EFFECTS OF EXPOSURE TO GENERAL ANAESTHESIA IN INFANCY ON ACADEMIC PERFORMANCE AT AGE 12.

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Introduction
Studies in animal models have shown that exposure to general anesthetic (GA) agents in neonatal life can cause irreversible damage to the developing brain1,2. Human cohort studies also suggest that children exposed to GA in early childhood were more likely to have behavioral problems3, learning disabilities4 and possibly poorer academic achievements.

Objectives
To determine if exposure to GA during infancy for minor surgery in otherwise healthy children predisposes them to poorer academic achievements at age 12 relative to children with no previous exposure to GA.

Methods
From our hospital database, children born in 1998-1999 with no pre-existing medical conditions, who were exposed to general inhalational anesthesia for minor surgical procedures (herniotomies, circumcision, cystoscopies and pyloromyotomies) before their first birthday were compared to age-matched controls with no previous exposure to GA.

Exclusion criteria: History of prematurity, genetic disorders, central nervous system disorders, major congenital cardiac defects, severe renal disorders and family history of developmental delay, intellectual disability and psychological disorders.

Parents of participants completed a 20-minute telephone interview with questions on their medical history, school and home environment.

Results
Stepwise logistic regression was performed on learning disability (binary outcome) as the response variable. Selection pool of potential predictor variables of learning disability: previous exposure to general anesthesia, race, gender, maternal education, paternal education, parental living arrangements, birth order, and afterschool care. The only significant predictor of formally diagnosed learning disability was previous exposure to general anesthesia.

Odds ratio (OR) of having a formally diagnosed learning disability in exposed group relative to the controls was 4.50, 95%CI, (1.44, 14.1).

The occurrence of children with formally diagnosed learning disability was 15% (15/100) in subjects vs. 3.77% (4/106) in controls (p<0.001.)

Parentally reported learning disability was 27% (27/100) in subjects vs. 4.71% (5/106) in controls (p<0.001).

Conclusions
Exposure to general anesthesia in otherwise healthy children for minor surgery before their first birthday was associated with a 4.5 times higher incidence of learning disability at age 12, relative to children without exposure to anesthesia. Study precision was inadequate to detect a clinically relevant difference in PSLE scores between the two groups.

References