

The effectiveness of evening primrose oil gel capsule as a cervical ripening agent during labor induction as measured by bishop score on term singleton pregnant patients*

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ABSTRACT

Background: Pre-induction of labor cervical ripening increases success of labor induction when there is unfavorable cervix. Evening primrose oil soft gel capsule contains linoleic and gamma-linolenic acid, which are precursors of prostaglandins E1 and E2.

Objective: To measure the effectiveness of evening primrose oil capsule as a cervical ripening agent by measuring the Bishop score before and 4 hours after intravaginal insertion of six capsules.

Methods: A quasi-experimental cross-sectional study was conducted from the period of May to July 2016 involving labor induction patients with a Bishop score ≤ 4 , an intact amniotic sac and a Biophysical profile score of 10/10 or 8/8.

Results: Thirteen patients had an average age of 27 ± 6 years, and a mean age of gestation of 40 ± 1 weeks. Seven patients (54%) were nulliparous, 2 (15%) were primiparous and 4 (31%) were multiparous. Seven patients (54%) had hypertension, 1 (8%) had diabetes mellitus, 5 (38%) had post-term pregnancies. A paired t-test was done to check for statistically significant changes in the Bishop score. Change in the Bishop score from baseline to 4 hours after insertion of evening primrose oil capsules was statistically significant ($p=0.001$). Eleven patients (85%) had improvement in the Bishop score after 4 hours, 4 (31%) of which had a clinically significant change in the Bishop score (≥ 4). Specifically, there were statistically significant changes in the dilatation ($p=0.027$), effacement ($p=0.006$) and consistency ($p=0.002$). The mean birth weight of deliveries was 3192 ± 351 grams. Nine patients (69%) underwent primary low segment cesarean section, six (46%) of which for nonreassuring fetal status, 2 (15%) for arrest in cervical dilatation, and 1 (8%) for intraamniotic infection. Four patients (31%) successfully delivered vaginally.

Conclusion: Results showed a positive effect on the Bishop score during cervical ripening although further studies are needed to establish direct correlation.

Keywords: Bishop score, cervical ripening, evening primrose oil capsule, labor induction

INTRODUCTION

Labor induction is the stimulation of contractions before onset of labor. Its success depends primarily in the readiness of the cervix to dilate during uterine contractions.¹ Cervical ripening is the process that helps soften the cervix in preparation for labor. Preinduction cervical ripening may either be done using mechanical or pharmacological methods.

Prostaglandins are physiologically active lipid compounds with diverse hormone-like effects. They are derived enzymatically from fatty acids and are found in almost every tissue in the human body. Among its many function, prostaglandins play a key role in cervical ripening by acting as a pro-inflammatory agent that

recruits leukocytes and inflammatory cytokines such as interleukin-8. Specifically, prostaglandin E2 increases the concentration of glycosaminoglycans and the activity of elastin, which contributes to the extracellular remodeling of the cervix². Prostaglandin E2 (Dinoprostone) is currently the drug of choice in well-resourced countries. However, due to its cost and instability, there is a need for an alternative cervical ripening agent. To date, there is still no gold standard preinduction cervical ripening agent that has proven to improve outcomes during the latent phase.

Evening primrose oil is a natural product extracted from *Oenothera biennis* L. seeds. It is used as a dietary supplement because of its high content of polyunsaturated fatty acids, particularly linoleic and gamma-linolenic acid (18:3n-6). Its effects have been reported in rheumatic and arthritic conditions, atopic dermatitis, premenstrual and menopausal syndrome, and diabetic neuropathy³.

Studies on the use of evening primrose oil for cervical ripening has been controversial. Although it has already been proven safe and effective to use in cervical

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priming prior to hysteroscopy⁴, there are limited data in pregnant patients. The reason for this is that there have really been a few studies to support its use, primarily because of the fear of adverse effects to the fetus. One local study in pregnant patients using evening primrose oil for preinduction cervical ripening demonstrated significant effect in the Bishop score and cervical length by transvaginal ultrasound and no documented adverse effect monitored using the modified Biophysical profile⁵. Because of the scarcity of evidence, its use is still not recommended.

OBJECTIVES

The general objective of the study is to determine the effectiveness of evening primrose oil gel capsule as a cervical ripening during labor induction on term singleton pregnant patients. The specific objective is to determine the change in Bishop score after administration of evening primrose oil gel capsules.

