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Guideline No. 392-Pregnancy and Maternal Obesity Part 2: Team Planning for Delivery and Postpartum Care

This Clinical Practice Guideline has been prepared by the authors and reviewed by the Society of Obstetricians and Gynaecologists of Canada (SOGC)'s Maternal-Fetal Medicine Committee, Family Physician Advisory Committee, and Guideline Management and Oversight Committee; and approved by the Board of the SOGC. Parts 1 and 2 of this Clinical Practice Guideline supersede the original version (#239) that was published in February 2010.

Note: Preconception and Prenatal Care are covered in Part 1.

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Key Words: Pregnancy, maternal obesity, labour and delivery, vaginal birth, Caesarean birth, wound disruption, venous thromboembolism, maternal morbidity, fetal/neonatal morbidity, fetal ultrasound, weight loss surgery, gestational weight gain, stillbirth, vaginal birth after Caesarean

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CHANGES IN PRACTICE

1. Aspirin prophylaxis
2. Increased surveillance following bariatric surgery
3. Delivery by term

KEY MESSAGES

1. Pregnancy care requires maternal medical assessment
2. Team planning enhances care and reduces risks for patients and caregivers
3. Increased awareness is needed for weight bias in obstetrics

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All people have the right and responsibility to make informed decisions about their care in partnership with their health care providers. In order to facilitate informed choice, patients should be provided with information and support that is evidence-based, culturally appropriate, and tailored to their needs.

This guideline was written using language that places women at the centre of care. The SOGC is committed to respecting the rights of all people—including transgender, gender non-binary, and intersex people—for whom the guideline may apply. We encourage health care to engage in respectful conversation with patients regarding their gender identity as a critical part of providing safe and appropriate care. The values, beliefs, and individual needs of each patient and their family should be sought and the final decision about the care and treatment options chosen by the patient should be respected.

Abstract

Objective: This guideline will review key aspects in the pregnancy care of women with obesity. Part I will focus on Preconception and Pregnancy Care. Part II will focus on Team Planning for Delivery and Postpartum Care.

Intended Users: All health care providers (obstetricians, family doctors, midwives, nurses, anaesthesiologists) who provide pregnancy-related care to women with obesity.

Target Population: Women with obesity who are pregnant or planning pregnancies.

Evidence: Literature was retrieved through searches of Statistics Canada, Medline, and The Cochrane Library on the impact of obesity in pregnancy on antepartum and intrapartum care, maternal morbidity and mortality, obstetric anaesthesia, and perinatal morbidity and mortality. Results were restricted to systematic reviews, randomized controlled trials/controlled clinical trials, and observational studies. There were no date or language restrictions. Searches were updated on a regular basis and incorporated in the guideline to September 2018. Grey (unpublished) literature was identified through searching the websites of health technology assessment and health technology assessment-related agencies, clinical practice guideline collections, clinical trial registries, and national and international medical specialty societies.

Validation Methods: The content and recommendations were drafted and agreed upon by the authors. Then the Maternal-Fetal Medicine Committees peer reviewed the content and submitted comments for consideration, and the Board of the Society of Obstetricians and Gynaecologists of Canada (SOGC) approved the final draft for publication. Areas of disagreement were discussed during meetings at which time consensus was reached. The level of evidence and quality of the recommendation made were described using the Evaluation of Evidence criteria of the Canadian Task Force on Preventive Health Care.

Benefits, Harms, and Costs: Implementation of the recommendations in these guidelines may increase obstetrical provider recognition of the issues affecting pregnant individuals with obesity, including clinical prevention strategies, communication between the health care team, the patient and family as well as equipment and human resource planning. It is hoped that regional, provincial and federal agencies will assist in the education and support of coordinated care for pregnant individuals with obesity.

Guideline Update: SOGC guideline will be automatically reviewed 5 years after publication. However, authors can propose another review date if they feel that 5 years is too short/long based on their expert knowledge of the subject matter.

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Summary Statements:

1. Unfavourable cervix and induction of labour are more common with maternal obesity. The role of induction of labour and risk of Caesarean birth remains unclear (II-2).
2. Electronic fetal monitoring is recommended for women in active labour with a body mass index >35 kg/m^2. Cervical assessment, uterine monitoring, and fetal heart rate monitoring may be more challenging with higher degrees of maternal body mass index (III).
3. Decision-to-delivery time is increased in women with obesity (II-2).
4. Body mass index increases risk of surgical site infection and wound complications (II-2).
5. Anaesthetic risks are increased with maternal obesity (II-2).
6. Rates of successful breastfeeding are reduced for women with obesity (II-2).
7. Several effective contraceptive choices are available to women with obesity (III).
8. Women with obesity are at higher risk of postpartum depression and anxiety (II-2).
9. Antenatal, labour and delivery, and postnatal care may be more complex in women with obesity (III).

Recommendations:

1. Electronic fetal monitoring is recommended for women in active labour with a body mass index >35 kg/m^2. Intrauterine pressure catheters may assist in assessment of labour contractions. Fetal scalp electrodes may be helpful to ensure continuous fetal monitoring when indicated (III B).
2. Women with obesity may benefit from higher dosage of preoperative antibiotics for Caesarean birth (I A).
3. It is recommended to reapproximate the subcutaneous tissue layers at the time of Caesarean birth to reduce wound complications (II-2 A).
4. Antenatal assessment with obstetric anaesthesia may assist in planning for safer birth for women with obesity (III A).
5. Postoperative thromboprophylaxis is recommended, at appropriate dosing for the given body mass index, due to the greater risk of venous thromboembolism following Caesarean birth with women with obesity (II-3 A).
6. Women with obesity should be offered lactation support in the postpartum period (III C)
7. Women with obesity should be screened for postpartum depression and anxiety given that maternal obesity is a risk factor for these conditions (II-2 A).
8. Counselling regarding weight management in the postpartum period is suggested in order to minimize risks in subsequent pregnancies (II-2 A).
9. Obstetric team planning may be helpful for women with obesity to navigate the steps in antenatal, labour and delivery, and postnatal care (III-3 A).

