

THE VALUE OF INTEGRATED PULMONARY INDEX (IPI) MONITORING DURING ENDOSCOPIES IN CHILDREN

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The IPI is a software tool that constitutes a representation of 4 parameters: End tidal CO₂ (EtCO₂), respiratory rate (RR), Oxygen saturation (SpO₂) and pulse rate (PR), already displayed on a monitor, in the form of a single index value ranging from 1 to 10 with trend information. The IPI index has been validated for adults and for children older than 1 year of age.

In this study we aimed to study the value of IPI monitoring using Capnostream20[®] during pediatric endoscopic procedures under general anesthesia (GA) and conscious sedation (CS). We specifically aimed to assess whether 1) IPI monitoring improves patient safety in the pediatric GI suite by reducing hypoxemia and respiratory depression events compared to regular monitoring with oxygen saturation and 2) to assess the safety net of different sedative medications as to adverse respiratory events and patient recovery.

The IPI signal was monitored and analysed in order to detect IPI changes due to various parameters changes such as drug dosage per weight, drug type, and the presence of an anaesthetist.

Results: Our data consisted of 124 measurements of 109 patients undergoing different procedures (upper endoscopy 84 patients, colonoscopy 6 patients, both 9 patients). The data was divided into 3 groups based on the drug type used: Propofol only- 5 patients (group 1) Propofol & midazolam-89 patients (group 2), Propofol, midazolam & Fentanyl-15 patients (group 3). patients in group 2 and 3, had significantly higher IPI levels than group 1. A significantly lower IPI values were found between ages 4-6y compared to 7-12y years old. High midazolam dose was associated with lower IPI levels during the procedure. No significant differences were found for propofol doses. Patients who had an anaesthetist present had lower IPI levels during the procedure compared to those who did not. No differences were noted between the different procedures. IPI values were never higher than 4, a value indicating that the patient requires attention, in all cases of clinically significant respiratory events. IPI alerted all apnea episodes (58 events, IPI=1) and hypoxia (26 events, IPI<=3) episodes, whereas, pulse oximetry captured only the hypoxia episodes (IPI sensitivity=1, specificity 0.98, positive predictive value 0.95).

Conclusions: Younger patient age, use of propofol alone, higher midazolam doses and presence of anaesthetist are all associated with lower IPI levels. IPI monitoring adds to patient safety during endoscopic procedures.