

Re: Cognition and brain structure following early childhood surgery with anesthesia

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Editor,

We note the latest addition to the collection of retrospective small human cohort studies of neurocognitive outcomes in young children exposed to surgery and anesthesia. [1] The possibility that general anesthetics might be neurotoxic in the developing human brain has left anaesthesia providers and parents with doubts as to whether it is safe to use anaesthesia in young children.

The current study states that language comprehension and performance IQ in children exposed to surgery and anesthesia were decreased compared with unexposed controls, and that these functional abnormalities were associated with decreased gray matter volume, primarily in posterior brain regions. The exposure group comprised 53 children with a history of surgery requiring anesthesia before the age of 4 years. Presumably all (n=53) of these children underwent ENT procedures (and possibly other additional surgical exposures). Children who undergo ENT surgery in preschool age are known to have a greater risk of subsequent language and cognition problems later in life. [2] This may well explain the differences in neurocognitive tests between the 2 studied groups.

Additionally, the authors conclude that exposure to surgery and general anesthesia leads to regional volumetric alterations in brain structure. This novel finding, however, could be due to the potential 'matching' of the study participants. 'Exposed' study participants display a near perfect Gaussian distribution for both the IQ performance test and OWLS listening comprehension score but not for the 'matched' control group. To validate the authors novel finding an additional 'unexposed' study group matched for the cognitive function tests would require studying.

However, is the potential of minor cognitive function either as a result of surgery and speculatively anesthetic agents really an important outcome marker? If anesthesia-related neurotoxicity exists in humans it must be minor or present only in a subset of susceptible infants. Alternative outcome markers (perceived perhaps more important within society) such as school exam marks and securing a good social status are not evidently influenced by early exposure to anesthetic agents. [3]

Many other perioperative factors impact on neurocognitive outcome in young children exposed to surgery and anesthesia and the authors need to be congratulated to extract some indicators of conduct of anesthesia such as hypotension, bradycardia, hypoxia from handwritten historical anesthetic charts. [4] However, other perioperative factors are equally or perhaps even more important: hyponatremia, hypocapnia, hyperoxia, hypo- and hyperglycemia, inflammation, pain, gender and genetics. There is no proven causal link between specific anesthetic agents or techniques, but there is a definite causal relationship between poor perioperative anesthetic care and bad neurocognitive outcome and mortality in neonates, infants and small children. [5]

Without ensuring proper conduct of anesthesia, as defined by the 10N-Pediatric Anesthesia Quality Checklist [5], no neurocognitive or pathological MRI findings should automatically be linked to general anesthesia or surgery.

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Conflict of Interest:

None declared

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