



Induction of Labor in Obese Women -What Should We Know?



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Summary

Maternal obesity is becoming an epidemic in developed countries. This group of women presents an increased risk of labor induction due to the more prevalent associated obstetric comorbidities, such as gestational diabetes and hypertension. On the other hand, they also have an increased rate of failed induction of labor (IOL), which relates directly with increasing body mass index. This leads to higher cesarean section rates and, therefore, higher maternal and neonatal complications. There are few studies comparing the efficacy of different cervical ripening' agents in obese women and none prospective study titrating the dosage of oral misoprostol in induction of labor in those women. The purpose of this mini-review is to alert clinicians to the high failure rate of IOL in obese women and the best way to overcome this issue.

Keywords: Obesity; Induction of Labor; Misoprostol

Mini Review

Maternal obesity worldwide

Obesity prevalence has been increasing dramatically in the last decades, affecting women in reproductive years and altering obstetric and prenatal outcomes [1]. The World Health Organization (WHO) stratifies obesity into three classes: class I (body mass index (BMI) 30-34.9), class II (BMI 35-39.9), and class III (BMI \geq 40) [2]. Worldwide, approximately 300 million females above the age of 20 years are categorized as overweight (BMI 25-29.9 kg/m²) or obese (BMI \geq 30 kg/m²).

Obesity associated comorbidities and the necessity of labor induction

Compared to women with normal weight, obese pregnant women have a higher rate of obstetric complications, namely hypertensive complications, gestational diabetes and fetal macrosomia [3,4]. Maternal obesity is also associated with prolonged pregnancy (\geq 41 week's gestation), particularly with BMI of 35 kg/m² or higher [5]. These often lead to labor induction before the due date and consequently a lower pre-induction cervical dilatation in obese women (66%) [1]. Also, the abovementioned comorbidities are all associated with higher cesarean rates [6]. Therefore, higher rates of IOL and cesarean section (CS) are well described in obese women [7-9]. It is also well known that the degree of obesity is directly associated with induction failure [9].

Data regarding IOL failure in obese women

In a study regarding prostaglandin IOL, failure of induction and the need of CS occurred with 3.9% of obese class I and II women

and 5.7% of women in class III obesity [4-10]. In another study this rate was 20.2% and 24.2%, respectively; also, women with a BMI 40-50 kg/m² had a failed induction rate of 31.6% and women with a BMI $>$ 60 kg/m² presented an IOL failure rate as high as 63.2% [11]. These facts reveal a gap in the knowledge about specific labor induction agents or methods more likely to result in vaginal delivery in obese patients [6]. Unfortunately, only a few studies have specifically compared the outcomes of different induction methods for obese women [9]. The volume of distribution for administered oxytocin/prostaglandins is greater in obese women when compared to lean women [7]. Consequently, obese patients may need more oxytocin or prostaglandins to reach an effective concentration at its myometrial receptors [8].

Suidan et al. compared outcomes for women receiving a 10 mg dinoprostone vaginal insert to those receiving misoprostol (25 μ g vaginally or 50 μ g orally). They adjusted for parity, gestational age, birthweight, and indication for induction, and found that misoprostol had better successful cervical ripening scores and a lower rate of cesarean delivery in obese women. When comparing only oral versus vaginal misoprostol, no differences existed, nor in successful cervical ripening or cesarean delivery. Hence, misoprostol appears to be a more effective induction agent than dinoprostone in obese women. [3] Nevertheless, obese women who receive misoprostol take longer to deliver than non-obese women (by up to 4 hours). The 2014 Cochrane review regarding the various methods of induction of labor does not take into consideration titration of the best dosage of misoprostol regarding maternal BMI [12]. Those women are also more likely to require higher use

of oxytocin than normal weight women, usually 1.5 to 2 times the amount of oxytocin for augmentation of labor used in non-obese

women, and also for longer periods of time (15 to 19 h vs. 14h) [1,3,5] (Table 1).

Table 1: Correlation between BMI and IOL failure rates.

Correlation Between BMI and IOL Failure Rates			
BMI class I	3,9 -20,2%	Risk factors for IOL failure in obese women	Prolongation of the latent phase of labor
BMI class II			Fetal macrosomia
BMI class III	5,7 -24,2%		Higher levels of leptin and cholesterol causing Diminished contractile ability of the myometrium
			Fat deposition in maternal pelvis

Possible etiology for induction failure in obese women

Recent studies suggest that labor in obese women does not respect exactly the standard labor curve, especially in the active stage of labor [13]. Obese women take longer periods to achieve active 6cm of dilation. Prolongation of the latent phase correlates directly with maternal weight. In fact, morbidly obese women require more time to reach 6cm than women with class I and II obesity [4,13]. However, after cervical dilatation of 7cm, no difference exists between obese and non-obese women.

There are many theories that attempt to determine the reason for the prolonged length of labor in obese women. The leading theory refers to differences in the contractile ability of the myometrium of obese women compared with non-obese women. In obese women without spontaneous labor, it shows decreased contractile function [3,6]. However, there does not appear to be a difference in the number of oxytocin receptors at term in obese versus normal weight women. Leptin and cholesterol, a hormone produced by adipose tissue and a lipid, respectively, present higher levels in obese women, and they both decrease the influx of calcium ions into uterine smooth muscle, leading to decreased contractility [4,5]. Fat deposition in the maternal pelvis and fetal macrosomia may also be responsible for labor dystocia and lead to CS [4,14]. Added to increasing maternal BMI, other factors associated with failure of induction are null parity, low Bishop score, lack of a previous successful vaginal delivery and advanced maternal age. Null parity is a major factor, because obese primigravitas have labor induced more often than obese multigravitas, and they are also more likely to end in an emergency section [11,14].

Peri and post-partum complications in obese women

Obese women are also more likely to have maternal complications after their cesarean delivery, such as chorioamnionitis, thromboembolic events, postpartum infection, and operative complications such as postpartum hemorrhage, incisional extension, or injury to a surrounding tissue [3,13]. According to some studies, the neonates of obese women who fail their labor induction have 1.5 to 3 times more neonatal morbidity (respiratory support, antibiotics, and/or transfer to the NICU) [9]. However, other studies found no difference in neonatal morbidity

and showed no increase in cord blood pH alterations, low Apgar score or incidence of shoulder dystocia [1,6].

Conclusion

Obstetric providers should be aware of the best induction agents available for obese women. As so, this group should be offered elevated doses of oxytocin, as well as induction with misoprostol rather than dinoprostone. Clinicians should also bear in mind the prolonged labor course in this group and the importance of healthy nutrition and tempered gestational weight gain.

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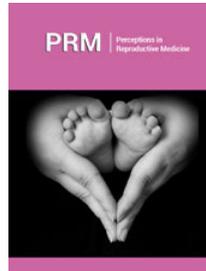
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