heal, was rather common in the early part of the 20th century. In our modern times this can masquerade as SBS since an inadequate vitamin C intake or a reduction in plasma ascorbic acid levels (due to a variety of reasons) gives rise to elevated levels of whole blood histamine in the body.⁷ The elevated whole blood histamine and low plasma ascorbic acid levels cause defective collagen synthesis, and can be responsible for bruising and bleeding of the bridging veins and venules between the brain and dura mater, including retinal petechiae.^{7,8} Should the depletion of vitamin C become marked for any length of time it can also lead to sub-periosteal haemorrhages, epiphysial separations, and bone fractures.⁷ Additionally, the typical bleeding gums of scurvy, an obvious sign of vitamin C deficiency in an adult, would be absent in an infant since bleeding gums would not likely occur before the eruption of the lower in-

cisor teeth at seven months of age.⁹ All of these features indicative of Barlow's disease variant could easily be mistaken for evidence of child abuse unless consideration is made for the possibility of vitamin C deficiency.

Clemetson developed this hypothesis several decades after his initial research showed an inverse relationship between low plasma ascorbic acid and elevated whole blood histamine levels, and the resolution of histaminaemia by the administration of 1,000 mg of vitamin C daily by mouth for three consecutive days in 10 of 11 subjects.¹⁰ Over the next few decades he became interested in causes of vitamin C depletion, in the relationship between vitamin C and whole blood histamine, and the potential implications of hidden vitamin C deficiency in infants. He argued that besides vitamin C intake, two main factors – minor infections and inoculations – can affect the vitamin C status of an infant, increase their whole blood histamine levels, and possibly cause harm by inducing marked capillary fragility. Minor infections cause marked reductions in leukocyte ascorbic acid levels (i.e., a local vitamin C deficiency) and high whole blood histamine levels.^{11,12} Inoculations can turn mild histaminaemia into severe histaminaemia, further depleting an infant's vitamin C status, following multiple inoculants given by injection.^{11,12}

In this particular case, the infant was three and half months old when she was taken to the hospital. In Ontario, multiple inoculants are given at two and four months of age so it is possible that this infant's vitamin C status was compromised in the weeks following the injection due to inoculation-induced histaminaemia. If this infant was formula fed, heating prior to feeding destroys vitamin C, which might have been a contributing factor.¹³ In addition, it is unknown if this infant had a cold or minor infection or a weakened immune system around the time of the emergency. Unfortunately, no hospital considers Barlow's disease variant or even conducts laboratory testing of ascorbic acid and histamine when abuse is suspected, so it is entirely possible that Mr. Ricketts was

found guilty of a crime he did not commit.

In this issue, we have a very timely article by retired haematologist, Dr. Michael D. Innis, who adds to Clemetson's body of work by relating signs of SBS to deficiencies or abnormalities of vitamins C, K, and D. Innis has been working diligently in this controversial area for many years and has given evidence for the defence in cases of SBS across the globe where parents or caregivers of infants have been wrongly accused of abuses they allegedly did not commit. Based on his analysis of cases, Innis asserts that a metabolic disorder involving vitamins C, K, and D can produce a syndrome that mimics SBS (i.e., leading to bruising, bleeding, and fractures) and is conceivably overlooked when an infant presents with clinical stigmata of abuse or unexplained trauma. We're certain you'll find this important report by Dr. Innis of interest, as it provides a logical and alternative explanation for the cause of SBS.



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