

Impact of obesity in pediatric anesthesia

An Assay

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تأثير السمنة في تخدير الأطفال

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List of abbreviations

A.I.DuPont	Alfred international. DuPont Hospital
BIPAP	Biphasic positive airway pressure
BIS	Bispectral index
BMI	Body mass index
Br	Bromide
CHD	Coronary heart disease
CNS	Central nervous system
CO2	Carbon dioxide
CPAP	Continuous positive airway pressure
FEV	Forced expiratory volume
FEV1	Forced expiratory volume in one second
Fl	Fluoride
FRC	Functional residual capacity
HDL	High density lipoprotien
HHNS	Hyperglycemic hyperosmolar nonketotic syndrome
IBW	Ideal body weight
IIH	Idiopathic intracranial hypertension
LBW	Lean body weight

LDL	Low density lipoprotein
LVH	Left ventricular hypertrophy
MCR	Melanocortin receptors
MCR4	One form of melanocortin receptor involved in feeding behaviour
NAFLD	Nonalcoholic fatty liver disease
NCHS	National center of health statistics
NHANES survey	National health and nutrition examination survey
O₂	Oxygen
OHS	Obesity hypoventilation syndrome
OSAS	Obstructive sleep apnea syndrome
PEEP	Positive end expiratory pressure
TBW	Total body weight
V_d	Volume of distribution

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Introduction

The rapidly increasing prevalence of obesity among children and adolescents is one of the most challenging dilemmas facing pediatric care professionals today. Childhood and adolescent obesity are important risk factors for adult obesity, with its consequent morbidity and mortality (***Freedman, et al., 2005***).

Therefore, prevention and/or treatment of childhood and adolescent obesity offer the best hope of preventing adult obesity and its related morbidities. A variety of adverse consequences are associated with being overweight in childhood or adolescence, including but not limited to type 2 diabetes mellitus, hyperlipidemia and hypertension (***Wang, et al., 2002***).

Obese children are special population requiring more planning, consultations, management and time to successfully anticipate their anesthetic needs. These children are more likely to present for certain invasive procedures related to air way management, musculoskeletal correction, and even surgical intervention for obesity. Obese children have a higher risk for airway complications, anesthesia related adverse events, and surgical complications (***Reber, 2005***).

The well recognized harmful effect of anesthesia add significantly to the derangement of physiology of different systems including cardiac, respiratory, endocrine, musculoskeletal, neurological systems and the difficulties encountered in airway management, peripheral access and regional techniques make anesthesia in obese pediatrics a challenge. So a careful and meticulous perioperative work up and management should be done (***Smith, et al., 2002***).

