Induction of labor with vaginal prostaglandin-E₂ in grand multiparous women

T.Y. Yamani, A.A. Rouzi*

Department of Obstetrics and Gynaecology, King Abdulaziz University Hospital, Jeddah, Saudi Arabia

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Abstract

Objective: To evaluate our experience of induction of labor with vaginal prostaglandin-E₂ in grand multiparous women. Methods: The outcomes of induction of labor with vaginal prostaglandin-E₂ of 101 grand multiparous women were compared with the outcomes of spontaneous labor of 202 grand multiparous women. Results: There were no statistical significant differences in the duration of labor, fetal birth weight, use of oxytocin augmentation, and Apgar scores in the two groups. Nine women (9.0%) in the induction group delivered by cesarean section compared to six woman (3.0%) in the control group. This was a statistically significant difference ($P = 0.02$). In the induction group, the mean duration of the hospital stay was longer ($P = 0.003$) and there was one neonatal fetal death and one ruptured uterus. Conclusion: Induction of labor with vaginal prostaglandin-E₂ in grand multiparous women is relatively safe. Further studies are needed to confirm our finding. © 1998 International Federation of Gynecology and Obstetrics

Keywords: Induction; Prostaglandin-E₂; Grand multipara

1. Introduction

Induction of labor for obstetric or medical reasons is an accepted obstetric practice. However, induction of labor in grand multiparous women (para 6 or more) is controversial. Some considered grand multiparity as a contraindication for labor induction because of increased risk of uterine rupture and amniotic fluid embolism associated with strong contractions in such women [1]. Others characterized induction of labor in grand multiparous women as a situation requiring ‘special attention’ but not a contraindication [2]. The reason for this controversy is the lack of information regarding induction of labor in grand multiparous women.

Vaginal prostaglandin-E₂ is usually used for
induction of labor when the cervix is unripe in primiparous and multiparous women. The safety of the use of vaginal prostaglandin-E\(_2\) in grand multiparous women has not been determined. We, therefore, undertook this study to evaluate our experience of induction of labor with vaginal prostaglandin-E\(_2\) in grand multiparous women.

2. Materials and methods

The labor ward records of King Abdulaziz University Hospital, Jeddah, Saudi Arabia between 1 January 1991 and 31 July 1997, were manually examined to identify grand multiparous women who were induced with vaginal prostaglandin-E\(_2\) and grand multiparous women who entered labor spontaneously.

Inclusion criteria for the study were: (1) grand multiparous women at completed 37-week gestation or more; (2) cephalic presentation; (3) unripe cervix (Bishop score of \(\leq 4\)) at the time of induction; (4) medical or obstetrical indication for induction of labor; and (5) no previous uterine scar.

The induction of labor was done with a vaginal prostaglandin-E\(_2\) tablet. Electronic fetal heart monitoring was carried out for 30 min and if the tracing was reassuring; half a tablet (1.5 mg of Dinoprostone, Upjohn, London, United Kingdom) was inserted in the posterior vaginal fornix during vaginal examination. The woman was instructed to lie in bed for 1 h with electronic fetal heart monitoring. Six hours later, vaginal examination was repeated. If the woman was not in labor, the cervix was still unripe, and the fetal heart monitoring was reassuring; another 1.5 mg prostaglandin-E\(_2\) was inserted in the posterior fornix. If the woman was still not in labor, but, the cervix was favorable; artificial rupture of the membranes was performed. Within 2 h if labor did not start, oxytocin infusion was started according to the institutional protocol which prescribes an initial infusion rate of 1 mU/min and is increased every 30 min (if needed) by 1 mU/min until 16 mU/min. The same protocol was used to augment labor when necessary. Intrapartum continuous fetal heart monitoring was carried out for almost all women. Unfortunately, epidural anesthesia is not available in our hospital. Pain relief in labor was provided by intramuscular administration of pethidine and phenergan.

For each induced grand multiparous women, two grand multiparous women who entered labor spontaneously and delivered on the same day or the following days were chosen as control subjects. The outcomes of labor of the two groups were compared.

