

# Planning Labour and Delivery in Pregnant Patients with High Body Mass Index (BMI)

Fayyaz S<sup>1</sup> and Brinder Jeet Kaur<sup>2\*</sup>

<sup>1</sup>Head of the department, Department of Obstetrics & Gynecology, Santokba Durlabhji Memorial Hospital & Research center, Jaipur, India

<sup>2</sup>Consultant, Department of Obstetrics & Gynecology, Santokba Durlabhji Memorial Hospital & Research center, Jaipur, India

## \*Corresponding author

Brinder Jeet Kaur, Consultant, Department of Obstetrics & Gynecology, Santokba Durlabhji Memorial Hospital & Research center, Jaipur, India.

**Received:** October 11, 2023; **Accepted:** November 01, 2023; **Published:** November 13, 2023

## ABSTRACT

There is a direct correlation between the degree of obesity and the severity of associated complications including diabetes, postpartum hemorrhage, fetal macrosomia, preterm delivery, intrauterine fetal death, and extended postpartum hospitalization, failure of lactation, neonatal intensive care unit (NICU) admissions. Optimal intrapartum management of the obese gravida requires that the obstetrician work closely with the labor and delivery nurse, obstetric anesthesiologist, nurse anesthetist, and pediatrician to ensure that all are aware of, and prepared for, potential complications

**Keywords:** Labour, Delivery, BMI, Obese

hypertensive disorders of pregnancy, fetal macrosomia, and intrauterine growth restriction [4].

## Introduction

It is reported that nowadays 15–20% of women start pregnancy as obese, 20–40% gain more gestational weight than recommended, and accordingly obesity increases among the women of childbearing age. According to the World Health Organization (WHO) criteria, the prevalence of obesity among pregnant women (BMI > 30 kg/m<sup>2</sup>) is between 1.8% and 25.3%. Obesity complicating pregnancy has been uniformly shown to increase the risk for adverse maternal, fetal, and neonatal outcomes.

- There is a direct correlation between the degree of obesity and the severity of associated complications including diabetes, postpartum hemorrhage, fetal macrosomia, preterm delivery, intrauterine fetal death, and extended postpartum hospitalization, failure of lactation, neonatal intensive care unit (NICU) admissions [1].
- The obese gravida is also at increased risk for developing preeclampsia, with one large study demonstrating that the risk of preeclampsia doubles with each 5–7 kg/m<sup>2</sup> increase in pre pregnancy BMI [2].
- Neonates born to mothers with BMI > 40 are at increased risk for peripheral nervous system, skeletal injury, respiratory distress syndrome, bacterial sepsis, seizures, and hypoglycemia, regardless of mode of delivery [3].
- Preexisting conditions such as hypertension and diabetes mellitus are often exacerbated by pregnancy, and further increase the risk for additional complications, including

Optimal intrapartum management of the obese gravida requires that the obstetrician work closely with the labor and delivery nurse, obstetric anesthesiologist, nurse anesthetist, and pediatrician to ensure that all are aware of, and prepared for, potential complications [4].

## Discussion

### Labor position

Physiologic change associated with obesity include: diminished lung volumes and capacities, decreased lung and chest compliance, decreased breathing efficiency and gas exchange, and relative hypoxia secondary to pulmonary shunt. For these reasons, careful consideration should be given to maternal position of the obese patient in labor. Optimal positioning can help to minimize maternal and fetal hypoxia with the left lateral position being most preferable. This position optimizes maternal oxygenation and uteroplacental blood flow and prevents caval compression. A sitting position with the head and chest elevated may also improve maternal comfort, prevent airway closure, and improve oxygenation. Continuous pulse oximetry monitoring should be initiated to identify hypoxia and supplemental oxygen provided as & when required. Epidural anesthesia should be considered, as the analgesia provided may decrease respiratory work by reducing pain [5].

### Anesthesia

As anesthesia complications are higher in the setting of obesity and pregnancy, consultation with an anesthesiologist, either during the antepartum period or upon admission to labor and delivery, is advisable. After general assessment of the patient's cardiovascular and pulmonary status, a thorough evaluation of the airway is essential [6-9]. Anesthetic evaluation, ideally in the non-emergent situation, is advised, as it has been reported that 80% of all anesthesia-related maternal mortality occurred among obese patients, with inability to accomplish intubation noted as the principal cause [10]. In fact, nearly 1/3rd of these patients may experience difficult intubation [11]. Given the challenges of accurate blood pressure measurement in the obese woman population, and difficulty with intravenous access, consideration may be given for a central venous line and an arterial line if clinically indicated.