CHAPTER 1

1-Pediatric obesity

2-Etiology of pediatric obesity

PEDIATRIC OBESITY

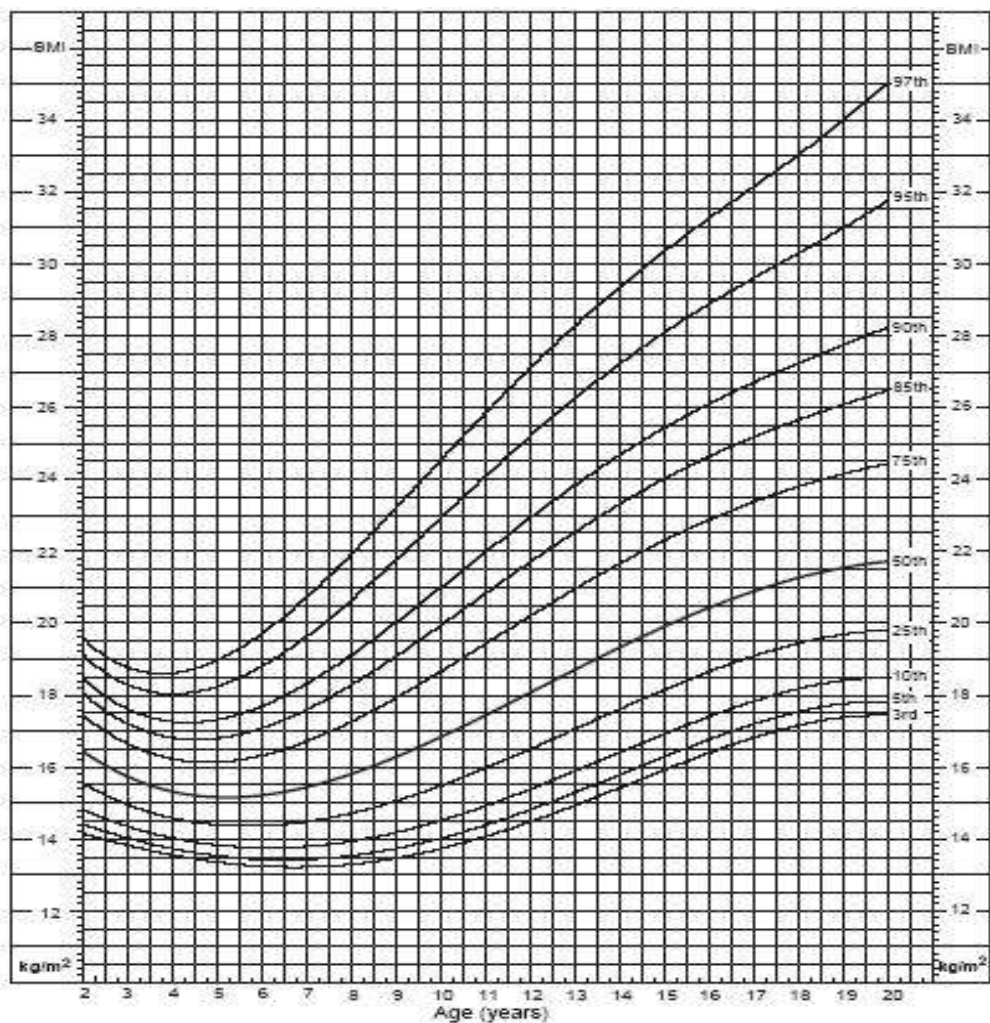
From the National Ambulatory Medical care Survey and National Hospital Ambulatory Medical Care Survey 1997 to 2000, Cook found that less than 1% of the pediatric population was diagnosed with obesity (**Cook, 2005**).

Pediatric obesity is under diagnosed by pediatricians and anesthesiologists (**Riley, 2005**).

Very few patients who present for surgical procedures carry the preoperative diagnosis of overweight or obese. Even though it may be obvious to the anesthesiologist, it is necessary to diagnose obesity by standardized methods. The standardized method for classifying obesity in adults is the BMI or body mass index. BMI is defined as weight in kilograms divided by body surface area in meters; it is expected to correlate with body fat and is used to quantify obesity. As of the year 2000, the World Health Organization and the National Institutes of Health used BMI to classify adults into the categories of

overweight (BMI 25 to 29.9 kg/m²), obese (BMI 30 to 39.9 kg/m²), morbidly obese (BMI 40 to 49.9 kg/m²) and super obese (BMI 50 kg/m² or greater). The classification of obesity is different for children. In pediatrics, BMI is affected by age, gender, and puberty. To measure this moving target, the Centers for Disease Control and Prevention place BMI in the context of the peer population (**Ogden, 2004**).

