

Induction of Labour by Extra-Amniotic Saline infusion in Women having Previous One Caesarean Section

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Abstract

Background: To determine the efficacy of labor induction by extra-amniotic saline infusion in women having previous one lower segment cesarean section.

Method: All women, fulfilling inclusion criteria, were selected for study. In lithotomy position, Foley's catheter no.16 was passed in the cervical canal extra amniotically and 30 ml sterile water was injected to inflate the balloon. Then 0.9 % normal saline at 40 ml/hour injected into the extra-amniotic space.

Results: The successful cervical ripening was 74.8% (49/66). The number of women delivered vaginally within 24 hours of insertion of Foley's catheter was 56.1% (37/66). The rate of uterine rupture was 1.5% (1/66). Thus extra-amniotic saline infusion through trans-cervical was an effective method for induction of labour in women having previous one lower segment cesarean section was 56.1% (37/66).

Conclusion: Extra-amniotic saline infusion is an effective method for labor induction in women having previous one lower segment cesarean section.

Keywords: Induction, Labour, Saesarean Section, Extra-Amniotic, Saline Infusion, Bishop Score.

Introduction

Induction of labour is a common obstetric procedure. Most recently the rate of labour induction has risen; it varies from 9.5% to 33.7% of all pregnancies annually.¹ Labour is induced when vaginal delivery can bring benefits to the health of foetus, mother or both. The success rate and safety of labour induction depends on

the state of cervix when labour is initiated.^{2,3} Women with unfavourable cervix are at increased risk for prolonged labour and febrile morbidity while the risk of caesarean delivery is 25-0% higher. Bishop score is assessed by cervical condition including cervical dilatation, effacement, position and consistency. It is assessed that a Bishop score ~6 and

higher indicates the possibility of positive induction of labour while a 5 or less of Bishop score is considered as unfavourable labour induction. Although this Bishop score was supposed to be the first according to its application to multiparous women, it is also a primary indicator for the successful induction for a nulliparous woman,⁴ and determine the most appropriate method to use for labour induction.⁵

Numerous methods have been developed and become popular for induction of labour. These include pharmacological agents like prostaglandins, oxytocin, misoprostol, mifepristone, relaxin and non-pharmacological approaches. Non-pharmacological methods include hygroscopic dilators, laminaria tents, and balloon devices. Foley's catheter alone or in combination with pharmacological agents is in current practice.⁶

Vaginal birth after caesarean has been actively promoted to reduce the rising caesarean delivery rate. The induction of labour of women with an unfavorable cervix, who have had a previous caesarean section is challenging.⁷ Recent studies have suggested that the use of prostaglandins for induction of labour in women having previous caesarean section could be associated with an increased risk of uterine rupture.⁸ Alternatively, mechanical methods of induction for labour have been reported, such as the use of laminaria intra-cervically, or single balloon catheter.⁹⁻¹⁰ Trans-cervical extra-amniotic Foleys catheter is a method of choice for induction of labour in women having previous one caesarean section,¹¹ as it has many advantages e.g. simplicity of use, low cost and lack of adverse systemic effects like fever, vomiting and gastrointestinal disturbance over pharmacological methods and risk of uterine rupture as close to spontaneous onset of labour.¹²⁻¹³

The aim of this study was to determine the efficacy of cervical ripening and improvement of Bishop score and analyze the threats of uterine rupture due to mechanical methods of ripening of cervical i.e., extra-amniotic saline infusion through the trans-cervical Foley catheter in women having previous one lower segment caesarean section.

Materials and Methods

This study was conducted at HBS-Medical and Dental College, Lahtrar road, near Taramri Chowk, Islamabad. All the women admitted for delivery through outdoor department having previous one lower segment caesarean section for non-recurrent cause (e. g, breech presentation, foetal distress) and

having at least previous one successful vaginal delivery, with singleton live pregnancy, gestational amenorrhea 40-41 weeks,¹⁴⁻¹⁵ vertex presentation, having bishop score ≤ 6 and reassuring foetal heart rate trace (diagnosed on the basis of history, examination will be included).¹⁶

Women having medical problems (like diabetes mellitus, hypertension etc.) congenitally anomalous foetus, placenta previa, abruption placenta and ruptured membranes (diagnosed on the basis of history, examination, ultra-sonography) were excluded.

After taking ethical committee approval and explaining the procedure, informed consent was taken.¹⁷ All women, fulfilling the above-mentioned inclusion criteria were selected for study. Exclusion criteria strictly followed to control the confounding variables. All the risk (uterine rupture) and benefits (low cost, decreased need for caesarean delivery) were explained to all patients. All the procedures were carried out by a resident doctor in the consultation with the attending obstetrician.