Table 1. Key to evidence statements and grading of recommendations, using the ranking of the Canadian Task Force on Preventative Health Care

Quality of Evidence Assessment[a]	Classification of Recommendations[b]
I: Evidence obtained from at least 1 properly randomized controlled trial	A. There is good evidence to recommend the clinical preventive action.
II-1: Evidence from well-designed controlled trials without randomization	B. There is fair evidence to recommend the clinical preventive action.
II-2: Evidence from well-designed cohort (prospective or retrospective) or case-control studies, preferably from more than 1 centre or research group	C. The existing evidence is conflicting and does not allow to make a recommendation for or against use of the clinical preventive action; however, other factors may influence decision making.
II-3: Evidence obtained from comparisons between times or places with or without the intervention. Dramatic results in uncontrolled experiments (such as the results of treatment with penicillin in the 1940s) could also be included in the category.	D. There is fair evidence to recommend against the clinical preventive action.
III: Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees	E. There is good evidence to recommend against the clinical preventive action.
	I. There is insufficient evidence (in quantity or quality) to make a recommendation; however, other factors may influence decision making.

[a] The quality of evidence reported in these guidelines has been adapted from The Evaluation of Evidence criteria described in the Canadian Task Force on Preventive Health Care.

[b] Recommendations included in these guidelines have been adapted from the Classification of Recommendations criteria described in The Canadian Task Force on Preventive Health Care.

DELIVERY CONSIDERATIONS

Induction of Labour

Observational studies show that pregnant women with obesity are more likely to undergo induction of labour.[1–3] One Canadian cohort study showed that 49% of women with obesity (compared with 28.8% of normal weight controls) were induced,[2] while a second showed that 39% of women with a body mass index (BMI) ≥50 kg/m^2 were induced compared to 30% of those of normal weight.[4]

Achievement of a favourable cervix in women with obesity poses challenges as they are less likely to achieve a Bishop Score of 6 after 1 dose of prostaglandin E_2 and are more likely to require multiple doses.[5] Conversely, an observational study comparing women with and without obesity revealed no increased risk of failure to achieve active labour or higher chance of Caesarean birth with mechanical ripening with a balloon catheter.[6]

Increasing obesity appears to increase the incidence of failed induction. In a secondary analysis of the Misoprostol Vaginal Insert Trial, the incidence of Caesarean birth after cervical ripening with prostaglandin followed by induction of labour was 21.3% for women with BMI <30 kg/m^2, but rose to 29.8% for BMI 30–39.9 and to 39.9% for BMI ≥40 kg/m^2.[7]

Nonetheless, several population-based cohort studies suggest that elective induction of women with obesity at term may decrease Caesarean birth rates, macrosomia, and neonatal morbidity.[8–10] A large, retrospective cohort study of patients with BMI >30 kg/m^2 compared elective induction at 39, 40, and 41 weeks with expectant management. Elective induction at 39 and 40 weeks was associated with significantly reduced odds of Caesarean birth (for 39 weeks; adjusted odds ratio [aOR] 0.83) in both nulliparous and parous women.[11] Elective induction at 39 or 40 weeks was also associated with decreased severe maternal morbidity and neonatal intensive care unit (NICU) admission, although there was no impact on neonatal and infant death.[11] While promising, there have not been prospective studies to replicate these findings.

Labour Dystocia

Both in vitro and clinical studies demonstrate an association between obesity and inhibition of uterine contractility. Leptin and apelin—adipocytokines that are secreted from adipose tissue—are elevated in obesity, and both inhibit myometrial activity.[12,13] Similarly, multiple observational studies have demonstrated that obesity is associated with prolongation of the first stage of labour in both nulliparous and parous women.[14,15]

Obesity is associated with an increased risk for Caesarean birth in the first stage of labour, generally due to a higher

ABBREVIATIONS

BMI	body mass index
DMPA	Medroxyprogesterone acetate
IUDs	intrauterine devices
VBAC	vaginal birth after Caesarean section
VTE	venous thromboembolism

incidence of labour dystocia. The association appears to be dose dependent, with 1 large Swedish observational study noting ORs for Caesarean birth for ineffective uterine contractility of 2.14, 2.72, and 3.98 for class I, II, and III obesity, respectively.[16]

Vaginal examinations are more likely to be difficult when maternal BMI is >35 kg/m^2 (OR 8.9).[17] To optimize cervical assessment, consider placing the patient in lithotomy position and/or minimizing the number of different examiners.[17]

Uterine Monitoring

Uterine contractions are monitored with external tocodynamometry and/or manual palpation of the maternal abdomen. This can become technically challenging in the presence of a thicker abdominal wall or panniculus.[17] Tocodynamometry may be unreliable for the assessment of uterine contractions, due to lack of efficacy in women who are obese (OR 0.18; 95% confidence interval [CI] 0.07−0.46 for the detection of contractions).[18] Intrauterine pressure catheters are not recommended for routine use; however, insertion should be considered if a patient's contraction pattern cannot otherwise be adequately assessed.

Electrohysterography measures uterine electrical activity from the surface of the maternal abdomen, and these measurements have been found to correlate well with readings from intrauterine pressure catheters.[19] While not commonly used clinically, this represents a potential future alternative to invasive monitoring.

