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Mini Review

The Escalating Prevalence and Classification of Obesity in Pregnancy

Dimitrios S Mastrogiannis*

Department of Obstetrics & Gynecology and Women's Health, Montefiore Medical Center Albert Einstein College of Medicine, Bronx, New York, United States

ABSTRACT

Obesity is now recognized as one of the most urgent global health challenges of the 21st century, affecting individuals of all ages and socioeconomic strata. In obstetric care, this issue has become particularly critical, given the well-established associations between rising maternal Body Mass Index (BMI) and numerous adverse pregnancy outcomes. According to national data, up to 41.9% of adults in the United States have obesity, and among women of childbearing age, the proportion is also sizable and growing. Even more concerning is the increasing prevalence of "Super obesity," often defined as a BMI ≥ 50 kg/m^2, which portends a uniquely high risk of complications. This review synthesizes key findings that elucidate the relationship between obesity and pregnancy outcomes, with a special focus on the management of super obesity (BMI ≥ 50 kg/m^2).

Keywords: Obesity; Pregnancy; Super obesity

INTRODUCTION

The classification of obesity into class I (BMI 30-34.9 kg/m^2), class II (35-39.9 kg/m^2), and class III (≥ 40 kg/m^2) by the World Health Organization (WHO) has become a mainstay in research and clinical practice [1-3]. Although class III obesity often called "morbid obesity" or "extreme obesity" previously seemed uncommon, current data reveal its striking rise in obstetric populations [1,2]. More specifically, super obesity (BMI ≥ 50 kg/m^2) has emerged as a pressing concern [2]. A large study of over 220,000 live singleton births in one region found that 5.9% of patients had a BMI of 40-49.9 kg/m^2, and 0.87% had a BMI ≥ 50 kg/m^2 [2]. Although these super obese patients comprised a smaller subset, they experienced a disproportionate burden of pregnancy-related morbidity.

LITERATURE REVIEW

Epidemiologic analyses show that, in just over a decade, obesity rates have climbed significantly in both urban and rural areas [4]. This observation concurs with broader population-level data indicating that adult obesity prevalence in the United States rose from 30.5% in 1999-2000 to 41.9% by 2020 [1,5]. The implications for perinatal care, especially in super obesity, include heightened risks of maternal morbidity and even mortality [2,6,7]. Indeed, one secondary analysis of maternal death cases in Michigan suggested that obesity might act as a contributor to as many as half of pregnancy-related deaths [3].

DISCUSSION

Maternal risks: Metabolic and cardiovascular complications

Gestational diabetes and hyperglycemia: One of the key associations in pregnant individuals with higher BMIs is the significantly elevated risk of Gestational Diabetes Mellitus (GDM) [8,9]. As maternal adiposity grows, insulin resistance and systemic inflammation worsen, predisposing these patients to early and/or more severe hyperglycemia [9,10]. In an extensive retrospective database of over 200,000 births, up to 15.2% of women with a BMI of 40-49.9 kg/m^2 and 19.5% of women with a BMI ≥ 50 kg/m^2 developed GDM [2]. Additionally, pregestational diabetes was noted in 5.2% of the super obese group, underscoring that metabolic risk in these patients is not confined to pregnancy alone [2]. Poor glycemic control can further exacerbate hypertensive disorders, macrosomia, and higher cesarean delivery rates [9,10].

Hypertensive disorders of pregnancy: A large body of evidence links obesity in pregnancy to chronic hypertension, gestational hypertension, and preeclampsia [2,7,8,11]. In extreme (BMI ≥ 40 kg/m^2) and super obesity (≥ 50 kg/m^2), the likelihood of developing preeclampsia is substantially higher than in non-obese populations [2,6]. Mechanisms involve endothelial dysfunction, dysregulated adipokines, and heightened inflammatory states [7]. One large-scale investigation showed that 16.8% of super obese women had chronic hypertension, while up to 16.2% had pregnancy-induced

Correspondence to: Dimitrios S. Mastrogiannis, Department of Obstetrics & Gynecology and Women's Health, Montefiore Medical Center Albert Einstein College of Medicine, Bronx, New York, United States, E-mail: dimitrios.mastrogiannis@outlook.com

