Intrapartum Care of the Morbidly Obese Gravida: Ten Guidelines for the Obstetrician

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Abstract: Obesity has evolved as a major public health issue worldwide, its effects having a significant impact on obstetrical care. Morbidly obese parturients are at a significantly increased risk of complications during the intrapartum period and thus require more intervention. Guidelines are needed to address the intrapartum management of the morbidly obese gravida to reduce the risk of morbidity and mortality.

Keywords: Morbid obesity, intrapartum care, morbidity, operative incision, BMI.

INTRODUCTION

The incidence of obesity has become a global pandemic. Obesity is defined as a BMI ≥ 30 kg/m^2, and is categorized as follows, Class 1 BMI 30-34.9 kg/m^2, Class II 35-39.9 kg/m^2, Class III, (or morbid obesity) ≥ 40 kg/m^2. In the United States the problem is significantly more evident in women than in men, with particular emphasis given to certain minority and low income groups over others [1, 2]. The surging rate of the disorder has now extended itself to reproductive age women; in this cohort the condition may be associated with several concomitant co-morbidities, and as such obese parturients are at an increased risk of peripartum complications. The focus and logistics of obstetrical care, particularly in the intrapartum period, are significantly altered when the pregnant woman is morbidly obese. It is therefore incumbent upon physicians to become familiar with the increased risk of morbidity during this transition period. This article focuses on the more salient points of care for the morbidly obese gravida in labor.

1. ANESTHESIA

Anatomic and hormonally mediated changes are significant in the term gravida; many of these changes are exacerbated by obesity. Increased oxygen consumption, minute ventilation, and carbon dioxide production are physiologic changes perceived as shortness of breath. In the obese gravida, excess abdominal fat, pendulous breasts, and decreased chest wall compliance result in small airway collapse, decrease in functional residual capacity, and intrapulmonary shunting [3]. Obese pregnant patients additionally have a higher incidence of hiatal hernia, GERD, and increased intragastric pressure compared to normal weight patients [4, 5]. Adiposity about the air way is associated with a more difficult mask ventilation, intubation and airway management; In the supine and trendelenberg positions these patients are prone to rapid oxygen desaturation during induction of general anesthesia [6].

In the best of situations, antenatal pre-assessment by an anesthesiologist evaluating for co-morbid conditions, venous access, airway anatomy, availability of instruments necessary for successful neuraxial or general anesthesia are of paramount importance. In the absence of such, early evaluation by the anesthesiologist upon the patients' presentation to labor and delivery is warranted.

2. CARDIOVASCULAR ASSESSMENT

Obesity induced pathologic changes occur in pregnancy inducing profound effects on cardiovascular function. Pregnancy increases cardiac output, particularly during labor and the immediate postpartum period approximately 75% above post delivery values; in obese patients this value increases markedly-- for every 100 grams of fat, cardiac output increases by 50 ml/min [7, 8]. In nonobese women, pregnancy is associated with a reduction in afterload; in obese women this is significantly impaired due to increased peripheral resistance [9]. Volume load leads to left ventricular hypertrophy of the myocardium--- continuation of this process subsequently leads to dilation, increased pressure overload, and systolic dysfunction. If pre-pregnancy hypertension exists, the hypertension may be accentuated ultimately leading to diastolic dysfunction, pulmonary hypertension, and potentially peripartum cardiomyopathy [10].

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Antenatal assessment of EKG, and echocardiography in morbidly obese patients, particularly those with chronic hypertension may be prudent to identify cardiovascular disease/dysfunction. If time and availability allow, these tests are recommended upon presentation to labor and delivery.

3. BLOOD PRODUCT AVAILABILTY

Naef *et al.*, noted that maternal obesity is associated with a marked increase in the risk for hemorrhage during or post abdominal delivery [11]. This may be due to the increased frequency of macrosomia and its increased risk of laceration, or to the large volume distribution associated with obesity leading to reduced bioavailability of uterotonic agents at standard doses [12]. As such type screen/crossmatch should be obtained upon presentation to labor and delivery by the obese gravida in preparation for possible hemorrhage.

4. INSTRUMENTATION

Health care facilities should be proactive in addressing the increased prevalence of obesity. Adequate instrumentation such as scales, blood pressure cuffs, tocometer belts, bariatric bedding/ operative tables, specialized operative instruments, wheelchairs, should be readily available to assist in the care of the morbidly obese patient [13]. Preplanning by obstetrical/OR staff in preparation of maintaining a "bariatric tray" on labor and delivery replete with larger instruments may be prudent.

5. ULTRASOUND AVAILABILITY

Vaginal examination and abdominal palpation may prove problematic intrapartum; additionally in the obese pregnant patient, fetal macrosomia, diabetes and difficulties in maintaining fetal well being in labor due to maternal body habitus all conspire for the need for sonographic availability on the labor and delivery suite [14]. Probes specific for the obese patient should, if possible, be a part of any ultrasound equipment package, and readily available in labor and delivery.