Augmentation

Given the inhibitory effects of obesity on myometrial contractility, Wuntakal et al. advocate for the early and liberal use of oxytocin to achieve 5 contractions in 10 minutes.[20] When oxytocin is required in the first stage of labour, women with obesity require significantly more oxytocin[21] and are more likely to require a Caesarean birth (69.6% vs. 11.4% for BMI >35 kg/m^2 vs. BMI <25 kg/m^2).[22] The Society of Obstetricians and Gynaecologists of Canada (SOGC) Clinical Practice Guideline "The Management of Spontaneous Labour at Term in Healthy Women" suggests that dilatation after 4 cm as slow as 0.5 cm/hour should be considered normal. It further states that when oxytocin augmentation is required, "a minimum of 4 to 6 hours of adequate uterine activity may be required to have the desired response."[23]

Fetal Monitoring

The SOGC recommends intermittent auscultation for "fetal surveillance during labour for healthy women without risk factors for adverse perinatal outcome,"[24] and this is felt to be a reasonable option for women with overweight or with obesity <35−40 kg/m^2. However, a Canadian observational study found that women with BMI >30 kg/m^2 were significantly less likely to have intermittent auscultation at any point during labour.[25]

Electronic fetal monitoring is recommended for women in active labour with a BMI >35 kg/m^2 according to the latest SOGC guidelines.[24] However, continuous electronic fetal monitoring also becomes more challenging in the setting of obesity, particularly for BMI >40 kg/m^2.[26] These patients are more likely to receive fetal scalp electrode monitoring during labour.[17] Abdominal-fetal electrocardiography is an emerging technology not commonly available at the time of this publication. Unlike continuous external monitoring, it does not seem to show a decline in reliability with increasing maternal BMI,[26,27] and this may evolve as an improved method of non-invasive fetal monitoring.

Shoulder Dystocia and Birth Trauma

Maternal obesity may be associated with a higher incidence of shoulder dystocia.[28] A meta-analysis of observational studies found a significantly increased risk of shoulder dystocia with increasing BMI (Relative Risk (RR) 1.29, 1.94, and 2.7 for class I, II, and III obesity, respectively), and the association between obesity and shoulder dystocia persisted after adjusting for gestational diabetes.[29] A Canadian observational study noted that women with BMI >50 kg/m^2 were at increased risk of shoulder dystocia after adjusting for macrosomia and gestational diabetes (OR 1.51).[4] However, another large, retrospective study found that obesity did not predict shoulder dystocia after controlling for birth weight and diabetes (overall RR 1.61).[30] Whether or not obesity is an independent risk factor for shoulder dystocia, health care providers must be prepared for a greater incidence in women with obesity.

Although not conducted specifically in patients with obesity, a randomized controlled trial demonstrated that induction of labour between 37 and 38^6 weeks gestation for estimated fetal weight >95th percentile significantly decreased the incidence of shoulder dystocia without increasing Caesarean birth rates or impacting neonatal morbidity.[31] A large, retrospective, population-based study comparing elective induction at 39−41 weeks with expectant management for patients with obesity showed only a modest reduction among parous (but not nulliparous) women induced at 39 weeks (RR 0.72) or 40 weeks (RR 0.77).[11] Other retrospective studies have not noted a significant reduction in shoulder dystocia or brachial plexus injury with elective induction for obesity.[8,10]

Acknowledging that the level of evidence supporting their recommendation is of low quality, the American College of

Obstetricians and Gynecologists recommends elective Caesarean birth when estimated fetal weight exceeds 4500 g in diabetic patients or 5000 g in non-diabetic patients.[32] The Royal College of Obstetricians and Gynaecologists supports consideration of primary Caesarean birth in diabetic patients only with estimated fetal weight above 4500 g, citing large numbers needed to treat to prevent 1 brachial plexus injury in non-diabetic patients.[33] These recommendations are not intended specifically for patients with obesity, and it is well-recognized that ultrasound estimation of fetal weight is less accurate with increasing gestational age, fetal weight, and BMI.[34,35]

Considerations for Caesarean Birth

Decision time

In addition to being at increased risk for emergency Caesarean birth, the interval from decision to delivery is generally longer in patients with obesity.[36,37] A retrospective analysis of emergency Caesarean births performed at a Canadian tertiary-level hospital showed that the decision-to-incision and decision-to-delivery intervals were both increased by an average of 4.5 minutes for patients with obesity compared with normal weight controls, although the majority were delivered in under 30 minutes in both groups.[36] The authors posited that the increased time to delivery was related to patient transportation and anaesthetic preparation, rather than surgical time, because the decision-to-delivery interval was not increased any more than the decision-to-incision interval. However, another observational study noted that increasing BMI was associated with significantly increased time from skin incision to infant delivery.[38] Dennis et al. found that women with BMI ≥45 kg/m^2 at delivery required an average of 20 minutes of additional theatre time compared with women with normal BMI and that each 1 kg/m^2 increase in BMI increased surgical time by an average of 0.3 minutes.[39]

Antibiotic prophylaxis

BMI is positively associated with the risk for postoperative surgical site infection[40] and other wound complications, such as seroma and wound separation.[41] A single dose of prophylactic antibiotics reduces the risk of wound infection, endometritis, and serious infectious complications by 60% to 70% in the general population of women undergoing Caesarean birth.[42]

The SOGC Clinical Practice Guideline "Antibiotic Prophylaxis in Obstetric Procedures" recommends that a single dose of first-generation cephalosporin (clindamycin or erythromycin can be used in the setting of penicillin allergy) be administered 15 to 60 minutes prior to skin incision.[43] In women with obesity, a dose of at least 2 g of cefazolin is generally used. However, whether patients with obesity—particularly those weighing over 120 kg—should receive a 3-g dose is the subject of debate, since increasing BMI is associated with decreased maternal plasma and adipose cefazolin concentrations.[44] A double-masked randomized controlled trial comparing 2 g and 3 g of cefazolin in patients with obesity noted increased maternal plasma and umbilical cord concentrations with the 3-g dose; however, maternal adipose concentrations were not consistently above the minimum inhibitory concentration for gram-positive and gram-negative bacteria in both groups.[44] Conversely, another pharmacokinetic study found that patients with BMI >30 kg/m^2 were more likely to achieve adequate tissue concentrations of cefazolin after a 3-g dose, compared with 2 g.[45] There are no studies demonstrating reduced infectious morbidity with 3-g cefazolin dosing, and thus further research is required.

