

Frequency of cesarean section in term pregnancies induced with prostin-E2: A descriptive case series from a tertiary care hospital in Pakistan

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A B S T R A C T

Introduction: Since the 1960s, prostaglandins have been used extensively in clinical practice to induce labor; nevertheless, gastrointestinal symptoms, such as nausea, vomiting, and diarrhea, as well as uterine hyperstimulation and fever, have been documented as adverse effects. Numerous prostaglandin preparations have been administered orally, intramuscularly, intravenously, and locally (intravaginal and intracervical).

Methodology: From September 1, 2019, to February 1, 2020, the Department of Obstetrics and Gynecology at Ayub Teaching Hospital in Abbottabad undertook a descriptive case series to ascertain the frequency of cesarean sections among patients induced with the pill Prostein-E2 at term. The study comprised 155 pregnant women who were having labor induction. Dinoprostone tablets were given to each patient; three milligrams were injected enters the fornix of the posterior vagina. A third 3 mg tablet was administered when the cervix was favorable (Bishop score $\pm$ 8) after two more vaginal exams that were separated by six hours.

Results: The study's age range was 18–40 years old, with a mean gestational age of 27.903 ± 2.61 years of 38.071 ± 0.73 weeks, a mean number of doses of 1.335 ± 0.47 , a mean parity of 1.419 ± 1.16 , and a mean weight of 65.664 ± 4.77 Kg. Cesarean section was seen in 20% of patients.

Conclusion: Therefore, induction of labor in the presence of an immature cervix is linked to failure to progress labor, induction failure, and cesarean section risk.

Keywords: Pregnancy; Labor induction; Prostein-E2; Cesarean section

Introduction

Labor is frequently induced to lower the risk of maternal or newborn illness and mortality.¹ About one in four or five women in the USA and Europe are induced because of prelabour rupture of the membranes, protracted pregnancy, and worries about the mother's or child's health (e.g., poor growth, cholestasis, preeclampsia, etc.).² Since the 1960s, prostaglandins have been used extensively in clinical practice to induce labor; however, there have been reports of adverse effects, such as fever, uterine

hyperstimulation, and gastrointestinal symptoms (diarrhea, vomiting, and nausea).³ Numerous prostaglandin preparations have been administered orally, intramuscularly, intravenously, and locally (intravaginal and intracervical). Prostaglandin E2 (PGE2) can be administered locally using a gel that contains 0.5 mg for intracervical use and 1 or 2 mg for intravaginal use. However, sustained-release pessary and a variety of different doses are also being employed at the moment.^{2,3}

There are versions of the gel that contain 1 mg and 2 mg. There is just a 3-mg variant of the tablets available.⁴ The current evidence suggests that the gel and pessary formulations appear to be equally effective, despite the gel formulation's intended more reliable and rapid absorption. With no discernible differences in the rates of cesarean section, oxytocin use, uterine hyperstimulation, or Within 24 hours, a vaginal birth was not accomplished. Given similar efficacy, vaginal tablets should be chosen over vaginal gel, according to the 2001 guidelines for induction of labor released by the Royal College of Obstetricians and Gynecologists (RCOG). This is because the tablets were less expensive and so more likely to be cost-effective.⁵ According to research by Taher S. et al., individuals who were induced with tablet Prostein-E2 at term had a 33.7% cesarean section frequency.⁶ According to another study by Mane JD, et al., the frequency of cesarean section was 17.5% in patients induced with the tablet Prostein.

Methodology

Between September 1, 2019, and February 1, 2020, the Department of Obstetrics and Gynecology at Ayub Teaching Hospital in Abbottabad conducted a descriptive case series to ascertain the prevalence of cesarean sections among patients induced with the tablet Prostein-E2 at term with the approval of Ethical Review Board CPSP/REU/OBG-2017-010-8345. Sequential non-probability sampling was adopted to collect the samples. 155 sample size was calculated with the WHO software with the following assumption: Confidence interval: 95% and an anticipated population of C.S after induction: 17.5% with absolute precision: 6%.⁷

According to the inclusion criteria, women between the ages of 18 and 40, singleton pregnancies on ultrasound with gestational ages of 37 and 39 weeks on LMP and parity scores 0-4, and any women undergoing induction of labor were included in the current study. Women with a previous history of cesarean pregnancy, glaucoma, bronchial asthma, unexplained vaginal bleeding on physical examination, or Malpresentation on ultrasound were excluded from the study.

After receiving approval from the research department and ethics committee, patients from the indoor Obstetrics and Gynecology Department who met the inclusion criteria were added to the study. Patients were asked to provide

their name, age, parity, gestational age, and weight on a weighing machine. Each patient gave their informed agreement, guaranteeing anonymity and the absence of any risks associated with participating in this study.

