



# Revista Colombiana de Anestesiología

## Colombian Journal of Anesthesiology

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### Editorial

## Metabolic Syndrome and General Anesthesia Complications

### Síndrome metabólico y complicaciones durante anestesia general

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Metabolic syndrome is a reality based on five clinical criteria, associated with increased risk for cardiovascular disease and diabetes mellitus.<sup>1</sup> The metabolic syndrome was originally described several decades ago and its definition has been the object of controversies and disagreement throughout its history. So much so, that several European and US health organizations have been arguing about the validity of their diagnostic criteria and definitions. Moreover, some trials have questioned its validity as a risk factor for cardiovascular disease.<sup>2-4</sup> Despite the controversy about the definition of metabolic syndrome and its usefulness for identifying cardiovascular risk, it is evident that the number of cases of metabolic syndrome among the global population has been increasing, as well as the number of reports associating this entity with a risk factor for cardiovascular and metabolic diseases and complications during general anesthesia.

In 2009 a consensus between the American Heart Association (AHA) and renowned international organizations (International Diabetes Federation Task Force on Epidemiology and Prevention, National Heart, Lung and Blood Institute, World Heart Federation, International Atherosclerosis Society and International Association for the Study of Obesity) agreed to define the metabolic syndrome as a clinical condition characterized by the presence of at least three of the following factors: a) large abdominal circumference; b) increased triglycerides (>150 mg/dL); c) reduced HDL (<40 mg/dL in females and <50 in males); d) high blood pressure (>130/85 mmHg), and e) fasting glucose >100 mg/dL.<sup>5</sup> Among these factors, the abdominal circumference measurement was the

only factor requiring special considerations, considering that such measurement could vary significantly, depending on the population. While the parameters for abdominal circumference have been defined for populations in industrialized countries, the parameters according to age, gender and ethnicity in other developing countries are yet to be defined.

In the United States, 31% of the population meet the criteria for metabolic syndrome and it is estimated to be the most important risk factor for cardiovascular disease, even more so than cigarette smoking.<sup>6</sup> The metabolic syndrome has been reported in most industrialized countries as well as in developing countries, including Latin America, Africa and Asia.<sup>7-9</sup> The increased prevalence of the metabolic syndrome worldwide is related to the global trend to sedentary life styles and obesity. Metabolic syndrome in Colombia has been the object of epidemiological studies in different populations and its prevalence has been reported to depend on multiple factors including age, geography and comorbidity of the population studied. While among the 15 to 20 age group the prevalence of metabolic syndrome is 9%, in the 20 to 55 year old group it is 21%, and among the 22 to 73 years old, the prevalence is 34%.<sup>10-13</sup> Studies in young HIV positive patients receiving retroviral therapy, indicate a prevalence of 20%.<sup>14</sup> Similar studies in hypertensive patients showed that the prevalence of the condition is significantly higher at around 81%.<sup>15</sup>

The increase in the number of metabolic syndrome cases and the risk that the pathology may represent for the general population during surgery under general anesthesia makes it compelling to make clinical prospective studies for its

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evaluation. It has been reported that the metabolic syndrome entails a higher operative risk under general anesthesia. The most frequently reported perioperative complications include intubation difficulties, post-intubation respiratory distress due to pulmonary atelectasis derived from a reduction in the vital and residual pulmonary capacity in obese patients.<sup>16,17</sup> Clinical studies to assess the perioperative risk during general anesthesia in patients with metabolic syndrome in Colombia are necessary to identify the frequency and type of complications arising in those patients as compared against controls. This information is vital to acknowledge the problem and its scope in different populations with metabolic syndrome.

In the current issue of the *COLOMBIAN JOURNAL OF ANESTHESIOLOGY*, Pomares et al<sup>18</sup> report a study on the perioperative complications during programmed general anesthesia procedures in patients with metabolic syndrome in Cartagena, Colombia. This is the first case controlled study ever developed in Colombia to describe the frequency of complications related to general anesthesia in these patients. The study reports that the frequency of perioperative complications was higher in metabolic syndrome patients versus the controls. The complications evaluated included hypotension, hypoxemia, hypertension, bleeding, pain and post-operative nausea and vomiting. Hypotension and hypertension were the two complications with a statically significant association with metabolic syndrome patients. The results reported are important because they underscore a problem previously ignored in Colombia. This study is expected to be replicated by other researchers in the country and abroad and may result in the requirement to provide special care for all patients with metabolic syndrome. Such care may include interventions aimed at preventing such complications during procedures that require general anesthesia or interventions to address such complications.

This study opens a new area of clinical research related to perioperative complications in patients with metabolic syndrome, prevention and management. New clinical studies will be required to assess the frequency and the characteristics of other metabolic syndrome-related complications, including respiratory, cardiovascular or metabolic complications. Such studies will identify the types of patients with higher risk of perioperative complications and specifically assess which are the most frequent and severe complications in pediatric, gynecology-obstetric or geriatric patients, during elective or emergency surgery requiring general anesthesia. The information derived from such clinical studies will provide the foundation for the assessment of specific surgical procedures in patients with metabolic syndrome, before or during general anesthesia. Clinical research on the use of drugs to improve the lipid profile in patients with metabolic syndrome before any surgery requiring general anesthesia will help to establish the effectiveness of those agents in lowering the frequency of perioperative complications. Other studies may be required to evaluate management guidelines whenever such complications arise during the perioperative period.

While the prevalence of the metabolic syndrome is currently viewed as a global public health problem, the information available regarding its etiology and pathogenicity mechanisms remains unknown.

Basic, clinical and translational studies are the foundation for designing future preventive measures. The knowledge about the molecular basis of insulin resistance requires a multidisciplinary approach to fully understand the interaction among multiple factors such as genetics or epigenetics, tissue, endocrine, nutritional and physical activity, as well as other environmental factors leading to insulin resistance, metabolic syndrome and risk of related diseases.

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## Funding

Department of Pediatrics, Vanderbilt University School of Medicine.

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## Conflict of interests

None declared.

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