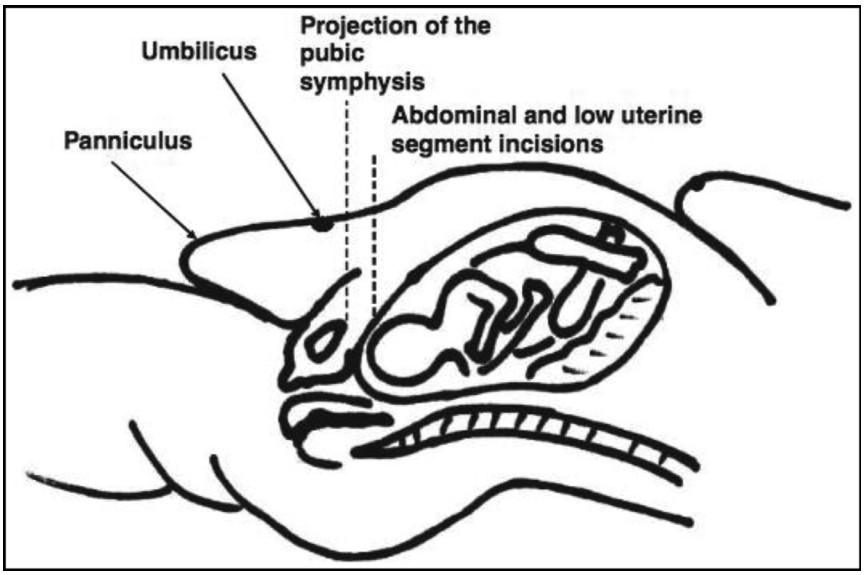
A double-masked, placebo-controlled randomized trial of 48 hours of oral cephalexin 500 mg and metronidazole 500 mg every 8 hours after Caesarean birth in patients with pre-pregnancy BMI ≥30 kg/m^2 demonstrated a significant reduction in surgical site infection (6% vs. 19%) and endometritis (2% vs. 8%) among patients who had ruptured membranes at the time of surgery.[46] Currently there is insufficient evidence to recommend postoperative antibiotics for women with obesity after intrapartum Caesarean birth.

Incision

Randomized controlled trials comparing skin incisions have not been performed; thus, the choice of incision is left to clinical judgement and local practice. Although lower abdominal transverse skin (Pfannenstiel) incisions are generally preferred for Caesarean birth, these incisions may lie in the moist area underneath the panniculus, which may compromise wound healing and promote infection.[47] Vertical midline incisions may be used as an alternative, although they are associated with increased postoperative pain and wound dehiscence.[47] Vertical incisions have been associated with a higher incidence of wound complications, including surgical site infections[48] and vertical hysterotomy,[49] but decreased risk of low 5-minute Apgar score and umbilical artery pH <7.1.[49] These studies are limited by confounders. For instance, a supraumbilical vertical incision can be undertaken to avoid dissecting through the thicker adipose layer below the umbilicus.[50] If this type of incision is planned, this must be coordinated with anaesthesiology given the higher dermatomes that must be anaesthetized.

If the panniculus hangs such that the umbilicus is caudal to the level of the pubic symphysis, a transverse infraumbilical or supraumbilical incision can be considered (Figure).[51] In

Figure. Site of supraumbilical transverse incision.



(Reproduced from Tixier et al., 2009.[51])

the correctly selected patient, this technique can offer straightforward access to the lower uterine segment without other significant difference in technique from a Caesarean birth performed via lower abdominal transverse incision.[51]

Exposure

Obtaining adequate surgical exposure can be challenging in patients with obesity, particularly when a lower abdominal transverse incision is pursued in the presence of a large panniculus. Many surgeons choose to tape the panniculus in a cephalad direction.[52] Self-retaining retractors, such as the Traxi Panniculus Retractor (Clinical Innovations, South Murray UT), the Mobius Retractor (Cooper Surgical, Trumbull, CT), or the Alexis O C-Section Protector/Retractor (Applied Medical, Rancho Santa Margarita, CA) may be used to obtain adequate exposure without additional assistants.[47] Given potential costs involved with these retractors, other options include using adhesive skin tape on either side of the maternal pannus and suspending upwards over the top of the operating table to achieve similar exposure if an infraumbilical skin approach is used. Some departments stock longer instruments to facilitate access to the pelvis.[53]

Closure and wound care

When the subcutaneous adipose layer is greater than 2 cm in thickness, reapproximation has been shown to significantly reduce wound disruption and seroma formation.[54] In some patients with increased subcutaneous thickness, multiple layers of sutures may be required. Subcutaneous drains, whether used alone or in combination with subcutaneous suturing, do not appear to confer benefit.[55]

Data from randomized controlled trials in general obstetric populations suggest that closure with subcuticular sutures reduces wound separation without significant differences in pain, patient satisfaction, or cosmesis.[56] However, a randomized controlled trial of women with BMI ≥40 kg/m^2 showed subcuticular closure was associated with lower rates of wound complications.[57]