A fetal cardiogram was conducted for 20 minutes before administering the study medication. The study coordinator, an obstetrician who will otherwise be independent of any further management, conducted a vaginal examination, took the initial Bishop score, and inserted tablets into the posterior vaginal fornix, as long as the fetal heart rate pattern was within normal bounds. After that, the fetal cardiogram was carried out for a further sixty minutes. Dinoprostone tablets were given to each patient; three milligrams were injected into the posterior vaginal fornix.

A third 3-mg tablet was administered when the cervix was favorable (Bishop score $\pm$ 8) after two more vaginal exams that were separated by six hours. When the cervix was good (Bishop score $\pm$ 8), the patient was sent to the delivery suite for amniotomy. After finishing the entire course of treatment, women having a Bishop's score below six, suboptimal fetal heart rate tracings on ultrasound, prolonged rupture of membranes (A speculum examination reveals liquor pooling in the upper vagina or trickling through the cervical on which will further increase by coughing or straining (Valsalva maneuver) for > 24 hours), were taken up for cesarean section. Data regarding cesarean section was noted by the researcher herself on specially designed proforma.

A statistical analysis application (IBM-SPSS version 22) was used to examine the data. We calculated percentages and frequencies for categorical data, such as cesarean sections. Quantitative characteristics such as weight, parity, number of dosages, age, and gestational age were described using mean $\pm$ SD. Stratification was used to adjust for effect modifiers like as weight, number of dosages, parity, age, and gestational age. A p-value of less than 0.05 was considered statistically significant when employing the post-stratification chi-square test.

Results

The mean age of the study participants was 27.903 ± 2.61 years, with a range of 18 to 40 years. Average gestational age of 38.071 ± 0.73 weeks, a mean number of doses of 1.335 ± 0.47 , a mean parity of $1.419 \pm$

1.16, and a mean weight was 65.664 ± 4.77 Kg as shown in Table 1. According to Table, 20% of patients had a cesarean section II. Stratification of the cesarean section concerning age, gestational age, parity, number of doses, and weight are shown in Tables 2 and 3.

Table 1: patients based on height, weight, BMI, age, and gestational age (n=155)

Statistics	Mean $\pm$ SD
Age(years)	27.903 $\pm$ 2.61
Age at Pregnancy (weeks)	38.071 $\pm$ 0.73
Number of doses	1.335 $\pm$ 0.47
Parity	1.419 $\pm$ 1.16
Weight (Kg)	65.664 $\pm$ 4.77

Table 2: Patients' frequency and percentage by cesarean section (n=155)

Cesarean Section	Incidence	Percentage
Yes	31	20%
No	124	80%
Total	155	100%

Table 3: Stratification of Caesarean Section to age, gestational age, parity, number of dosages, and weight

Stratification of Caesarean Section		Yes	No	P-value
Age (years)	18-30	27 (21.6%)	98 (78.4%)	0.309
	31-40	4 (13.3%)	26 (86.7%)	
	Total	31 (20%)	124 (80%)	
Gestational Age (weeks)	37-38	22 (20.4%)	86 (79.6%)	0.861
	38	9 (19.1%)	38 (80.9%)	
	Total	31 (20%)	124 (80%)	
Parity	0-2	30 (24.2%)	94 (75.8%)	0.009
	3-4	1 (3.2%)	30 (96.8%)	
	Total	31 (20%)	124 (80%)	
Number of doses	1	4 (3.9%)	99 (96.1%)	0.000
	2	27 (51.9%)	25 (48.1%)	
	Total	31 (20%)	124 (80%)	
Weight (Kg)	≤ 65	30 (23.3%)	99 (76.7%)	0.024
	> 65	1 (3.8%)	25 (96.2%)	
	Total	31 (20%)	124 (80%)	

Discussion

Given that 20–30% of pregnancies are induced, inducing labor is a common medical procedure. Nowadays, ripening an unfavorable cervix is a crucial step in the labor induction procedure. Induction of labor is still a major clinical challenge. There are several different options for cervical ripening and induction.⁸ Every induction technique has benefits and drawbacks. To determine the chance that women with a negative Bishop score will have a cesarean delivery after being induced at term, the current study was carried out on 155 patients at the Department of Obstetrics and Gynecology, Ayub Teaching Hospital, Abbottabad.⁹

Because the tablet Prostein-E2 is non-invasive, efficacious, and patient-acceptable, it was chosen as an inducing agent. Additionally, it shortens the time that oxytocin accelerates. According to Kenedy, Ulmsten, and Mackenzie, the patients were at term.¹⁰ The patient's early pelvic examination, abdominal examination, and ultrasonographic examination all verified the anticipated delivery date. Due to the rising number of institutional births encouraged by the Pakistani government, 85.5% of patients in the current research were booked and 14.5% were not.¹¹ The highest number of patients were between the ages of 18 and 30, with a mean age of 27.903 ± 2.61 years. In Wilson, Ulmsten, and Neilson's research, the average age was 23.3 years, 25 years, and 24 years, respectively.¹²

