Blood Pressure and the Obese

Mindy McCallum Mullins, CRNA, DNAP

KEYWORDS

• Obesity • Blood pressure • Forearm • Oscillometric • Technology in operating room

KEY POINTS

- Although technological advancements may enhance patient care delivery, health care providers must question why and how specific tasks are performed, such as blood pressure measurement.
- A single abnormal blood pressure value may not dictate a treatment change. An inaccurately obtained measurement, however, may result in misdiagnosis and under- or overtreatment.
- Accuracy of blood pressure measurement in patients who are obese is contingent on many factors, including selection of proper cuff size and shape, location of measurement, and extremity characteristics. Measurement site circumference must be determined prior to cuff selection.
- Manufacturers of oscillometric monitoring devices either do not recommend forearm blood pressure measurements or do not provide valid, detailed, or reliable directions for obtaining measurements from the forearm.
- In the presence of numerous comorbidities or complex positioning with improper noninvasive blood pressure measurement technique, perioperative invasive blood pressure monitoring should be considered in patients who are obese to avoid harmful complications.

VALIDITY OF A FOREARM APPROACH IN OBTAINING PERIOPERATIVE BLOOD PRESSURE MEASUREMENTS IN PATIENTS WHO ARE OBESE

The worldwide prevalence of obesity has increased 60% since the year 2000 with the number of overweight individuals rivaling the number of underweight.[1,2] The World Health Organization estimates that by 2015 more than 2 billion individuals will be overweight, and of them 700 million will be obese.[2] Individuals classified as obese have a body weight greater than 30% above ideal body weight and a body mass index (BMI) equal to or greater than 30 kg/m^2.[3]

Disclosure: None.
Department of Anesthesia, Baptist Memorial Hospital North Mississippi, 2301 South Lamar Boulevard, Oxford, MS 38655, USA
E-mail address: mmullins45@yahoo.com

Nurs Clin N Am 50 (2015) 241–255
http://dx.doi.org/10.1016/j.cnur.2015.03.009 **nursing.theclinics.com**
0029-6465/15/$ – see front matter

With the prevalence of obesity escalating globally, an increasing number of patients who are obese are seeking elective or requiring emergency surgery. Certified registered nurse anesthetists (CRNAs) are challenged daily to provide vigilant, safe care. New technology, equipment integrity, and patient positioning are a constant concern as are CRNAs' dependence on technological devices to monitor physiologic variables, such as oxygen saturation, carbon dioxide level, blood pressure measurement, and electrocardiogram. Effective hemodynamic monitoring guides the administration of anesthesia and enables the CRNA to recognize patient deterioration prior to irreversible and detrimental complications. The ability to provide supportive therapy and make anesthetic adjustments is often hindered with obesity, especially in relation to ineffective blood pressure monitoring.

Studies dating from 1954 have investigated the validity and reliability of blood pressure monitoring techniques in individuals who are obese.[4,5] The validity of blood pressure measurements obtained with a cuff are often questioned, and the use of an arterial catheter for invasive blood pressure monitoring is associated with potential risks, such as infection and trauma. Additionally, invasive monitoring is often impractical and difficult to place in patients who are obese.

In the clinical setting, CRNAs routinely obtain blood pressure measurements from the forearm of patients who are obese. The primary reason for the alternative approach is poor cuff size fitting in relation to the upper arm's circumference, conical shape, and length. Current recommendations concerning the optimal location of a blood pressure cuff for forearm measurement have yet to be established. The purpose of this project was to explore evidence-based literature to determine the validity of a forearm approach in obtaining perioperative blood pressure measurements in patients who are obese.

SIGNIFICANCE OF THE PROBLEM

Society in General

Obesity ranks as the fifth leading cause of global deaths and surpasses tobacco as the leading cause of preventable death.[2] Obesity is more prevalent in men than women, and individuals with a BMI greater than 30 kg/m^2 have a decreased life expectancy of 2 to 4 years in comparison with healthier individuals.[6] Individuals classified as morbidly obese, with a BMI greater than 40 kg/m^2, have an additional reduction of 8 to 10 years.[6] More than 300,000 American adults die annually of causes directly associated with obesity.[7]

The obesity epidemic is not limited to the adult population. Internationally, 42 million children under the age of 5 are overweight, and epidemiologists predict that children's lives will be shorter than their parents'.[2,8,9] Childhood obesity has been linked to low socioeconomic status, low education levels, high unemployment rates, and high-calorie food.[10,11] The prevalence of childhood and adolescent obesity represents a major health concern toward the susceptibility of acquiring noncommunicable diseases at an earlier age.[12] Public health advocates, health care industries, and government officials have yet to identify a compelling way of reversing obesity in today's youth.[12]

Obesity poses a challenge for the nation's overall economy by having an impact on public health and productivity.[9] The national estimated cost of obesity exceeds $254 billion annually.[10] The principal cause of employee absenteeism is health issues attributed to obesity, with lost productivity reported to be more than $153 billion annually.[9] The Congressional Budget Office anticipates that obesity related spending will escalate another 60% by 2020.[8]