While prophylactic use of negative pressure wound therapy (e.g., PICO dressing, [Smith & Nephew, Mississauga, ON]) has been proposed, there is no robust evidence to support the efficacy or cost-effectiveness of this practice.[58–60] A meta-analysis of 6 randomized controlled trials and 3 cohort studies comparing prophylactic negative pressure wound therapy versus standard care after Caesarean birth in women with obesity reported a decrease in surgical site infections (RR 0.45; 95% CI 0.31–0.66) and composite wound complications (RR 0.68; 95% CI 0.49–0.94).[61] Another systematic review including all but 1 of the previous trials did not demonstrate a reduction in risk of wound infection (RR 0.79; 95% CI 0.44–1.41) or overall wound complications (RR 0.97; 95% CI 0.63–1.49).[59] Other wound dressing options may include low-adherence, hydrogel, hydrocolloid dressings.[62] Patients should inspect the wound area regularly and report concerns to their provider. Providing the patient with practical advice to keep the area under the panniculus clean and dry might include the use of hand towels or sanitary napkins to wick away moisture accumulation and/or the use of a hair dryer on cool setting to dry the area after showering.

Vaginal Birth After Caesarean

Maternal BMI is associated with increased risk for failed vaginal birth after Caesarean section (VBAC). A retrospective study of 510 eligible patients attempting VBAC demonstrated a success rate of 54.6% among patients with BMI >30 kg/m^2 compared with 70.3% for patients with normal weight.[63] In a prospective observational study of term singleton gestations with planned VBAC, failed trial of labour occurred in 15.2% of women with normal weight, compared with 29.9% and 39.3% for patients with BMI 30.0–39.9 kg/m^2 and ≥40.0 kg/m^2, respectively.[64] Two other small observational studies found that only 4 of 30 (13%) women weighing at least 136 kg (300 lbs)[64] and 9 of 26 (35%) women with BMI ≥50.0 kg/m^2 had successful VBAC.[65] In a secondary analysis of a prospective cohort study, women with obesity were more likely to have repeat Caesarean birth for an arrest disorder prior to 6 cm dilatation, despite being allowed to labour longer and receiving higher maximum doses of oxytocin.[66]

When counselling patients about the option of VBAC, patients with obesity should be informed about the increased risk for emergency Caesarean birth and the increased risk for severe maternal morbidity when intrapartum Caesarean birth is required.[67] Decisions around VBAC should also take into account local resources and the ability to offer emergency surgery to patients where transportation, anaesthetic, and surgical challenges may be anticipated.

Obstetric Anaesthesia

Anaesthetic time increases with increasing maternal BMI, especially if BMI ≥45 kg/m^2.[39] An observational study of over 800 women undergoing Caesarean birth at a tertiary level hospital revealed a greater risk of regional anaesthetic failure in women with obesity (8.5% for BMI >35 kg/m^2 compared with 3.7% if BMI <30 kg/m^2).[37] Epidural top-up was associated with less delay to skin incision.[37] Consideration of early epidural insertion is recommended by the American Society of Anesthesiologists and the Society for Obstetric Anesthesia and Perinatology.[68]

Epidural insertion is more challenging in patients with obesity. A sitting, flexed position minimizes the distance from the skin to the epidural space.[69] Ultrasound can be a useful adjunct to identify the midline and estimate the distance to the epidural space.[70] Combined spinal-epidural anaesthesia is often used for Caesarean births; it provides a more dense block while allowing the flexibility of additional surgical time with a continuous epidural infusion.[69]

A retrospective cohort study demonstrated that patients with obesity ≥40 kg/m^2 were more likely than patients with normal weight to experience hypotension and fetal heart rate decelerations after epidural anaesthesia.[71] Care should be taken to ensure that these patients receive adequate volume preloading.

Obesity also increases the risk for a difficult airway.[68] Positioning on the operating room table in a ramped position (upper body slightly elevated) with leftward lateral tilt is recommended. Horizontal alignment of the external auditory meatus with the sternal notch optimizes conditions for endotracheal intubation.[69]

Furthermore, patients with obesity are at increased risk for aspiration and may require stricter restrictions on oral intake during labour and before planned Caesarean birth. This should be determined on a case-by-case basis, according to other risk factors for aspiration and anticipated risk for operative delivery.[68] An antenatal assessment for women with obesity may be useful to assess risks with anaesthesia and plan for birth.

REFERS TO SUMMARY STATEMENTS 1, 2, 3, 4, AND 5 & RECOMMEDATIONS 1, 2, 3, AND 4

POSTPARTUM CONSIDERATIONS

Women with obesity are at increased risk for several postpartum complications. These risks are increased with increasing levels of obesity.[72–77] Obstetric care providers should be aware of the maternal and fetal risks associated with obesity and that these risks persist into the postpartum period. Modifications in postpartum care can be utilized to optimize outcomes.[78]

Infections and Wound Care

Pregnant women with obesity are at increased risk for infection postpartum, regardless of mode of delivery and the use of prophylactic antibiotics.[3,72,79] There is an increased risk of vaginal infections, endometritis, and episiotomy infections. As discussed in the previous section, Caesarean wound complications are also increased.[72,78,79]

Incisions should be monitored closely for signs of infection, hematomas, and disruption while in hospital and after discharge as rates of complications are increased.[40,72,80] A study of 194 women with a BMI ≥50 kg/m^2 who underwent Caesarean birth reported a 30% wound complication rate, and the majority (86%) were diagnosed after discharge.[80]

