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REPLY

Abusive head injuries in infants corroborated versus non-corroborated cases: more answers to more questions

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Dear Editor

I thank Mr. Lynøe for this new occasion of discussion on the topic of shaken baby syndrome (SBS) sparked by our study [1]. I agree happily with him on some issues, like the problem of circular reasoning, the independence of the medical diagnosis and judicial sentence, and the need not to shake a baby; I disagree on several others. I will answer the most salient points of his critics in the order these appear in his letter.

Regarding the impact of preventive campaigns on the incidence of abusive head injuries (AHI), I agree that some studies have indeed failed to identify a decrease in the incidence of AHI [2, 3]; however, others have recorded a positive effect [4, 5]. Furthermore, the lack of impact of some of the campaigns on the number of new cases of AHI does not prove that shaking is not the mechanism. We know from the survey by Theodore et al. [6] that shaking is widespread, happening in up to 2.6% of households, the vast majority of victims having no or few visible manifestations. Prevention campaigns stimulate not just awareness among the public but also involvement among caregivers and may result in greater diagnostic accuracy and exhaustiveness, especially regarding milder forms of abuse. In consequence, increased diagnostic accuracy could offset a true decrease of abuse.

I agree that researchers should avoid conflating apparent life-threatening events (ALTE), considered as a milder form of sudden infant death syndrome (SIDS), with abusive shaking. However, it appears that Lynøe himself does precisely this in his study mentioned in reference 3, by suggesting that shaking for resuscitation purposes in ALTE (credited with 37% of the "reasons for shaking") could be mistaken for AHI. Unfortunately, although this paper is referred to as "accepted for publication" in 2020, I was unable to find it online, so how the percentages were calculated remains unclear to me. In the literature, ALTE is considered a dubious cause of intracranial bleeding or retinal hemorrhages (RH) [7]; the presence or absence of intracranial bleeding in SIDS is also much debated [8, 9], especially because some cases of alleged SIDS may have been undiagnosed SBS. Whatsoever, RH are rare in SIDS and, if present, differ clearly from those found in SBS [10]. In my experience, the story "the baby collapsed, I shook him" was always given as an afterthought, after a judiciary inquiry had started and the accused had contacts with a lawyer, which are reasons to suspect that these were induced responses.

I agree that the confession by a perpetrator is by no means a gold standard, but I consider that it brings us as close as we can get to what really happened. I am aware that reducing such a tortuous process as confession to a binary variable in our study may be an oversimplification but was justified by the highly significant differences disclosed between the two groups [1]. Whatsoever, I can hardly imagine that one of the caretakers would falsely self-accuse during the inquiry in 37% of cases. By contrast, spontaneous confession at the time of medical diagnosis is exceptional; over a period of more than two decades during which we saw more than 300 cases of AHI, it happened only twice. In one these two cases, the judge did not condemn the self-accused father, who in his opinion had clearly sacrificed himself in order to shield his highly unstable spouse. Regarding denial, although not being a psychologist, I can easily imagine the agony of a perpetrator overwhelmed by guilt, having no escape but to repress his memories into his subconscious. In that measure, denial can be sincerely untrue [11]. In any case, it is for the judiciary (who, unlike me, are true professionals in this domain) to decide whether they should accept or not the caretaker's story, confession, or denial.

The aggressive and injurious tone of the next paragraph, entitled "the terms 'insufficient' and 'limited' scientific evidence," should not be admitted in a scientific publication. Despite Lynøe's excessive reaction, I maintain that the

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diagnosis of SBS is made on medical findings alone, which is commonsense for any diagnosis. Lynøe considers that having, in the report of the SBU (*Statens beredning för medicinsk och social utvärdering*, Swedish Agency for Health Technology Assessment and Assessment of Social Services) [12] found no class 1 evidence proving the diagnostic value of the so-called "triad," no one can make a diagnosis of SBS. In my opinion, the protocol used in the Swedish report is the correct procedure to answer a flawed question. I agree with Lynøe that assembling the elements of the "triad" (hopefully often reduced to a dyad when the brain is apparently intact) is not the correct method to make the diagnosis of SBS, but I draw other conclusions. This diagnosis is more complex and subtle than just ticking three boxes; it involves careful analysis of the findings of clinical examination, imaging of the brain and spine, neuro-ophthalmological explorations, skeletal X-rays, biology, and medicosocial inquiry, and confrontation of these findings with the medical history told by the caretakers and the child's age. This allows the clinician in charge to make the diagnosis in emergency "beyond reasonable doubt" and, if we follow Lynøe's interesting distinctions between the clinical, scientific, and medicolegal tasks, fulfill the clinical task.

The scientific task, with a higher level of exigence, is fulfilled by the convergence of all the different lines of evidence on SBS, including animal and numeric models [13, 14], a unique cluster of medical findings as identified by artificial intelligence [15], detailed descriptions by perpetrators [16], survey of the public [6], the impact of prevention campaigns [4, 5], and the occasional video footage caught on CCTV. The absence of class 1 evidence is not a final criterion, because some scientific facts and theories cannot be proven, as discovered by the mathematician Kurt Gödel, who died of hunger because he was unable to prove that his food was not poisoned [17]. Regarding the medicolegal task, it derives from science since the expert has to answer the queries from the judge by providing him objectively with the scientific state of the art.

If Lynøe challenges the "SBS theory," especially if framed in an artificial "triad" (the denialists' strawman), as "never proven" because he does not accept the scientific evidence, this does not attest of scientific rigor but rather of entrenched denialism. Science however has a duty to rise to challenges, and it has always progressed through controversies. A consensus by a panel of experts is no guarantee of truth, as shown during Galileo Galilei's trial; Galilei's theory became finally accepted, to be later corrected and completed by Johannes Kepler, then Isaac Newton, and Albert Einstein. Time is thus the ultimate test; Abraham Lincoln used to say, "You can fool some of the people all of the time, and all of the people some of the time, but you cannot fool all of the people all of the time." Regarding SBS, the convergence of all the clinical and scientific evidence accumulated over the last 5 decades, and getting richer and more coherent and documented by the year, is scientifically utterly convincing.

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Availability of data and material We the authors commit ourselves to provide all data upon request.

Declarations

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