According to the current study, 20% of deliveries were cesarean sections, whereas 80% were vaginal deliveries. According to research by Taher S. et al., patients who were induced with tablet Prostein-E2 at term had a 33.7% cesarean section rate.¹³ According to a different study by Mane JD et al., 17.5% of patients who were induced with tablet Prostein-E2 at term had a cesarean section.¹⁴ The cesarean rate in the prior study varied between 23.3% to 33.8%.¹⁵ This range also includes the current cesarean rate.

In the current study, the average induction to delivery period was 13.38 ± 7.91 hours. A recent study found that the mean induction to the delivery interval fell within this range.¹⁶ Fetal distress (31.48%) was the second most common reason for cesarean delivery, behind inadequate progress (48.14%). There have also been reports of similar indications.¹⁷ Postpartum hemorrhage (1.5%), cervical tear (1.5%), uterine hyperstimulation (1.0%), and wound

resuturing (0.5%) were among the maternal problems seen in this study. Just nine (4.5%) of the 200 patients experienced this problem. Women from various political parties participated in this survey. Women who were multiparous made up 71% of them. This study's findings are similar to those of earlier research.^{18,19}

A dosage regimen of 1.5 mg was employed in the trial on large multiparous women with unripe cervixes. In contrast to our study, 24.8% of their patients underwent amniotomy and syntocinon stimulation to enhance labor. Ninety percent of their patients were given 1.5 mg PGE2 vaginal pills no more than three times. They had one case of uterine rupture and an 88.1% success rate. The success rate in this trial was comparable to that of a study conducted on high-parity women in the same region that used a low dose of 1.5 mg prostaglandin E2 tablets with a gradual increase in the dose.²⁰ For 17.5% of their patients, they employed syntocinon augmentation. 71% of their patients, however, only needed modest prostaglandin dosages of 1.5 – 4.5 mg. Their study found no evidence of uterine rupture or hyperstimulation. The patients in our trial received a lower total dosage of prostaglandins and no syntocinon augmentation.²¹

Conclusion

The purpose of the current study was to determine the risk of cesarean birth following induction at term and to assess the impact of Tablet Prostein-E2 on the delivery route. Therefore, induction of labor in the presence of an immature cervix is linked to failure to progress labor, induction failure, and cesarean section risk. Successful induction of labor shows a statistically significant positive correlation with the bishop score, indicating that the bishop score is a solid predictor of successful induction of labor.