In lithotomy position, cleaning of vulva and vagina with sterile water was carried out. With the help of Cusco's speculum, under direct vision, Foley's catheter no .16 was passed in the cervical canal extra-amniotically and tip was advanced up to 5 centimeters to ensure that balloon was in the uterine cavity. Then 30mL sterile water was injected to inflate the balloon. To keep it under strain, it was strapped on to the thigh with the tape. Then 0.9% normal saline at 40 ml/ hour was injected through catheter port into the extra-amniotic space. All women were monitored for maternal pulse, uterine contraction, fetal heart rate, and per vaginal bleeding half hourly. Bishop score was assessed either; at the time of spontaneous expulsion of catheter or after at least 3 regular uterine contractions (each lasting for 45sec) in 10 minutes' interval or when any sign of uterine rupture develops or after the period of 12 hour of insertion of catheter.

Bishop score of ≥ 8 was taken as cut off value for successful cervical ripening.¹⁸ Amniotomy was done at that time followed by augmentation with oxytocin infusion at rate of 1mIU/min and was increased at 20minutes interval by 1-2 mIU/min up to 32mIU/min if contractions are less than 3 per 10 minutes. Induction of labour was considered successful if vaginal delivery occurs within 24 hours from insertion of Foley's catheter without maternal complications. Variables of our study were:

1-Improvement of bishop score ≥ 8 .

- 2-Achievement of vaginal delivery within 24 hours of insertion of catheter.
- 3-Maternal complications i.e. uterine rupture.

A total of sixty-six (66) women from different age groups having previous history of transverse caesarean delivery and fulfilling the required criteria for inclusion were selected for this study. The number of women from 21-24 years was 19.7% (13), 25-28 year

Result

Table 1. Frequency And Percentages Of Cervical Ripening, Failed Induction, Vaginal Delivery, Caesarian Section And Uterine Rupture

| Age | Total | Successful Cervical Ripening | Failed Induction | Vaginal Delivery within 24 Hours | Caesarean Delivery | Uterine Rupture |
|-------|-----------|------------------------------|------------------|----------------------------------|--------------------|-----------------|
| 21-24 | 19.7%(13) | 53.8% (7/13) | 46.2% (6/13) | 53.8% (7/13) | 46.2% (6/13) | 0 |
| 25-28 | 45.5%(30) | 76.6% (23/30) | 23.3% (7/30) | 46.7% (14/30) | 53.7% (7/30) | 1 |
| 29-32 | 31.6%(21) | 81.0% (17/21) | 19.0% (4/21) | 66.7% (14/21) | 33.3% (7/21) | 0 |
| 33-36 | 3%(2) | 100% (2/2) | 0% (0/2) | 100%(2/2) | 0% (0/2) | 0 |
| Total | 66 | 74.2% (49/66) | 25.8% (17/66) | 56.1% (37/66) | 43.9% (29/66) | 1.5% (1/66) |

were 45.5% (30), 29-32 years were 31.8% (21), and 33-36 years were 3% (2).

The Bishop score was observed after 12 hours of insertion of catheter, or at the time of expulsion of catheter, or on the onset of effective uterine contraction. The induction was considered successful for Bishop score more than 8. We observed a satisfactory rate of successful cervical ripening (i.e., 74.8%). The results are presented in Table 1.

On the other hand, the rate of vaginal delivery was also not discouraging. Thirty-seven out of sixty-six (i.e., 56.1%) women delivered vaginally within 24 hours of insertion of Foley’s catheter while remaining 43.9% were delivered by caesarean section. The increased rate of caesarean delivery was mainly due to dystocia in the first stage of labour.

A very low rate of maternal complications in terms of uterine rupture in patients undergoing an induction of labour with extra-amniotic saline infusion through a trans-cervical Foley catheter was observed which was 1 out of 66 i.e., only 1.5%.

Table 2. Age Groups * Improvement of Bishop Score>8

| age groups | | improvement of bishop score>8 | | Total |
|------------|---------------------|-------------------------------|-------|--------|
| | | yes | no | |
| 21-24 | Count | 7 | 6 | 13 |
| | % within age groups | 53.8% | 46.2% | 100.0% |
| 25-28 | Count | 23 | 7 | 30 |
| | % within age groups | 76.7% | 23.3% | 100.0% |
| 29-32 | Count | 17 | 4 | 21 |
| | % within age groups | 81.0% | 19.0% | 100.0% |
| 33-36 | Count | 2 | | 2 |
| | % within age groups | 100.0% | | 100.0% |
| Total | Count | 49 | 17 | 66 |
| | % within age groups | 74.2% | 25.8% | 100.0% |

With different age groups, we noticed low rate of cervical ripening in younger women as shown in Table 2. The rate of failed induction decreases for women with more age, i.e., 46.2%, 23.7%, 19.0%, and 0% for age group 21-24 years, 25-28 years, 29-32 years, and 33-36 years, respectively. Though we can generalize this result due to difference in number of women for different age groups, this gives us a direction for success of insertion of catheter in women of different ages. The results of vaginal deliveries within 24 hours of insertion of catheter with respect to different age groups is given in Table 3.

