Feasibility and preliminary results of an observational study to investigate a relationship between postoperative emergence delirium (ED) and postoperative cognition alterations in young children - the NarcoKids trial

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Background and Goal of Study: Up to 80 % of children are affected by ED¹ with possible consecutive maladaptive behaviour². The aim of this observational study was to examine interrelations between preoperative anxiety, incidence of ED in the recovery room and postoperative cognition.

Figure 1: Study flow chart

Materials and Methods: Following ethics committee's approval, registration of the study (NCT02481999) and parental written informed consent, 189 children aged 0.5 to 8 years scheduled for elective surgery were enrolled. Children were assessed with the modified Yale Preoperative Anxiety Scale (mYPAS). Anaesthesia induction and maintenance were applied as standard procedures. In the immediate postoperative period occurrence of ED was assessed by PAEDscale¹ (in short intervals). Children were invited for age-adapted cognitive testing at 7d and 90d following surgery. Data analysis was performed with SPSS 25, employing appropriate testing for numerical, ordinal and categorical data.

Conclusion: Apart from cognitive follow-up testing which exhibited a very low compliance of the participating families to the study course, the study design was feasible and well accepted. Further measures to improve compliance for cognition testing would require a modification to the study protocol. In contrast to literature² we did not find a higher rate of preoperative anxiety in the ED group, probably due to age heterogeneity or a differing premedication regimen. As ED and behavioral outcome in young children with multiple anaesthetic procedures are closely related, cognitive impairment should be monitored³ in this vulnerable population.

References:

1. Aldecoa C *et al* European Society of Anaesthesiology evidence-based and consensus-based guideline on postoperative delirium. *Eur J Anaesthesiol*. 2017;34:192-214
2. Kain ZN *et al* Preoperative anxiety and emergence delirium and postoperative maladaptive behaviors. *Anesth Analg* 2004;99:1648-1654
3. Hu D *et al* Association between exposure of young children to procedures requiring general anesthesia and learning and behavioral outcomes in a population-based birth cohort. *Anesthesiology*. 2017;127:227-240

Figure 2: Incidence of emergence delirium depending on gender

Results and Discussion: 37 children were lost to analysis because of preliminary study drop-out. 49 children of 152 analysed (32.2%) were diagnosed with ED (PAEDscale >10¹). Children with ED were younger and had previous surgery experience. They did not have a significantly higher rate of preoperative anxiety (mYPAS) immediately before induction of anaesthesia. Induction and maintenance of anaesthesia had no significant influence on incidence of ED.

Figure 3, left: Influence of type of induction on emergence delirium

Figure 4, right: Influence of anaesthetic maintenance on emergence delirium

32 children with ED completed the cognitive follow-up testing. 55 children did not attend cognitive testing. Detailed cognition data remains to be evaluated by the child psychologist.

Figure 5: Participation in cognitive testings.
t1= before anaesthesia
t2= 7days postoperative
t3= 90days postoperative