6. FETAL MONITORING

With the existence of co-morbid conditions in a morbidly obese gravida, careful consideration should be given to the obstacles commonly encountered in maintaining a technically adequate fetal heart tracing during the intrapartum period. Invasive fetal/uterine monitoring should be embarked upon as expeditiously as practically possible, as this may be the only way to effectively monitor uterine contractions and fetal well being [15]. In some instances, intermittent monitoring with a portable ultrasound machine may be necessary when it is not possible to insert internal monitors. Strategies such as the above serve to enhance positive outcomes and reduce the risk of claims of negligence for failure to properly monitor the fetus during the intrapartum course.

7. DECISION FOR INCISION

The type of operative skin incision utilized in the obese gravida is still a subject of debate. Obesity affords specific difficulties during surgery due to distortion of the abdominal wall by a large pannus [16]. In attempting to evaluate the patient for the type of incision, attention to the location of the uterine fundus, symphysis pubis, and the iliac wings should be undertaken by the surgeon. Two choices exist—transverse or vertical incision. A transverse incision may be made either above or below the pannus. In the obese patient, the area superior to the symphysis is generally firm and flat; it is important however that the panniculus is retracted cephalad exposing this ideal incision site. An excellent technique proposed by Thornton [17], is helpful in operative delivery of the obese parturient. In her study the panniculus is elevated and pushed cephalad – a first layer of cloth tape being placed horizontally just above the proposed incision site extending from right to left iliac crest. With the panniculus retracted, another length of cloth tape is the placed at the outer third of the original horizontal tape layer and then run up to, and over the patients shoulder, continuing down the back over the scapula in a pulley fashion. The area exposed is then prepped and draped in usual sterile fashion for a pfannenstiel incision with povidone iodine or chlorhexidine. Both the anesthesiologist and surgeon should be attuned to the patients' cardiopulmonary status during surgery. Advantages of this transverse skin incision include less adiposity, increased wound strength, decreased operative time, decreased postoperative blood loss/pain, and improved deep respiratory effort. Concern however does exist for the potential for wound infection in the moist fold beneath the pannus. Vertical skin incisions, while perhaps allowing for better visualization of the pelvic anatomy are associated with an increased risk of wound complications in obese women undergoing cesarean [18,19].

8. WOUND CARE

Prophylaxis with an antibiotic effective against gram positive and gram negative organisms decreases the

risk of postoperative infections [20]. If possible the antibiotic should be infused 1 hour prior to incision. In the morbidly obese patient, standard doses may need to be titrated accordingly [21, 22]. Subcutaneous tissue closure to obliterate the dead space in a women with fat thickness greater than 2 cm has been noted in a metanalysis to decrease wound complications [23]. While wound closure with skin suturing vs. staples is associated with a decreased risk of wound infection and separation, operative time however is increased. A paucity of literature exists addressing suturing vs. staples. If staples are utilized, consultation with wound care specialists are recommended prior to and post discharge of the obese gravid; this allows for patient instruction/oversight as to cleanliness and early recognition of wound infection.

9. THROMBOEMBOLIC PROPHYLAXIS

The risk of thromboembolic phenomena varies according to multiple factors and given such, ACOG advised that patients be stratified in low to high risk categories [24]. According to the Royal College of Obstetricians and Gynecologists, temporary use of intermittent use of compression devises and/or unfractionated heparin prophylaxis might be considered especially in the presence of obesity [25].

10. RESPIRATORY

During pregnancy, aspects of oxygenation and ventilation are affected by both the hormonal milieu, and mechanically by the growing uterus resulting in a decrease in the functional residual capacity, residual volume, and expiratory reserve volume. However, obesity, in and of itself affects these parameters additionally, secondary to the added weight and decreased compliance of the chest wall [26]. Pulmonary complications, including a higher prevalence of pneumonia, are more common in obese women. Early ambulation, increased frequency of position change and incentive spirometry decrease the risk. Obese women with a history of sleep apnea additionally show an increased incidence of hypoxia and airway obstruction, particularly when administered narcotics for intrapartum/postpartum analgesia. Pulse oximetry may be utilized to determine adequate oxygenation; if decreased, oxygen is administered to maintain effective oxygenation during labor and postpartum for promotion of normal postoperative wound healing. Positive pressure devices, in some cases may be necessary to ensure airway patency. As such, monitoring in a high dependency region of the medical floor in the intrapartum/postpartum periods should be stongly considered [27].

CONCLUSION

Given the marked increases in adverse obstetric and perinatal risk associated with maternal obesity, consideration for the development of an interventional maternal obesity service may be a prudent proactive approach for health care facilities. The ability of the obstetric staff to provide safe care and prevent adverse outcomes for morbidly obese women is predicated upon careful risk assessment and planning. Interdisciplinary collaboration, teamwork and communication serve as hallmarks of a service component relegated to the care of the obese gravida. A positive experience for these women is enhanced when collaborative planning is initiated during the antepartum period, which includes the women, her support system, and all essential team members, and provides a seamless transition during the intrapartum and postpartum periods.

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