Abstract

Over the last decade much controversy has been created around the diagnosis and medico-legal implications of abusive head trauma (AHT). The likelihood of a traumatic origin for the injuries seen in these cases has been questioned by some individuals, and non-mainstream hypotheses have been used during court proceedings that have not been supported by rigorous scientific studies. One of the questions often raised within this area of research is, where does the bleeding come from when an infant suffers a subdural haemorrhage? The most widely held theory for the source of bleeding is damage to bridging veins which travel from the surface of the brain to the dural membrane. However, there are some authors that suggest that bridging veins are too ‘robust’ to rupture due to forces inflicted during the shaking of a baby. There is insufficient scientific research in the area of AHT, including that relating to the blood vessels associated with the dural membrane. Most data on bridging veins comes from studies of adults.

Post-mortem research in the area of AHT is extremely challenging. Ethical approvals are required to carry out work of a very sensitive nature, access to cases is challenging and the standard method of autopsy removal of the brain is disruptive to the areas of interest, including the bridging veins.

In cases of suspected AHT, a thorough and systematic study of the cranium and its contents is essential, preferably using the best available methods for observing the brain and its coverings. We have developed a novel minimally invasive method for removal of the calvarial bones in infant autopsies to allow viewing of the dura mater and brain (1). This method leaves the dura undamaged, enhancing the ability to observe and photographically document autopsy findings, including the artefact-free detection of signs of injury such as subdural haemorrhages and brain swelling. We have also further enhanced the post-mortem assessment of infant head injuries using a reversible technique which increases the transparency of the dural membrane (2).

Not only do our novel post-mortem methods enhance viewing of the cranial injuries seen in AHT, but they also leave the bridging veins intact, allowing for future study of these blood vessels. Accordingly we present preliminary findings of our investigations of cerebrodural veins using optical coherence tomography.


Biography

Emma Cheshire started a PhD in 2011 within the University of Leicester, investigating the source of subdural bleeding in cases of infantile non-accidental head injury. The project, due to be completed in December 2015, provides novel anatomical data on the infant dural vasculature system.
Objectives

Objective 1: To develop infant autopsy methods.
Objective 2: To improve assessment of bridging veins.
Objective 3: Artefact free observation of intracranial injuries.