Factors Influencing Caesarean Section Rate after Induction of Labour in Nulliparous Women

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Aims and Objectives

To Identify what factors significantly influence the rate of Caesarean Section (CS) after induction of labour (IOL).
Comparing the effect of

1) Cervical ripening and methods of cervical ripening
2) Gestational Age
3) Maternal age
4) Maternal BMI
5) Induction indication:
   - Pre-labour rupture of membranes (PROM)
   - Preeclampsia/pregnancy induced hypertension
   - Suspected fetal compromise
   - Macrosomia
   - Gestational diabetes/pregestational diabetes
   - Post-term pregnancies
   - other

Background

IOL is common in Australia: 29% of woman undergo induction(1). Induction may be advocated for to reduce fetal, neonatal or maternal morbidity.

IOL may result in emergency caesarean section (CS). Emergency CS carries increased risks, including infection and surgical complications (2-5).

Predictors of success in labour induction may aid clinicians to make the safest decisions for patients.

Methods

Retrospective study examining the rate of CS delivery after IOL in:

- Primiparous women
- At term (≥ 37/40 weeks)
- Singleton pregnancies
- Cephalic pregnancies

Conducted at the Mercy Hospital for Women from 2008 to 2018.
All women were managed according to the Mercy Hospital for Women induction protocol.
Eligible participants were identified using the Mercy Hospital for Women's electronic database, birthing outcome system.

Table 1. Baseline Characteristics of Study Population

BMI (kg/m^2)	25.6 (5.9)
Maternal Age	30.1 (4.7)
Gestation at delivery (weeks)	40.0 (2.2)
Birth weight (grams)	3374.6 (486.7)
Cervical Ripening	
Any ripening	44.2%
With prostaglandins	26.4%
With balloon Catheter	16.1%
Combined	1.7%

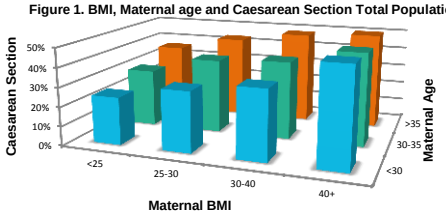
Mean (±SD) or n(%)

Contact hilaryjgrover@gmail.com for further information regarding this research project

Results

9990 women were included. 3296 women (33.0%) had a CS.

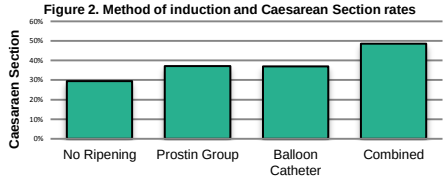
Figure 1. BMI, Maternal age and Caesarean Section Total Population



The rate of CS increased with (figure 1):

- Increase in maternal age (p<0.0001)
- Increase in maternal BMI (p<0.0001)
- Age and BMI remain statistically significant after adjustment for gestation, induction method, indication for induction, maternal age and BMI

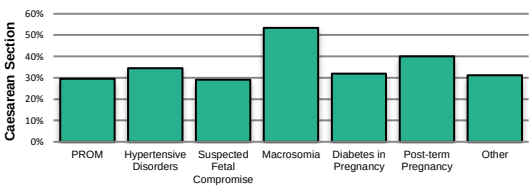
Figure 2. Method of induction and Caesarean Section rates



When comparing IOL methods and their CS rates (figure 2):

- Prostin (OR 1.4 CI, 1.3-1.6, compared to no ripening)
- Balloon catheter (OR 1.4, CI 1.3-1.6, compared to no ripening)
- Combined (OR 2.3, CI 1.7-3.1, compared to no ripening)
- These remained significant after adjusting for maternal age, BMI, induction indication and gestation

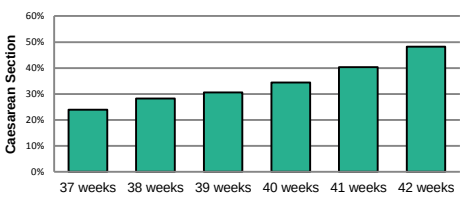
Figure 3. Indication for Induction and Caesarean Section Rate



When comparing the CS rate for different indications for IOL (figure 3):

- CS rate increased after induction for macrosomia, hypertensive disorders and post-term pregnancy (p<0.01)
- After adjustment for age, BMI, method of induction and gestation:
  - Hypertensive disorders did not increase CS rate
  - Macrosomia associated with increase in CS rate (OR 2.00, CI 1.56-2.57)
  - Post-term pregnancy resulted in an decreased OR for CS rate (OR 0.8, CI 0.65-0.96)

Figure 4. Rate of Caesarean Section by Gestation



With increasing gestation and IOL (figure 4):

- There is an increase in CS rate (p<0.0001) for every week of gestation
- After adjustment for maternal age, BMI, induction indication and induction method this remains significant for all except 38 weeks (p<0.0001 ref 37 weeks).

Conclusions

When cervical ripening is needed, there is no difference in the rate of CS between prostin and balloon catheters.

CS rate increased with increasing maternal age, advancing gestation and increasing BMI.

There is no increase in CS rate for any of the indications for IOL except macrosomia.

This information may help inform women and clinicians on the likelihood of CS after induction.

References: 1. Buist R. Induction of Labour: Indications and Obstetric Outcomes in a Tertiary Referral Hospital1999. 251-3 p. 2. Australian Institute of Health and Welfare. Australia's Mothers and babies 2015 - In Brief. In: AIHW, editor. Perina Canberra 2007. 3. Ghuman M, Rohlandt D, Joshy G, Lawrenson R. Post-caesarean section surgical site infection: rate and risk factors. The New Zealand medical journal. 2011;124(1339):32-6. 4. Leth RA, Møller JK, Thomsen RW, Uldbjerg N, Nørg infections after cesarean section compared with vaginal birth: a five-year cohort study of 32,468 women. Acta Obstetricia Et Gynecologica Scandinavica. 2009;88(9):976-83. 5. Kobayashi T, Nakamura M, Sakuma M, Yamada N, Sakon M, Fujita S, thromboembolism (PTE) and new guidelines for PTE prophylaxis in Japan. Clinical hemorheology and microcirculation. 2006;35(1-2):257-9.