[RRA2-2] High body mass index in older children as a risk factor for peri-operative complications

Liu M, Nafiu O
Cs Mott Children's Hospital, University of Michigan , Ann Arbor , MI, USA

Introduction

Obesity is potentially the most serious chronic disorder currently threatening children in the United States as reflected in the increasing proportion of children presenting for surgery who are overweight or obese. High body mass index (BMI) is associated with peri-operative (mainly respiratory) adverse events. Prior studies describe adverse respiratory complications in children aged 2-18yr (1,2). However, as respiratory complications are often more frequent in younger children, it can be difficult to determine the effects of age in these existing studies. Therefore the objective of this study was to determine the frequency of peri-operative adverse events in older children and propose that older children with high BMI have a higher incidence of peri-operative adverse events than their lean peers.

Methods

Using prospectively collected clinical and anthropometric data, children aged 6-18yr undergoing elective non-cardiac surgeries were classified into high or normal BMI groups based on age and gender-specific criteria. High BMI (overweight and obese) was defined as age and sex-specific BMI $\geq$ 85th percentile. Data on adverse events were prospectively collected at two epochs: pre-incision period and upon arrival in the post anesthesia care unit with the incidence of adverse events compared. Recorded outcome data were crosschecked with anesthesia providers who were unaware of the purpose of the study.

Children with secondary causes of obesity such as Prader-Willi syndrome, Cushing's syndrome or nephrotic syndrome were excluded as were children with cranio-facial anomalies, cognitive impairment or severe cardio-respiratory disease.

Results

A total of 1102 children were studied. Overall prevalence of high BMI was 37.7%. There was no age, gender or ethnic differences between the groups. Overweight/obese children had a higher prevalence of asthma and essential hypertension than their lean peers. Composite adverse airway events were more frequent in the high BMI group than in lean controls (Table 1). On multivariate analysis, BMI remained a significant predictor of adverse respiratory events after controlling for age, snoring, obstructive sleep apnea and bronchial asthma (OR 1.9, 95% CI = 1.6-2.4; p = 0.03). Conclusion: Older children with high BMI have a higher incidence of peri-operative adverse respiratory events than their lean peers. The former group also had a longer PACU stay (Figure 1). High BMI in older children should be considered a risk factor for respiratory complications and delayed PACU discharge.

References

1. Nafiu OO et al. Paediatr Anaesth. 2007;17(5):426-430.
2. Tait AR et al. Anesthesiology. 2008;108:375-380.

Table 1. Peri-operative characteristics and complications by BMI categories.

Characteristics	Normal BMI (N = 686)	High BMI (N =416)	p value
Age (yr)	10.8±3.6	10.6±3.4	0.35
Hypertension (%)	1.9	4.6	0.01
Asthma (%)	17.2	25.7	0.001
Habitual snorer (%)	21.9	36.3	<0.001
OSA history (%)	7.0	11.1	0.013
Abdominal obesity (%)	1.7	58.4	<0.001
Nuchal obesity (%)	1.0	7.5	<0.001
Difficult mask (%)	9.6	22.1	<0.001
UAW obstruction (%)	2.1	10.4	<0.001
Laryngospasm (%)	1.3	5.6	<0.001
Airway event (%)	6.7	16.3	<0.001
Difficult DL (%)	5.5	6.0	0.83

OSA, obstructive sleep apnea; PACU LOS, post anesthesia care unit length of stay; UAW, upper airway; DL, direct laryngoscopy.
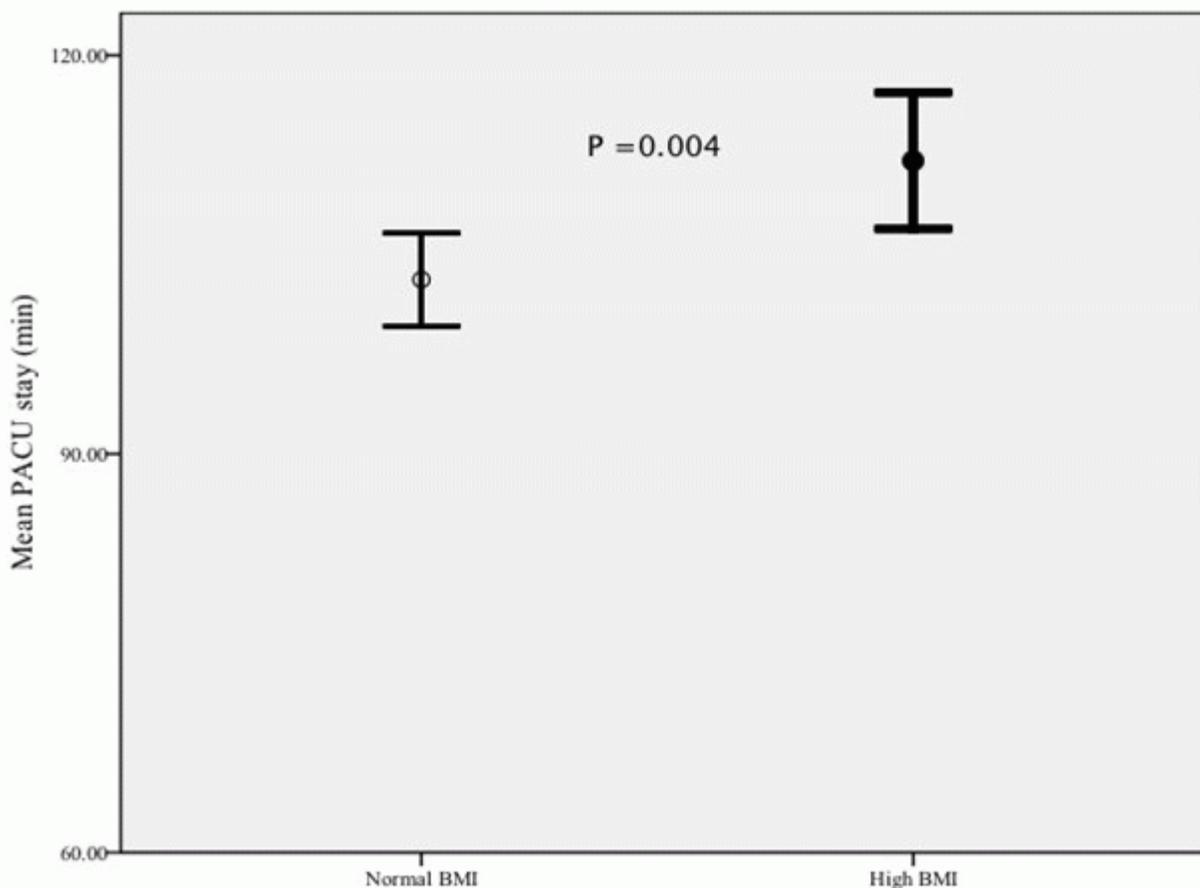

Fig 1. Mean PACU LOS compared between children with normal and high BMI. Error bars represent 95% CI. Children with high BMI had longer PACU stay than their lean peers.