Venous Thromboembolism Prevention

Pregnancy, particularly the postpartum period, and obesity are independent risk factors for venous thromboembolism (VTE). VTE in pregnancy and postpartum can include deep vein thrombosis (DVT) and pulmonary embolism (PE).[81,82] The incidence of VTE is 2−5 times greater in the postpartum period compared to antepartum, and the risk is highest in the first 6 weeks postpartum.[83−86]

Additional factors including operative delivery (especially emergent) and other maternal demographic and medical factors (maternal age, smoking, infection, varicosities, thrombophilia, obstetric hemorrhage) are also associated with an increased risk of developing a VTE.[83−86] A combination of risk factors leads to an increased risk of VTE, which is a significant cause of morbidity and mortality.[87,88] Studies have demonstrated an increasing risk of VTE with increasing levels of maternal BMI compared to patients with a normal BMI.[72,89]

For vaginal birth there is no evidence for routine thromboprophylaxis. Individual risk factors other than an increased BMI should guide management. Early mobilization and adequate hydration should be encouraged. For Caesarean birth, early mobilization is beneficial. Physical therapy to assist with ambulation may be helpful, particularly in patients with mobility limitations. The use of appropriately fitted pneumatic compression devices and thromboprophylaxis should be considered for women with obesity, due to the increased risk of VTE.[78,87] There is a lack of consistent evidence for recommending routine dosing and duration of thromboprophylaxis in this population. In high-risk patients, particularly those women with obesity as well as additional clinical and/or maternal risk factors, thromboprophylaxis should be considered. Unfractionated or low-molecular-weight heparin has been utilized, with stronger evidence for low-molecular-weight heparin.[90] Weight-based dosing may be more effective than BMI-stratified dosing.[91] Continuation of thromboprophylaxis at least until the patient is fully ambulatory is suggested. Individual patient factors and delivery considerations should guide decision making around the duration of use and the dose.

Breastfeeding and Lactation

Breastfeeding should be encouraged and promoted in women with obesity. The benefits of breastfeeding for both the mother and the newborn should be highlighted, including that breastfeeding may be protective against childhood obesity, which is increased in this population. It is well established that obesity decreases successful breastfeeding outcomes. Evidence suggests a higher rate of breastfeeding difficulties and challenges in women with obesity and a higher early discontinuation rate.[92−95] Numerous studies have identified that women with obesity are less likely to initiate breastfeeding, tend to initiate breastfeeding later compared with women of normal weight, are less likely to exclusively breastfeed, and breastfeed for a shorter duration of time.[96,97] Bever Babendure et al. in 2015[97] suggested that women with a BMI >30 kg/m^2 have a 13% decrease in the rate of initiation of breastfeeding and a 20% decrease in the rate of any breastfeeding at 6 months. An Ontario population-based study reported that mothers with obesity were less likely to intend to breastfeed (OR 0.84; 95% CI 0.70−0.99) and were less likely to exclusively breastfeed on hospital discharge (aOR 0.68; 95% CI 0.61−0.76).[98] There is a positive association with breastfeeding discontinuation and increasing BMI.[92]

The reasons proposed for reduced initiation of breastfeeding in women with overweight and obesity include mechanical factors and delayed lactogenesis.[97] Larger breasts affecting traditional breastfeeding positions; postpartum edema, which may affect nipple flattening, resulting in poor latch; and delayed lactogenesis may play a role in lower initiation of breastfeeding.[92,97] Women are more likely to have medical complications including diabetes, Caesarean birth, or preterm birth, which can result in delayed lactogenesis.[97] Reduced initiation of breastfeeding and an increased risk of early cessation of breastfeeding in women with obesity may be partly due to pregnancy complications making early separation of mother and baby more likely.

Additional support, lactation education, and access to public health services for ongoing outpatient support should be considered in order to optimize breastfeeding continuation and success in mothers with obesity. Interventions including education regarding the benefits of breastfeeding, physiology, potential challenges, and management options; optimizing social supports; and physical interventions including antenatal colostrum collection, postnatal breast expression, and skin-to-skin contact at and after birth have proven to be beneficial in increasing breastfeeding initiation and continuation.

Contraception

Safe and effective contraception is essential for preventing unintended pregnancy. For women with obesity who have additional comorbidities, there is increased risk of pregnancy-related complications; thus, avoidance of unintended pregnancy is especially important. Sexually active women with obesity of reproductive age are significantly less likely

to use contraception compared with women of normal weight in an American survey.[99]

With respect to safety, for women with obesity and no comorbidities, progestin-only contraceptives and intrauterine devices (IUDs) are acceptable. Medroxyprogesterone acetate (DMPA) is considered safe for most women with obesity; however, there is an association with weight gain and potential for menstrual irregularities.[100,101] Estrogen-containing contraceptives should be considered after careful review of additional risk factors for VTE and should not be started before 4–6 weeks postpartum, according to guidelines.[102] Obesity itself and age >35 are not contraindications to considering estrogen-containing contraceptives if there are no other contraindications to these medications.[100]

There is no evidence that any specific method of contraception is considered ineffective in women with obesity; however, there is potential for oral contraceptives and transdermal patches to have suboptimal efficacy due to lower serum drug levels and thus insufficient hormone level to ensure contraceptive benefit.[103–105]

Chin et al.[106] reported on contraceptive use among 361 women with overweight and obesity at 12 months postpartum. Effective contraception use was reported by 45% of women overall. At 12 months postpartum, women with obesity were less likely to use effective contraception compared to overweight women. This is important in our understanding of continuation of contraception if pregnancy is not desired.