### Aspiration Prophylaxis

Anesthesiologist should be notified when a gravid obese woman is admitted for Labor and Delivery. Aspiration of acidic gastric contents remains a life-threatening risk, particularly for the obese gravida. The risks are due to anatomic barriers to intubation, increased gastric contents with lower pH values [12]. Although randomized trials are lacking, a practical approach that we consider includes an H2 antagonist (e.g. ranitidine hydrochloride 50 mg IV q 6-8 hrs in labor or 45 minutes prior to surgery). Sodium citrate with citric acid should be given to all patients prior to anesthesia, and one may also consider metoclopramide (10 mg IV) 45 minutes prior to surgery to further reduce aspiration risks in this population [5].

### Induction of Labor

Induction of labour (IOL) is associated with higher risks of obstetrical complications compared to spontaneous labor. While cesarean section carries greater risks for morbidity than successful induction of labour resulting in vaginal delivery. The greatest risk occurs in women who undergo cesarean delivery following prolonged labour. Unfortunately, medical conditions associated with obesity such as hypertension and diabetes requires frequent preterm or early - term induction of labour. The authors found that increasing BMI correlated with an increased incidence of cesarean delivery from 1.3% in those with BMI < 30, to 29.8% in those with BMI 30-39.9, and 30.5% in those with BMI > 40. They also reported increased dose and duration of oxytocin, and increased median time to delivery as BMI increased [13].

### Dysfunctional Labor

Arrest of dilation, as historically defined by the Friedman labor curve, is often noted as the indication for cesarean delivery among obese patients in labor. The authors concluded that obesity should be considered when defining normal labor. Another large retrospective, multicenter review of 118,978 gravidas with singleton, term cephalic gestations compared labor patterns by body mass index [14]. The authors concluded that the time difference to reach 10 cm dilation was 1.2 hours from the lowest to highest BMI category for nulliparas. Those with BMI > 40 took longer to reach active phase. Progression from 4-10 cm was also shown to increase in duration as BMI increased. The authors suggest that labor management should be altered as appropriate for obese women [14]. Generally, the achievement of a successful vaginal delivery is preferred in the obese patient

given that obese women who undergo cesarean delivery are at a higher risk of morbidities when compared to those women with a normal BMI [15]. Rates of wound infection, wound separation, dehiscence, anesthetic complications, and surgical injury are higher among obese women undergoing cesarean section.

### Trial of Labor after Cesarean

Failed trial of labor after cesarean (TOLAC) rate among obese women are higher in such cases. Obesity may reduce the likelihood of TOLAC success to no more than 15% with significantly increased risks for infectious morbidity described. Therefore, in counseling the obese patient with respect to issues relating to TOLAC, realistic outcomes should be conveyed with significantly higher risk for cesarean delivery noted.

### Anticipated Complications Associated with Macrosomia

Obese women are twofold more likely to give birth to infants weighing >4500 g, and obesity has been shown to be an independent risk factor for fetal macrosomia. Thus, the obstetrical team should be well prepared for the complications associated with macrosomia, including shoulder dystocia, malpresentation, postpartum hemorrhage, and vaginal lacerations. The American College of Obstetricians and Gynecologists (ACOG) recommends delivery by cesarean section when the estimated fetal weight reaches 4500 g in pregnancy complicated by diabetes, and 5000 g otherwise (ACOG Practice Bulletin No. 22, November 2000; reaffirmed 2013). Factors contributing to cesarean delivery In obese gravid the incidence of malpresentation, CPD, protracted labour are common. Obesity is also strongly associated with higher rates of diabetes & hypertensive disorder & higher incidence of induction of labour. In obese multigravida, due to above reasons, they are at least twice as likely to be delivered by primary cesarean section & furthermore, her risk for emergency C-section & perioperative morbidity is significantly higher. Obesity specific risks assoc. Other factors further increasing risk of wound infection include African American race, steroid use, endometritis, and incisions greater than 16 cm.

1. Prior to surgery, appropriate cleansing of the skin is important to decrease bacterial colonization, especially in the obese patient with many skin folds .
2. Preoperative antibiotics effective against both gram positive and gram negative bacteria, such as a first-generation cephalosporin (e.g. cefazolin), is generally selected, and should be administered within 1 hour of skin incision. This approach has been demonstrated to decrease the rate of infection 60% in the general population.
3. To reduce the risk for significant wound complications, the subcutaneous tissue should be reapproximated in the obese gravida undergoing cesarean section.
4. Incision closure with staples allows shorter operative times but 2-4 times higher rates of wound disruption compared to subcuticular closure.

