The effect of body mass index on postoperative pain in paediatric surgical population

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Introduction

In children body mass index (BMI) varies with age and sex. WHO defines childhood overweight and obesity according to standard deviations (BMI Z-scores) from the mean BMI. The aim of this study is to evaluate the effect of BMI on postoperative pain and postoperative analgesia requirements in paediatric surgical population.

Materials and methods

757 consecutive children, aged 1 to 15 years old, ASA PS I-III, were included in this study.

Participants were allocated into four groups according to WHO BMI classification:

Group 1 (n=110) underweight,

Group 2 (n=456) normal weight,

Group 3 (n=106) overweight and

Group 4 (n=85) obese.

All patients underwent elective surgical procedures under general anesthesia and received 0.003-0.005mg/kg fentanyl, 20mg/kg paracetamol and 0.02mg/kg nalbuphine intraoperatively according to standard department protocol. Demographic data were obtained from patients records.

Postoperative pain scores with Hanallah, NRS and Wong Baker (WBFPS) pain scales at rest and movement (deep breath) and Aldrete score were assessed in 1(st) hour following surgery. Postoperative analgesic requirements after discharge were recorded.

Statistical analysis was performed with ANOVA posthoc and chi square tests. Level significance was set at $p < 0.05$.

Table 1. Patient's demographic data

		Group 1	Group 2	Group 3	Group 4
Age	Mean	6.3	8.7	9.5	8.2
	SD	3.3	3.6	2.9	3.0
BMI	Mean	12.9	16.6	20.5	23.2
	SD	1.5	2.6	2.9	4.5
ASA PS (I/II/III)		82/28/0	363/81/12	70/34/2	61/19/5
Duration anaesth	Mean	68.2	70.4	75.4	75.2
	SD	31.3	34.1	35.5	25.1
Duration surgery	Mean	49.4	51.6	60.3	55.0
	SD	28.5	30.2	27.2	24.4
FNT (µg/kg)	Mean	4.8	5.2	4.1	3.9
	SD	3.2	2.5	1.8	2.3

Conclusion

BMI may relate with immediate postoperative pain scores and analgesia. Underweight and normal children received less analgesics and reported less pain compared to overweight and obese children, postoperatively.

Results

There were no differences in patients demographic data except for the body weight and BMI. Table 1 Obese children (Group 4) reported statistically significant more pain in Hannalah scale compared to group 2 and 3 ($p < 0.05$). No statistical differences were noted between groups regarding WBFPS at rest and movement. In group 3 NRS scale was statistically significant lower compared to group 1 ($p < 0.05$). Table 2

Underweight children (Group 1) received significantly less analgesics after recovery compared to normal (Group 2, $p < 0.05$). Moreover, there was statistically significant difference in analgesia consumption in Group 2 compared to group 3 ($p < 0.05$) and 4 ($p < 0.05$). Table 3

There was also statistically significant higher Aldrete scale score in group 2 compared to group 4 ($p < 0.05$). Table 2

Table 2. Pain scales measurements

	Group 1	Group 2	Group 3	Group 4	p- value
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	
Hanallah	0.8±1.4	0.6±1.2	0.5±1.1	1.0±1.4	2 vs 4: 0.01
					3 vs 4: 0.01
WBFPS rest	1.3±2.2	1.3±1.7	1.3±1.8	1.3±1.8	NS
WBFPS move	1.5±2.9	1.5±1.1	1.5±1.1	1.5±2.1	NS
NRS rest	0.9±1.8	0.7±1.5	0.4±1.0	1.1±1.8	3 vs 4: 0.05
NRS move	1.5±1.9	1.0±1.7	0.8±1.2	1.4±2.1	1 vs 3: 0.05
Aldrete	9.6±0.4	9.7±0.4	9.6±0.5	9.5±1.2	2 vs 4: 0.01