The most reliable and efficacious options for contraception in women with obesity are IUDs, DMPA, or implants.[101,107] Contraceptive failure in IUD users did not differ among women of normal, overweight, or obese BMI. Both the copper IUD and levonorgestrel-releasing IUD appear to be effective in this population. IUD insertion may prove to be challenging; selection of the appropriate-sized speculum, and potentially using a condom with the end cut off over the speculum, may improve visualization,[108] and ultrasound guidance for insertion and/or confirmation of correct placement is also potentially beneficial.

DMPA has been shown to be effective in preventing pregnancy in women with obesity.[101,109] Median DMPA levels remained high enough to prevent ovulation in a study of pharmacokinetics in women with all classes of obesity.[110] There is a shorter time to resumption of ovulation and subsequent conception after discontinuation of DMPA in women with lower body weight compared with those who have obesity.

Contraceptive implants may be effective in women with obesity.[101,111] Progestin implants have failure rates as low as those with permanent contraception.[101] Although the levels of hormone concentrations remain above contraceptive requirements for the duration of the implant, the levels may be lower than levels in women without obesity.

Oral contraceptives have been shown to suppress ovulation in most women with obesity and are effective in pregnancy prevention; however, they may have a higher failure rate with imperfect use due to altered pharmacokinetics related to obesity.[104] A tablet containing 20–30 μg of ethinyl estradiol should be considered if this is the contraception of choice. The risk of VTE must be assessed prior to initiation of use of estrogen-containing contraceptives.[102]

The contraceptive patch may have reduced efficacy in women with weight ≥90 kg. This is not an absolute contraindication to its use; however, it must be considered in the clinical circumstances regarding the desire for effective contraception.[102,112]

The contraceptive ring has been studied in large trials in women with normal weight. Ring failures in studies incorporating women of varying BMI status were not different among ring users based on BMI. However, non-compliance and methodological issues may not truly reflect the influence of increased BMI.[113,114]

Another option for permanent sterilization in women with obesity, outside of a combination of planned Caesarean birth and bilateral tubal ligation or fimbriectomy or partner vasectomy, would be hysteroscopic tubal occlusion. The advantages of this procedure that it may be done under local anaesthesia and may avoid laparoscopy/laparotomy risks. However, the device used in this procedure is currently unavailable in Canada.

Weight gain related to contraceptive options is a concern for many women. Combined hormonal contraceptives, progestin-only oral options, IUDs, and implants have not been associated with weight gain or stoppage of contraceptive option due to weight gain.[101,115,116]

Weight Management

Weight loss before a future pregnancy has been shown to be the most effective intervention to improve medical comorbidities in women with obesity.[117,118] Weight loss and reduced BMI are associated with decreased adverse pregnancy outcomes.[73–77,119] Weight loss has beneficial effects on future pregnancy outcomes, overall health, and reproductive function.[78,120] Even small reductions in

weight pre-pregnancy may be associated with improved maternal and fetal outcomes.

Interpregnancy weight loss has been shown to decrease obstetric maternal and fetal risks such as gestational diabetes mellitus, Caesarean birth, and unsuccessful VBAC.[121−126] Weight loss between pregnancies in women with obesity has been shown to decrease the risk of a large for gestational age infant (aOR 0.61; 95% CI 0.52−0.73).[123] Weight loss of ≥2 BMI units resulted in a 40% reduction of a subsequent large for gestational age infant.[126] There is also a decrease in the stillbirth rate compared to those who maintained their weight.[123,125]

Excessive gestational weight gain (GWG) is associated with postpartum weight retention.[127] In a meta-analysis, in women with obesity whose GWG was above recommended targets, there was a significant increase in weight retention over time compared to women who were on target.[127] GWG below target was associated with less weight retention within 6 months postpartum. Another study reported that postpartum weight gain was higher in women who gained 20 kg versus those who gained 10−15 kg in pregnancy.[128]

Strategies to reduce postpartum weight include behavioural approaches, physical activity, and diet.[129] Motivational interviewing techniques have been shown to promote weight loss, dietary modification, and adoption of exercise behaviours.[130,131] Behavioural intervention strategies during pregnancy have shown some benefit in increasing the number of women in overweight and obese categories who reached their preconception weights, or below, within 6 months postpartum (30.7%, intervention group vs. 18.7%, routine care group).[132] Energy intake, breastfeeding, and work status were predictors of weight change.[133]

Mental Wellness

Obesity has been associated with mental illness in pregnancy and postpartum.[134−137] The transition to motherhood is a time when women's body image, weight, and depressive risk are changing.[138] Pre-pregnancy obesity, GWG, and postpartum weight retention may be associated with an increased risk of maternal depressive and anxiety symptoms during pregnancy and in the postpartum period.

Body image concerns can impact weight gain and the development of depressive symptoms in pregnancy and postpartum. In a Norwegian study tracking 39 000 women through pregnancy and for 36 months postpartum, depressive symptoms in women with obesity were increased with weight gain over time.[138] The effect was more pronounced in women with higher pre-pregnancy BMI.

Ertel et al.[135] studied depressive symptoms using the Edinburgh Postnatal Depression Scale (EPDS) at mid-pregnancy and 6 months postpartum. Pre-pregnancy obesity was associated with an increased risk of postpartum depression (OR 1.69; 95% CI 1.01−2.83) compared to participants with normal pregnancy weight.

Molyneaux et al.[136] performed a systematic review and meta-analysis to assess the presence and risk of mental disorders among women with overweight and obesity during pregnancy and the postpartum period. Sixty-two studies including over 500 000 women were included for review. Women who had overweight or obesity had higher risks of elevated depressive symptoms compared with normal-weight women (antenatal [obese: OR 1.43; 95% CI 1.27−1.61; overweight: OR 1.19; 95% CI 1.09−1.31]; postpartum [obese: OR 1.30; 95% CI 1.20−1.42; overweight: OR 1.09; 95% CI 1.05−1.13]). The median prevalence of antenatal depressive symptoms was also higher in women with increased BMI: obese, 33.0%; overweight, 28.6%; normal weight, 22.6%. This trend was also seen postpartum: obese, 13.0%; overweight, 11.8%; normal weight, 9.9%.