A similar trend of successful vaginal delivery was observed as was for the cervical ripening. All the women with Bishop > 8 in the age groups 21-24 and 33-36 had successful vaginal delivery. However, the success rate decrease from 76.7% to 46.7% for age group 25-28 and decreases from 81.0% to 66.7% for age group 29-32. The single women who experienced uterine rupture was from the age group 25-28 years.

Table 3. Age groups * Achievement of Vaginal Delivery within 24 hours of Insertion of Foley's Catheter.

| age groups | | achievement of vaginal delivery within 24 hours of insertion of Foley's catheter | | Total |
|------------|---------------------|--|-------|--------|
| | | yes | no | |
| 21-24 | Count | 7 | 6 | 13 |
| | % within age groups | 53.8% | 46.2% | 100.0% |
| 25-28 | Count | 14 | 16 | 30 |
| | % within age groups | 46.7% | 53.3% | 100.0% |
| 29-32 | Count | 14 | 7 | 21 |
| | % within age groups | 66.7% | 33.3% | 100.0% |
| 33-36 | Count | 2 | | 2 |
| | % within age groups | 100.0% | | 100.0% |
| Total | Count | 37 | 29 | 66 |
| | % within age groups | 56.1% | 43.9% | 100.0% |

Discussion

In our study 66 women underwent a trial of labour after a previous caesarean delivery by extra-amniotic saline infusion through trans-cervical Foley catheter. When results were compared with Bujold¹⁹, no difference was found in the risk of uterine rupture. We did not observe any dissimilarity in reported rate of scar disruption at the time of caesarean delivery in the patients with failed labor trial.

The above mentioned results were found consistent to different studies with involvement of transcervical Foleys in patients having vaginal birth after caesarean delivery. Sharvit et al²⁰ conducted a study having 129 patients with only one rupture of uterine (0.8%) having a caesarean delivery in past who had transcervical Foleys catheter and in 274 patients, 2 uterine ruptures (0.7%) with induction of labour but cervical ripening is not required. Ben-Aroya et al²¹ stated a study with 161 patients with no uterine rupture, who had cervical ripening with transcervical Foleys catheter. Eventually, Meetei et al²² conducted a study with total 38 patients with caesarean delivery in past with cervical ripening having no uterine rupture by using a different mechanical procedure before labour a double-balloon device. It is proved by our study that twenty four thousand patients or more are required to clearly differentiate in uterine rupture rate between labour inductions through transcervical Foleys catheter as compare to with oxytocin.

In our study, we analyzed that patients who had previous caesarean delivery (78%), underwent a labour induction having previous cervical ripening using Foleys catheter were found less to maintain a vaginal birth. Ben-Aroya et al²³ studies a rate of after caesarean delivery of 51% out of 161 primiparous patients would achieve successful vaginal birth while 65% in control group of patients had a transcervical Foleys catheter with spontaneous labour. In this study, after adjusting for confounding results, it is assessed that for cervical ripening, the use of Foleys catheter was not proper parameter related to failed trial of labour. Alternatively, they observed a modified Bishop score of four or less was related to an increased failed trial of labour. These findings were found consistent with Miller and Grobman²⁴ who described that cervical effacement before labour induction was successfully related to vaginal birth after caesarean delivery. A key relation between the status of cervical at admission's time and successful vaginal delivery

with previous caesarean birth has also been demonstrated by Sharma²⁵.

On regard of our findings, we consider that induction of labour though the application of transcervical Foleys catheter is not related with higher rate of uterine rupture by comparing with spontaneous labour. Thus, a patient with an opposed cervix may not be exclusively deferred against labour trial though the chances of successful vaginal delivery are less.

Conclusion

Induction of labour for planned delivery has become an established part of modern obstetrics. It is concluded that good cervical preparation is achieved with extra-amniotic saline infusion by the mechanical effect of distended cervical balloon and by the release of endogenous release of prostaglandins. Labour induction using trans-cervical Foley catheter is not directly related to higher risk of uterine rupture as compared to spontaneous labour.

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