MATERIALS AND METHODS

A quasi-experimental cross-sectional design from the period of May to July 2016 was done to assess the efficacy of evening primrose oil in the induction of labor. Women who presented to the outpatient clinics and emergency department in a tertiary hospital for induction of labor was included.

Criteria for inclusion:

- 1) age > 18 years old
- 2) accurate dating of gestation by last menstrual period or sonologic aging including crown rump length (CRL) measurements in the first trimester of pregnancy or two sonographic estimations of fetal age
- 3) singleton term pregnancy
- 4) cephalic presentation
- 5) unfavorable cervical status defined as a Bishop score (BS) of ≤ 4
- 6) intact amniotic membranes
- 7) Biophysical profile of 10/10 or 8/8
- 8) patients with stable maternal conditions, with any of the following conditions:
 - a. at least 37 weeks age of gestation; chronic hypertension with superimposed preeclampsia;
 - b. at least 38 weeks age of gestation; gestational or overt diabetes mellitus;
 - c. 41 weeks age of gestation for induction of labor with unfavorable cervix

Criteria for exclusion:

- 1) any contraindications to vaginal delivery:

- a. placenta previa
- b. previous uterine scar
- c. estimated fetal weight more than or equal to 4000 grams

Demographics were encoded and categorized using descriptive statistics. Bishop score before and 4 hours after intravaginal insertion of evening primrose oil capsules were determined by the same examiner. A paired t-test was done to determine statistical significance on the Bishop score and each of its component: dilatation, effacement, consistency, position and station.

RESULTS

There were 13 patients admitted for labor induction from May to July 2016. The mean age of patients was 27 ± 6 years, with mean age of gestation of 40 ± 1 weeks. Seven patients (54%) were nulliparous, 2 (15%) were primiparous and 4 (31%) were multiparous. Seven patients (46%) had hypertension, 1 (8%) had diabetes mellitus, 5 (38%) had post-term pregnancies (Table 1).

The change in the Bishop score from baseline to 4 hours after insertion of evening primrose oil capsules was statistically significant ($p=0.001$). Eleven patients (85%) had improvement in the Bishop score after 4 hours from insertion of evening primrose oil capsule. Among those with improvement, four patients (31%) had an improvement in Bishop score ≥ 4 . Analysis of the specific components of the Bishop score showed statistically significant change in the dilatation ($p=0.027$), effacement ($p=0.006$) and consistency ($p=0.002$), while no significant change was noted in the position ($p=0.08$) and station (0.17). Changes in the cervical status were further analyzed based on the clinical changes in terms of cervical dilatation and effacement. Eleven patients (85%) had significant improvement in both cervical dilatation and effacement ($p=0.0007$ for dilatation, and $p=0.0002$ for effacement) but of these, only 5 (38%) had pertinent increase to effect a change in the Bishop score in terms of dilatation and 5

Table 1. Baseline Characteristics of the Study Population (n=13).

Mean age	27±6 years
Mean age of gestation	40±1 weeks
Parity	Frequency
Nulliparous	7 (54%)
Primipara	2 (15%)
Multiparous	4 (31%)
Hypertension	7 (54%)
Diabetes mellitus	1 (8%)
Post term	5 (38%)