Statistical analysis was performed using SPSS-PC for windows, version 6.1. Student \(t\)-test and \(\chi^2\) were used as appropriate.

3. Results

During the period of the study, 16,498 women delivered at our obstetrics unit, 2,344 (14.21%) of whom were grand multiparous. Of these, 138 (6.0%) grand multiparous women were induced with vaginal prostaglandin-E\(_2\). The inclusion criteria for the study was fulfilled by 101 women. Thirty-seven grand multiparous women were excluded for the following reasons: one previous

<table>
<thead>
<tr>
<th>Variable</th>
<th>Induction ((N = 101))</th>
<th>Spontaneous ((N = 202))</th>
<th>(P)-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>34.3 ± 4.4</td>
<td>33.3 ± 4.4</td>
<td>NS</td>
</tr>
<tr>
<td>Gravidity</td>
<td>8.9 ± 1.9</td>
<td>9.0 ± 1.9</td>
<td>NS</td>
</tr>
<tr>
<td>Parity</td>
<td>7.3 ± 1.7</td>
<td>7.3 ± 1.5</td>
<td>NS</td>
</tr>
<tr>
<td>Gestational age</td>
<td>39.1 ± 2.1</td>
<td>39.3 ± 1.5</td>
<td>NS</td>
</tr>
<tr>
<td>Maternal weight</td>
<td>82.5 ± 16.5</td>
<td>69.6 ± 16.9</td>
<td>0.0001</td>
</tr>
<tr>
<td>Maternal height</td>
<td>156.0 ± 5.2</td>
<td>153.3 ± 5.8</td>
<td>NS</td>
</tr>
</tbody>
</table>

Notes. Data are presented as mean ± S.D.; NS, not significant.
Table 2
Outcome of induction and spontaneous labor in grand multiparous

<table>
<thead>
<tr>
<th>Variable</th>
<th>Induction (N = 101)</th>
<th>Spontaneous (N = 202)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaginal delivery</td>
<td>89 (88.1%)</td>
<td>195 (96.5%)</td>
<td>0.02</td>
</tr>
<tr>
<td>Vaccum delivery</td>
<td>3 (3%)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Forceps</td>
<td>-</td>
<td>1 (0.5%)</td>
<td></td>
</tr>
<tr>
<td>Cesarean section</td>
<td>9 (8.9%)</td>
<td>6 (3%)</td>
<td>0.02</td>
</tr>
<tr>
<td>Duration of labor</td>
<td>5.24 ± 3.4</td>
<td>5.70 ± 3.2</td>
<td>NS</td>
</tr>
<tr>
<td>Birth weight</td>
<td>3459.30 ± 606</td>
<td>3304.90 ± 547</td>
<td>NS</td>
</tr>
<tr>
<td>Apgar scores &lt; 7 at 1 min</td>
<td>4 (4.0%)</td>
<td>5 (2.5%)</td>
<td>NS</td>
</tr>
<tr>
<td>Apgar scores &lt; 7 at 5 min</td>
<td>1 (1.0%)</td>
<td>1 (0.5%)</td>
<td>NS</td>
</tr>
<tr>
<td>Fetal death</td>
<td>1 (1%)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Rupture uterus</td>
<td>1 (1%)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Hospital stay</td>
<td>1.8 ± 1.8</td>
<td>1.2 ± 1.0</td>
<td>0.003</td>
</tr>
</tbody>
</table>

Notes. Data are presented as mean ± S.D. or (percentage); NS, not significant.

cesarean section (26 women); breech presentation (six women); and missing files (five women).

There were no significant differences in maternal characteristics between the grand multiparous women who had been induced and those who entered labor spontaneously except for maternal weight Table 1. There were no statistical significant differences in the duration of labor, fetal birth weight, and Apgar scores in the two groups. Nine women (9.0%) in the induction group delivered by cesarean section compared to six woman (3.0%) in the control group. This was statistically significant difference ($P = 0.02$). In the induction group, the mean duration of the hospital stay was longer ($P = 0.003$) and there was one neonatal fetal death and one ruptured uterus Table 2.

