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Brain bioelectrical function and cerebral oxygenation during neonatal anaesthesia with two different opioid drugs - pilot clinical study.

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Disclosure statement

I have nothing to declare.

Introduction

- Preterm newborns are often in need of surgical treatment.
- One of the most commonly used drugs in newborn anesthesia are opioids.

Introduction

- One of the most commonly used opioids are fentanyl and remifentanyl.
- They have different pharmacokinetics and they might have different effect on brain function.

	Fentanyl	Remifentanyl
Onset	Almost immediate	1-3 minutes
Duration	0,5-1 hour	3-10 minutes
Metabolism	Rapid via blood and tissue esterases	Hepatic, primarily via CYP3A4 by N-dealkylation (to norfentanyl) and hydroxylation to other inactive metabolites
Half elimination	2,4 hours	5,4 minutes

Introduction

- There are two new methods of brain function monitoring.
 1. Amplitude integrated electroencephalography (aEEG) which allows to continuously monitor electric brain function.
 2. Near Infrared Spectroscopy (NIRS) monitors brain tissue oxygenation.



Aim

The aim of the study was to compare the effect of two opioid drugs on brain function assessed with amplitude integrated electroencephalography (aEEG) and near infrared spectroscopy (NIRS)

Methods

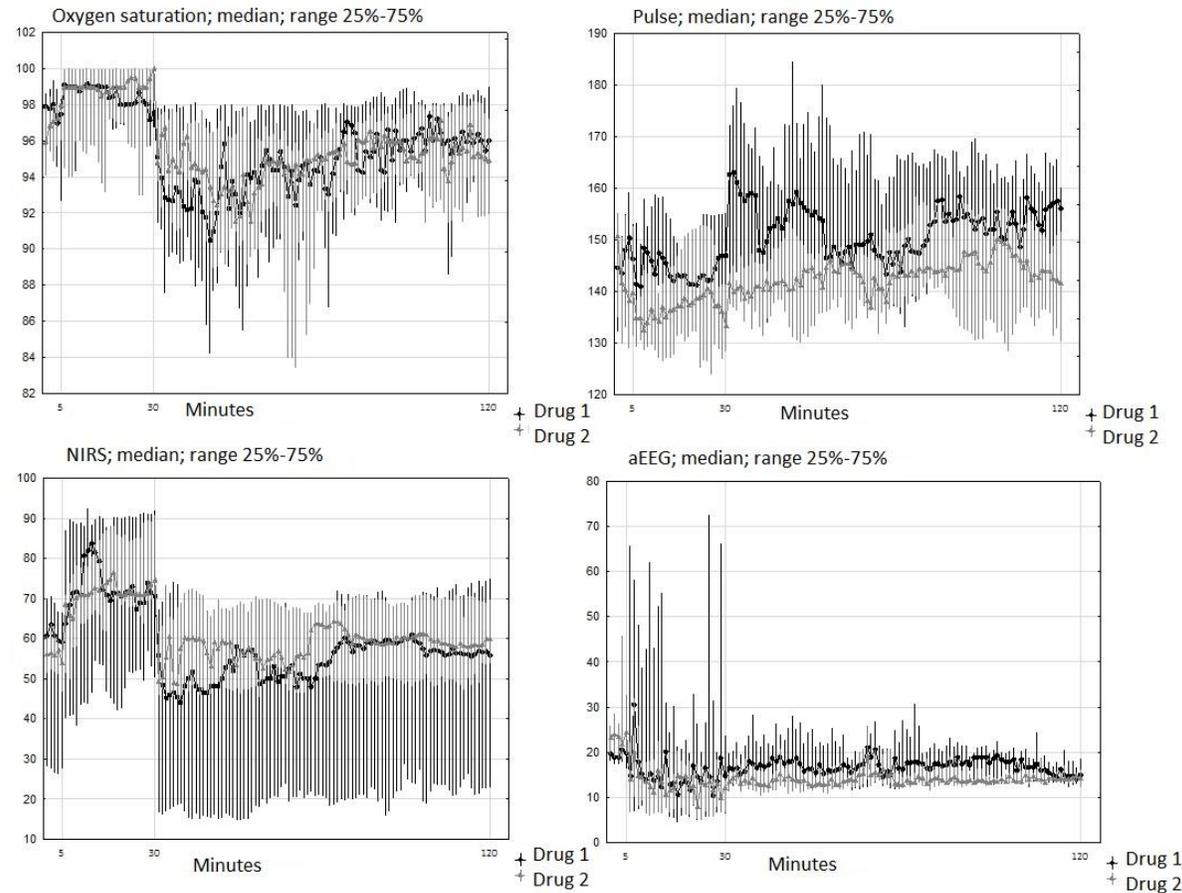
- Infants requiring surgery for retinopathy of prematurity were included into the singlecenter, randomized, pilot clinical study.
- Patients were divided into two groups. Group 1 received remifentanil and group 2 fentanyl.
- The following variables were analyzed: length of ventilator support, mean aEEG voltage and interburst intervals (IBIs), brain oxygenation and saturations.
- Each patient was monitored for 5 minutes before the surgery, during the surgery and for 1,5 hour after the procedure.
- Time after procedure was divided into 3 epochs (30 minutes each) for the analysis.

Results

- 15 patients had been included into group 1 and 13 into group 2.
- Group 2 had longer time on mechanical ventilation after the procedure (505min. vs. 172 min. $p=0,004$).
- Group 1 had significantly higher heart rate in first 30 minutes after the surgery ($p=0,004$) and in last 30 minutes ($p=0,03$).
- Group 2 had lower mean voltage in first 30 minutes after the procedure ($p=0,008$) and during last 30 evaluated minutes ($p=0,04$).
- After the surgery, in all three phases, group 2 had more IBIs after the surgery.
- There were no differences in saturation and brain oxygenation.

Results

Comparison of saturation, pulse, brain oxygenation and mean aEEG voltage between groups.



Conclusions

- Infants receiving remifentanil needed less time on mechanical ventilation after the surgery. They had also higher aEEG voltage and less IBIs after the procedure. Difference in heart rate requires further investigation.



Thank you for your attention.