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hypertension, both well above rates observed in lower-BMI cohorts [2]. Such patients are more likely to experience severe complications, including eclampsia and end-organ damage, contributing to the increasing trend of hospitalizations in maternal ICUs [2,12]. **Severe Maternal Morbidity and Mortality (SMM):** Severe Maternal Morbidity (SMM), frequently defined as life-threatening events or near-misses, captures ICU admission, hemorrhage requiring transfusion, end-organ failure, and other acute diagnoses [11]. Obesity especially in the higher BMI classes represents a main driver of SMM [2,6,11,12]. The impact extends beyond the delivery hospitalization, potentially affecting postpartum recovery and future reproductive health. One retrospective analysis reported that each 1-point increase in BMI was associated with a 2% higher odds of ICU admission and a 0.8% higher odds of composite SMM, an effect that became more pronounced among those with BMI ≥ 50 kg/m^2 [2]. Relatedly, maternal death rates appear elevated in obesity, often linked to cardiomyopathy, anesthesia complications, and Venous Thromboembolism (VTE) [3,12].

Perioperative anesthesia challenges: Anesthesia-related challenges, from neuraxial analgesia placement to difficult airways under general anesthesia, occur more frequently in obese and super obese populations [13]. Physiologic changes reduced functional residual capacity, increased oxygen consumption, and altered pharmacodynamics demand specialized skills and preoperative planning. Cesarean delivery with neuraxial anesthesia is often still preferred, but repeated attempts or a conversion to general anesthesia can occur if technical difficulties or suboptimal block heights arise [13,14].

Fetal-neonatal implications

Macrosomia and birth trauma: A consistent finding across multiple studies is the higher incidence of macrosomia newborn weight ≥ 4000 or ≥ 4500 g in obese or super obese mothers [8-10]. Hyperglycemia and abnormal placental function drive fetal overgrowth, which increases the risk of operative delivery, shoulder dystocia, and birth trauma [9,14]. A subset of neonates from super obese mothers may also experience transient hypoglycemia and require specialized nursery or Neonatal Intensive Care Unit (NICU) care [15]. Large-scale population-based data from Australia corroborate that super obesity correlates with more frequent macrosomia, gestational hypertension, and NICU admission [15].

Preterm delivery and NICU admissions: Although obesity is occasionally associated with post-term pregnancy, several groups have demonstrated an elevated risk of indicated or spontaneous preterm birth in super obese women [2,7,8]. In one regional database, 9.91% of mothers with BMI ≥ 50 kg/m^2 delivered before 37 weeks, compared to 6.68% in the reference group (BMI 18.5-29.9 kg/m^2) [2]. The rate of NICU admission or transfer was also strikingly higher (16.14% vs. 7.6%) [2]. These findings reflect the complexity of obesity-related comorbidities that often necessitate earlier deliveries for maternal or fetal indications.

Respiratory challenges and congenital anomalies: While not universally reported in all studies, maternal obesity has been linked to increased risks of certain congenital anomalies, such as neural tube defects and cardiac malformations, potentially due to inadequate folate supplementation or obesity-related metabolic derangements [10]. Moreover, neonates of obese mothers can exhibit delayed organ maturity or require respiratory support postpartum [14]. These complexities underscore the necessity of meticulous antenatal care.

Cesarean delivery and surgical decision-making

High rates of cesarean delivery: Multiple analyses confirm that obese women, particularly those with super obesity, face up to a two-fold or three-fold increase in the likelihood of undergoing cesarean delivery [16]. The specific factors include failed labor induction, macrosomia, abnormal fetal presentations, and comorbid conditions such as hypertension or diabetes [10,15]. In an extensive birth-certificate-based study, 61.85% of mothers with BMI ≥ 50 kg/m^2 ultimately delivered by cesarean, much higher than for those with lower BMIs [2]. Identifying modifiable risk factors early such as optimizing glycemic control and carefully titrating labor induction may avert some of these surgical interventions.

Skin incision choice: Pfannenstiel vs. High transverse vs. Vertical: One of the most challenging issues in performing cesarean sections for super obese women is selecting the optimal skin incision. Although Pfannenstiel (low transverse) incisions often exhibit fewer wound complications in general obstetrics, the overhanging pannus in obesity can obscure the operative field [16,17]. Alternatively, a high transverse incision (made infra- or supraumbilically above the pannus) may improve exposure, yet a single-institution cohort study of 328 women with BMI ≥ 40 kg/m^2 found that the high transverse approach significantly increased wound morbidity compared to Pfannenstiel (23.1% vs. 8.0%, respectively; adjusted odds ratio 3.46, 95% CI 1.67-7.17) [8].