References

- Kreft M, Krähenmann F, Roos M, Kurmanavicius J, Zimmermann R, Ochsenbein-Kölble N. Maternal and neonatal outcome of labour induction at term comparing two regimens of misoprostol. *J Perinat Med*. 2014; 42(5):603-9. DOI: <https://doi.org/10.1515/jpm-2013-0215>.
- Ibishi VA, Isjanovska RD. Prelabour rupture of membranes: mode of delivery and outcome. *Open Access Maced J Med Sci*. 2015; 3(2):237-40. DOI: <https://doi.org/10.3889/oamjms.2015.037>.
- Thomas J, Fairclough A, Kavanagh J, Kelly AJ. Vaginal prostaglandin (PGE2 and PGF2a) for induction of labour at term. *Cochrane Database Syst Rev*. 2014; (6):CD003101 DOI: <https://doi.org/10.1002/14651858.CD003101.pub3>.
- Dülger Ö, Sik BA, Aba YA. A comparative randomized study on the effect of vaginally administered glyceryl trinitrate placebo on cervical ripening prior to induction of labor in overdue pregnancies. *Indian J Pharmacol*. 2018; 50:260-5. DOI: https://doi.org/10.4103/ijp.IJP_182_18.
- Knight HE, Cromwell DA, Gurol-Urganci I, Harron K, van der Meulen JH, Smith GCS. Perinatal mortality associated with induction of labour versus expectant management in nulliparous women aged 35 years or over: an English national cohort study. *PLoS Med*. 2017; 14(11):e1002425. DOI: <https://doi.org/10.1371/journal.pmed.1002425>.
- American College of Obstetricians and Gynecologists' Committee on Practice Bulletins-Obstetrics. ACOG Practice Bulletin No. 205: Vaginal Birth After Cesarean Delivery. *Obstet Gynecol*. 2019 Feb; 133(2):e110e127. DOI: <https://doi.org/10.1097/AOG.0000000000003078>.
- Clapp MA, Barth WH. The Future of Cesarean Delivery Rates in the United States. *Clin Obstet Gynecol*. 2017; 60(4):829-839. DOI: <https://doi.org/10.1097/GRF.0000000000000325>.
- Kasagi Y, Okutani R, Oda Y. Specialized operating room for cesarean section in the perinatal care unit: a review of the opening process and operating room management. *J Anesth*. 2015; 29(1):149-51. DOI: <https://doi.org/10.1007/s00540-014-1861-3>.
- Wilson RD, Caughey AB, Wood SL, Macones GA, Wrench IJ, Huang J, et al. Guidelines for Antenatal and Preoperative care in Cesarean Delivery: Enhanced Recovery After Surgery Society Recommendations (Part 1). *Am J Obstet Gynecol*. 2018; 219(6):523.e1-523.e15. DOI: <https://doi.org/10.1016/j.ajog.2018.09.015>.
- Committee on Practice Bulletins-Obstetrics. ACOG Practice Bulletin No. 199: Use of Prophylactic Antibiotics in Labor and Delivery. *Obstet Gynecol*. 2018; 132(3):e103-e119. DOI: <https://doi.org/10.1097/AOG.0000000000002833>.
- Smid MC, Dotters-Katz SK, Silver RM, Kuller JA. Body Mass Index 50 kg/m2 and Beyond: Perioperative Care of Pregnant Women With Superobesity Undergoing Cesarean Delivery. *Obstet Gynecol Surv*. 2017; 72(8):500-510. DOI: <https://doi.org/10.1097/OGX.0000000000000469>.
- Tita ATN, Boggess K, Saade G. Adjunctive Azithromycin Prophylaxis for Cesarean Delivery. *N Engl J Med*. 2017; 376(2):182. DOI: <https://doi.org/10.1056/NEJMc1614626>.
- Haas DM, Morgan S, Contreras K, Enders S. Vaginal preparation with antiseptic solution before cesarean section for preventing postoperative infections. *Cochrane Database Syst Rev*. 2018; 7:CD007892. DOI: <https://doi.org/10.1002/14651858.CD007892.pub6>.
- Walton RB, Shnaekel KL, Ounpraseuth ST, Napolitano PG, Magann EF. High transverse skin incisions may reduce wound complications in obese women having cesarean sections: a pilot study. *J Matern Fetal Neonatal Med*. 2019; 32(5):781-785. DOI: <https://doi.org/10.1080/14767058.2017.1391780>.
- Fogarty M, Osborn DA, Askie L, Seidler AL, Hunter K, Lui K, et al. Delayed vs early umbilical cord clamping for preterm infants: a systematic review and meta-analysis. *Am J Obstet Gynecol*. 2018; 218(1):1-18. DOI: <https://doi.org/10.1016/j.ajog.2017.10.231>.
- Cavallin F, Galeazzo B, Loretelli V, Madella S, Pizzolato M, Visentin S, et al. Delayed Cord Clamping versus Early Cord Clamping in Elective Cesarean Section: A Randomized Controlled Trial. *Neonatology*. 2019; 116(3):252-259. DOI: <https://doi.org/10.1159/000500325>.

17. Stegwee SI, Jordans I, van der Voet LF, van de Ven PM, Ket J, Lambalk CB, et al. Uterine cesarean closure techniques affect ultrasound findings and maternal outcomes: a systematic review and meta-analysis. *BJOG*. 2018; 125(9):1097-1108
DOI: <https://doi.org/10.1111/1471-0528.15048>.
18. Roberge S, Demers S, Girard M, Vikhareva O, Markey S, Chaillet N, et al. Closure methods for laparotomy incisions for preventing incisional hernias and other wound complications. *Cochrane Database Syst Rev*. 2017; 11:CD005661.
DOI: <https://doi.org/10.1002/14651858.CD005661.pub2>.
19. Indraccolo U, Pace M, Corona G, Bonito M, Indraccolo SR, Di Iorio R. Cesarean section in the absence of labor and risk of respiratory complications in newborns: a case-control study. *J Matern Fetal Neonatal Med*. 2019; 32(7):1160-1166.
DOI: <https://doi.org/10.1080/14767058.2017.1401999>.
20. Gross B, Rusin L, Kiesewetter J, Zottmann JM, Fischer MR, et al. Crew resource management training in healthcare: a systematic review of intervention design, training conditions and evaluation. *BMJ Open*. 2019; 9(2):e025247.
DOI: <https://doi.org/10.1136/bmjopen-2018-025247>.
21. Greer JA, Haischer-Rollo G, Delorey D, Kiser R, Sayles T, Bailey J, et al. In-situ Interprofessional Perinatal Drills: The Impact of a Structured Debrief on Maximizing Training While Sensing Patient Safety Threats. *Cureus*. 2019; 11(2):e4096.
DOI: <https://doi.org/10.7759/cureus.4096>.