Fifty-five grand multiparous women (52.5%) received 1.5 mg prostaglandin-E$_2$, 27 (25%) received 3 mg, 11 (12.5%) received 4.5 mg, five (6.3%) received 6 mg, and three (3.8%) received 7.5 mg. Twenty-five women (24.8%) in the induction group and 32 women (15.8%) in the control group received oxytocin to augment labor. This was not statistically significant. The indications of the induction of labor are listed in Table 3.

4. Discussion

Grand multiparity used to be associated with high maternal and perinatal mortality and morbidity. As early as 1934, grand multiparous women were characterized as ‘the dangerous multipara’ [3]. Subsequent reports described a high incidence of peripartum complications [4–8]. However, recent studies failed to establish a cause and effect relationship [9–12]. Furthermore, these studies showed that; with proper antenatal care, modern obstetrics, and advanced neonatal service there is no difference in outcome between grand multiparous women and women of low parity.

Induction of labor with vaginal prostaglandin-E$_2$ is effective and safe in nulliparous and multiparous women [13]. However, induction of labor in grand multiparous women with vaginal prostaglandin-E$_2$ is controversial. Abo El-Leil et al. [14] based upon the outcome of induction of labor with vaginal prostaglandin-E$_2$ in 54 grand multiparous women concluded that vaginal
prostaglandin-E₂ proved to be safe and effective. There is no other studies to determine the safety of vaginal prostaglandin-E₂ in grand multiparous women.

In our society, for religious and social reasons, large families are favored. Elective cesarean section is considered as a limiting factor. Therefore induction of labor in grand multiparous women for obstetrical or medical indications in our hospital is practiced. We use vaginal prostaglandin-E₂ as the method of induction in women with an unripe cervix. Our aim was to evaluate our experience of induction of labor with vaginal prostaglandin-E₂ in grand multiparous women.

Abu El-Lail et al. [14] compared the outcomes of induction of labor in grand multiparous women with induction of labor in nulliparous and multiparous (parity 1–5) women. We, on the other hand, compared the outcomes of induction of labor in grand multiparous women with the outcomes of spontaneous labor of grand multiparous women. There were no statistical significant differences in the duration of labor, fetal birth weight, and Apgar scores in the two groups.

The finding of a statistically significant difference \((P = 0.02)\) in the cesarean section rate is hampered by the small number of women who delivered by cesarean section. There was one neonatal fetal death, and one rupture uterus in the induction group.

Review of the records of the women who had rupture uterus and neonatal fetal death revealed that she received two doses of 1.5 mg of vaginal prostaglandin-E₂ to induce labor for postterm pregnancy. No oxytocin was used. She progressed rapidly from a 3-cm dilated cervix to a fully dilated cervix in 2 h and suddenly the fetal heart rate went into prolonged deceleration for which emergency cesarean section was performed. At the cesarean section there was a left lateral uterine tear which was repaired intra-operatively. The baby was male and born alive but very severely asphyxiated and died after a few hours. The weight was 4830 g.

The occurrence of even a single case of a ruptured uterus in the grand multiparous women induced with vaginal prostaglandin-E₂ is alarming. This is because of the inherent risks of a ruptured uterus on the mother and the baby.

The alternative method to avoid induction of labor is elective cesarean section. However, this approach is not without risks. These include: aspiration pneumonia (especially with general anesthesia); infection with sepsis; hemorrhage; injury to adjacent structures; thrombo-embolism; and even maternal mortality. Liford et al. [15] reported a relative risk of seven for maternal mortality with cesarean section compared with vaginal delivery.

The ideal method to compare induction of labor with vaginal prostaglandin-E₂ in grand multiparous women with elective cesarean section should be by a randomized clinical trial. Although scientifically sound; it may not be accepted by our pregnant women. In light of absence of such a trial, part of counseling the grand multiparous women who needs to be delivered should include the risks and benefits of induction of labor and elective cesarean section to help her make an informed decision.

In conclusion, induction of labor with vaginal prostaglandin-E₂ in grand multiparous women is relatively safe. Further studies are needed to confirm our finding.

References