### Venous Thromboembolic Prophylaxis

Pregnancy, obesity and surgery are all significant risk factors for venous thromboembolism (VTE). Obesity places women at a 10-fold increased risk of VTE following cesarean delivery. In retrospective reviews, more than half of all VTE occurred in women with BMI > 30.

Early postoperative ambulation, compression stockings, and pneumatic compression devices placed before the initiation of surgery and continued postoperatively have all been, shown to decrease thromboembolic disease after many surgical procedures.

The RCOG recommends that women who have an elective cesarean delivery with one or more risk factors, including obesity or an emergency cesarean delivery, be considered for thromboprophylaxis with LMWH for 7 days after delivery. These recommendations are based on case-control or cohort studies.

We initiate low-molecular-weight heparin generally 12 hours postoperatively, given potential concerns of postoperative hemorrhage, including the risk of postepidural catheter hemorrhage in the setting of neuraxial anesthesia.

**Acknowledgements** - Nil

**Conflict of Interest** - Nil

### References

1. Gunatilake R, Perlow JH. Obesity and pregnancy: clinical management of the obese gravida. *American Journal of Obstetrics Gynecology*. 2011. 204: 106-119.
2. Scott-Pillai R, Spence D, Cardwell CR, Hunter A, Holmes VA. The impact of body mass index on maternal and neonatal outcomes; a retrospective study in a UK obstetric population. 2004-2011. *BJOG*. 2013. 120: 932.
3. O'Brien TE, Ray JG, Chan WS. Maternal body mass index and the risk of preeclampsia: a systematic overview. *Epidemiology*. 2003. 14: 368.
4. Blomberg M. Maternal obesity, mode of delivery, and neonatal outcome. *Obstetrics Gynecology*. 2013. 122: 50-55.
5. Perlow JH. Obesity in the obstetric intensive care patient. In: Foley MR, Strong Jr TH, and Gante TJ (eds). *Obstetric Intensive Care Manual*, 3rd edn. Chicago, IL: McGraw-Hill. 2011.
6. Perlow JH, Morgan MA. Massive maternal obesity and perioperative cesarean morbidity. *American Journal of Obstetrics e Gynecology*. 1994. 170: 560.
7. Vricella LK, Louis JM, Mercer BM, Bolden N. Anesthesia complications during scheduled cesarean delivery for morbidly obese women. *American Journal of Obstetrics Gynecology*. 2010. 203: 1-5.
8. Soens MA, Birnbach DJ, Ranasinghfl JS, van Zundert A. Obstetric anesthesia for the obese and morbidly obese patient: an ounce of prevention is worth more than a pound of treatment. *Acta Obstetricia et Gynecologica Scandinavica*. 2008. 52: 6-19.
9. Tan T, Sia AT. Anesthesia considerations in the obese gravida. *Seminars in Perinatology* 2011. 35: 350355.
10. Hood DD, Dewan DM. Anesthetic and obstetric outcome in morbidly obese parturients. *Anesthesiology*. 1993. 79: 1210.
11. Johnson D. Society for Maternal-Fetal Medicine (SMFM) Statement of cesarean delivery in the morbidly obese woman. *Contemporary Obstetrics & Gynecology*. Oct 1, 2012.
12. Loubert C, Fernando R. Cesarean delivery in the obese parturient: anesthetic considerations. *Current Opinion in Anaesthesiology*. 2007. 20: 175-180.
13. Pevzner L, Powers BL, Rayburn WF, Rumney P, Wing DA. Effects of maternal obesity on duration and outcomes of prostaglandin cervical ripening and labor induction. *Obstetrics & Gynecology*. 2009. 114: 1315-1321.
14. Kominiarek MA, Zhang J, Van Veldh U, Sen P, Troendle J, Beaver J, et al. Contemporary labor patterns: the impact of maternal body mass index. *American journal of Obstetrics & Gynecology*. 2011. 205: 1-8.
15. Dodd JM, Grivell RM, Nguyen AM, Chan A, Robinson JS. Maternal and perinatal health outcomes by body mass index category. *Australian and New Zealand journal of Obstetrics and Gynaecology*. 2011. 51: 136140.