Specific complications included wound infection, dehiscence, and the need for negative pressure wound therapy [8]. Nonetheless, other studies suggest high transverse incisions can be beneficial if certain precautions are taken [17,18]. A vertical (midline) incision is sometimes considered for rapid entry or a massively enlarged pannus, but it carries its own drawbacks, including higher risk of dehiscence and incisional hernias [19,20].

Wound complications and prophylaxis: Obesity in pregnancy predisposes to postoperative Surgical Site Infections (SSI), delayed healing, and hematoma formation [20]. Meta-analyses consistently show that subcutaneous tissue thickness over 2 cm is a risk factor for wound infection [20,21]. In super obesity, these concerns multiply. Adequate antibiotic prophylaxis is paramount, generally involving increased doses (e.g., 3 g of cefazolin for patients ≥ 120 kg) and re-dosing if the operation is prolonged or blood loss is significant [22]. Additional strategies such as self-retaining retractors for better exposure, multilayer closure, prophylactic negative pressure wound therapy remain under investigation [23,24]. Some trials indicate that prophylactic negative pressure dressings may reduce wound disruptions, though not all data are uniformly supportive [24].

Perioperative and postpartum management

Anesthesia and hemodynamic monitoring: Close cooperation between obstetrics, anesthesiology, and critical care is critical for super obese parturients. Ramped positioning, ultrasound-guided neuraxial anesthesia, and vigilant cardiopulmonary assessment can mitigate complications [4,13]. Post-cesarean analgesia must be carefully balanced with the risk of sedation, hypoventilation, or hemodynamic instability in patients with restricted respiratory reserve.

Thromboembolism prophylaxis: Given the potentiated risk of Venous Thromboembolism (VTE) in obesity, mechanical prophylaxis (e.g., sequential compression devices) and weight-based pharmacologic prophylaxis are essential [6,25]. The American

College of Obstetricians and Gynecologists (ACOG) recommends extended prophylaxis beyond hospital discharge in individuals at high risk [25]. Early mobilization and thorough hydration also reduce VTE rates.

Lactation and long-term follow-up: Postpartum weight retention and subsequent obesity pose a cycle of compounded risks in future pregnancies. Breastfeeding confers metabolic benefits and assists maternal weight reduction, yet super obese women can experience mechanical difficulties and lower rates of successful lactation [7,10].

Focused lactation support, early postpartum follow-up, and counseling for long-term weight management (including bariatric surgery where indicated) may improve outcomes in subsequent gestations [20]. Regular screening for obesity-driven comorbidities hypertension, dyslipidemia, glucose intolerance enables timely interventions.

Avenues for future research: The complexities of super obesity in pregnancy are considerable, underscoring the need for large, prospective, and possibly randomized studies to guide best practices in medical management, anesthesia, and surgical technique [11,16]. High-quality data evaluating the comparative effectiveness of Pfannenstiel versus high transverse or vertical incisions in super obese cohorts, for instance, could inform more nuanced surgical guidelines [8,16,17].

Likewise, future trials might better evaluate prophylactic negative pressure wound therapy, antibiotic regimens, and postpartum interventions such as postpartum follow-up within the first two weeks to reduce readmission and late morbidity [23-25]. Moreover, deeper investigations into health disparities and social determinants of health may illuminate why certain communities bear a disproportionate burden of obesity-related pregnancy risks [4].

CONCLUSION

The surge in obesity, notably super obesity (BMI ≥ 50 kg/m^2), presents a daunting challenge in obstetric practice. From gestational diabetes and hypertensive disorders to escalated risks of cesarean delivery, wound complications, and severe maternal morbidity, the impact of excessive adiposity resonates throughout the perinatal period. Data from numerous contemporary studies underscore that adverse outcomes persistently track upward with increasing BMI. Yet, with vigilant antenatal surveillance, appropriate antibiotic dosing, refined surgical decisions (particularly regarding skin incision choice), and robust postoperative management strategies, many complications are preventable or modifiable.

Multidisciplinary collaboration integrating obstetrics, anesthesiology, nutrition, critical care, mental health, and bariatric surgery offers the best route to optimizing outcomes for both mother and newborn. Interpregnancy intervals afford key opportunities to address modifiable factors such as hyperglycemia and hypertension, while postpartum weight management and lactation support can help stem the cycle of obesity.

As obstetric populations become heavier, the imperative for evidence-based, patient-centered care intensifies. Through ongoing research, interprofessional education, and carefully altered interventions, we can strive to protect and improve the health of women with super obesity and the children they bring into the world.

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