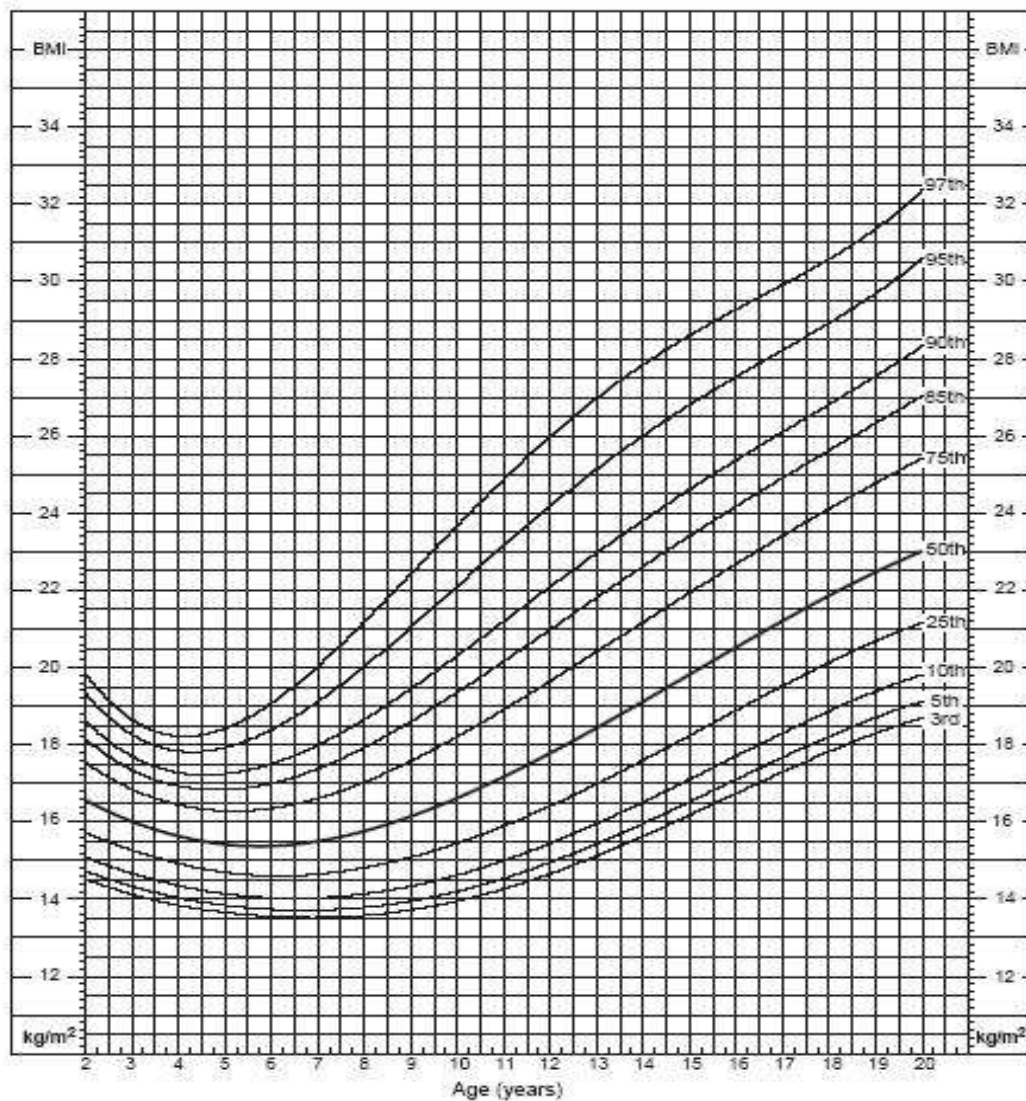
Obesity is defined in the relative terms of percentile ranking of the respective gender of the child (Figs. 1 and 2). Children of 2 years to 20 years old are considered at risk for obesity if they are represented at the 80th to 95th percentile of their peers, and overweight if they are equal or greater than 95th percent of the population in BMI. There are no standardized definitions to define super obese children yet (**Kuczmarski, 2000**).



Published May 30, 2000.

SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Prevention and Health promotion (2000).

Fig1. Body mass index-for-age percentiles in girls, age 2 to 20 years, according to the National Center for Health Statistics.



Published May 30, 2000.

SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Prevention and Health promotion (2000).

Fig2. Body mass index-for-age percentiles in boys, age 2 to 20 years, according to the National Center for Health Statistics