There is limited information available on health-related quality of life during pregnancy and in the postpartum period. In a longitudinal study, questionnaires were offered to pregnant women at various stages in pregnancy and at intervals in the first year postpartum. Results were reported by BMI category. Health-related quality of life of all participants decreased, but it was significantly lower in women with obesity compared to those with overweight and normal weight. Results returned to baseline in all BMI groups within 3 months postpartum.[139]

REFERS TO SUMMARY STATEMENTS 6, 7, AND 8 & RECOMMEDATIONS 5, 6, 7, AND 8

HEALTH CARE TEAM PLANNING

Given the potential complexity at the time of birth, team planning to ensure adequate organization, personnel, equipment, and understanding of possible complications may help to alleviate the concerns of the patient, her family, and the care team.

Antenatal Planning

As the medical risks associated with maternal obesity are well known (as discussed previously in this guideline),

maternal assessment, testing, and in some cases consultation will be needed to manage risks. Development of tools such as antenatal checklists, flowsheets, care plans, and availability of advanced obstetric nursing practice may provide additional support. As health care resources vary among regions, hospitals may need to update accessibility to accommodate parturients of all sizes. Consideration can be given to the design and outfitting of seating, hospital beds, bathroom fixtures, and supports to facilitate ambulation.

Intrapartum Care Planning

Given the higher likelihood of challenges with obstetric anaesthesia for labour and birth, it may be useful to equip units with readily available items such as longer epidural and spinal needle kits,[140] intrauterine pressure catheters, and other equipment that may facilitate obstetric and surgical interventions. As discussed elsewhere in this guideline, shoulder dystocia is more common and presents greater difficulty in management,[29,141] so there may be need for urgent assistance in "breaking the bed" and utilization of maternal foot support (either manually with assistance or by means of foot holders). Evidence suggest that care bundles for management of such obstetric emergencies can improve maternal and neonatal outcomes.[142]

Similarly, Caesarean birth is associated with a number of peripartum complications including greater surgical complexity and operating time as discussed in this guideline. Decision-to-incision time is increased by approximately 5 minutes[36]; thus, an unplanned Caesarean may not be feasible in terms of the generally recommended 30-minute rule. In cases where maternal risk factors are considered exceedingly high or where maternal BMI may pose significant challenges (e.g., when BMI exceeds 60 kg/m^2), a "mock" or trial birth process may help the team rehearse steps needed in this complex care.

Evidence-based care bundles have been successfully tested in general obstetric populations to reduce outcomes such as neonatal morbidity[143] and maternal surgical site infection.[144] At present, no such care bundles exist for management of women with obesity.

Postnatal Care

Elements of the prenatal and intrapartum care planning and outcomes should be communicated to the postnatal care providers given increased risks of obstructive sleep apnea, higher incidence of postpartum mood disorders, as well as decreased successful breastfeeding.

Caring for the Caregivers

The health care providers supporting women with obesity in the antenatal, intrapartum, and postnatal settings should be aware of risks to themselves as well. Workplace injury can occur from multiple causes, and prevention is occasionally hampered by time constraints.[145] For example, sonographer repetitive stress injury can occur with longer and more complex ultrasound scanning.[146] The installation and utilization of patient lifts and inflatable mattress devices may lessen the risks associated with patient transfer and positioning for the obstetric care team. Educating team members of potential risks and preventative steps may help to alleviate worker injuries.

Education and Weight Bias

Weight bias and stigmatization are well-documented in the health care system presenting a health care challenge with limited solutions.[147] All care providers should be familiar with appropriate terminology to employ with patients and their families. For example, evidence shows that "overweight" is preferable to the term "obese" or "fat" in terms of patient perception. It is also helpful to use "people first language" such as "a woman with obesity" versus "an obese woman."[148] All members of the health care team, including learners, can be educated not only in the medical and surgical care of pregnant women with obesity, but can be made aware of the sensitivity required to address these issues in a professional and non-stigmatizing manner. Evidence has shown that when weight bias exists, women are less likely to seek care, ask questions, and discuss their concerns.[149]

REFERS TO SUMMARY STATEMENT 9 & RECOMMEDATION 9

CONCLUSION

Patients, families, and health care providers should be aware that maternal obesity carries significant risk for both mother and fetus. While there are limited options for weight loss and management during pregnancy, pre-pregnancy medical and surgical management can be explored in order to potentially decrease future pregnancy risks. Women with obesity should have a medical evaluation prior to or during early pregnancy to assess for medical risk factors. Folic acid supplementation prior to and during pregnancy can reduce the risk of congenital anomalies, which are more frequent with maternal obesity. Other preventative strategies include aspirin prophylaxis. Pregnancy care involves several issues including nutrition and exercise counselling, ultrasound assessment of the fetus throughout pregnancy for dating,

growth, and well-being, as well as special consideration for mothers carrying multiple gestations or with a history of weight loss surgery. Planning the birth requires coordination of the entire health care team, including obstetric anaesthesia, and in some cases specialized techniques and/or equipment to minimize complications during vaginal or Caesarean birth. During the postpartum period, special attention is needed for successful breastfeeding as well as monitoring for postpartum depression. Throughout the pregnancy and postpartum course for women with obesity, health care providers should be aware of weight bias and stigmatization in order to optimize the experience of birth for the patient and her family.

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