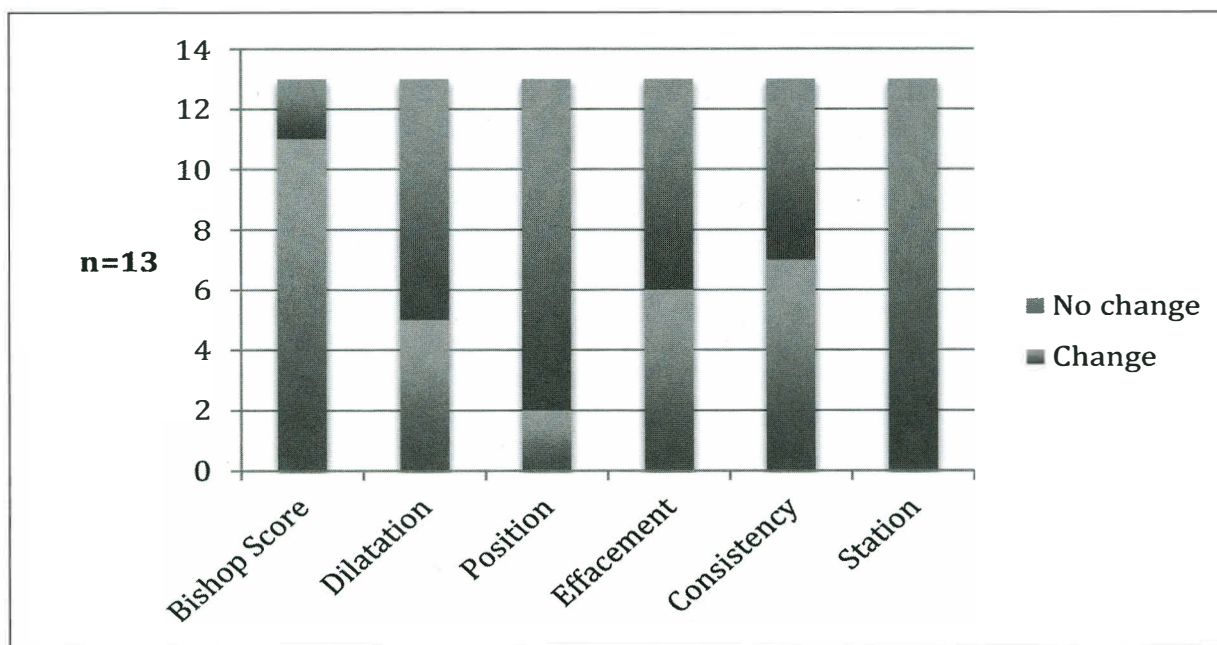


Figure 1. Changes in the Bishop Score.

Table 2. Secondary Outcomes.

Mode of delivery	Cesarean section	
	Nonreassuring fetal status	6 (46%)
	Arrest in cervical dilatation	2 (15%)
	Intraamniotic infection	1 (8%)
	Vaginal delivery	4 (31%)

(38%) in terms of effacement (Figure 1).

Nine patients (69%) underwent primary low segment cesarean section, six (46%) of which for nonreassuring fetal status, 2 (15%) for arrest in cervical dilatation, and 1 (8%) for intraamniotic infection. Four patients (31%) successfully delivered vaginally (Table 2). The mean birth weight of the babies was 3192 ± 351 grams.

DISCUSSION

The mean age of patients was 27 ± 6 years, with mean age of gestation of 40 ± 1 weeks. Seven (54%) patients were nulliparous, 5 (38%) of which delivered by cesarean section (2 for cephalopelvic disproportion, 2 for nonreassuring fetal status and 1 for intraamniotic infection). Seven patients (54%) had hypertension, 1 (8%) had diabetes mellitus, 5 (38%) had post-term pregnancies. The effectiveness of evening primrose oil capsule was measured using the Bishop score before and 4 hours after intravaginal insertion of six capsules. Eleven (85%) patients had a statistically significant increase in Bishop score, 4 (31%) patients of which had a clinically significant increase to a Bishop score of ≥ 4 . Further

analysis on the components of the Bishop score revealed statistically significant changes in the dilatation ($p=0.027$), effacement ($p=0.006$) and consistency ($p=0.002$). This may be explained by extracellular matrix remodeling during cervical ripening through the actions of prostaglandins^{1,2}. Evening primrose oil capsule contains precursors of prostaglandins E1 and E2, which may facilitate faster and more productions of the said prostaglandins. Both prostaglandins also have relaxation effects on smooth muscles that alter the cervical vascular tone^{2,6}, which could probably explain the significant change in consistency. Furthermore, prostaglandins act as uterotonins¹ thereby effecting cervical dilatation and effacement, which is more effective in a ripened cervix. Change in station and position were not significant in this study. Station is determined by the descent of the presenting part, which occurs later in the labor process. The posterior angle of the cervix, which is clinically determined by its position, may be the last to change after descent of the presenting part. Descent redirects the cervical angle towards the vaginal canal for delivery. This sequence of changes was also supported by other studies where Bishop score, cervical aperture, consistency and length had a positive predictive value in vaginal delivery^{7,8}. The significant change in cervical ripening as measured by the Bishop score can suggest but not conclude to be a direct effect of evening primrose oil capsule.

The study population was limited to term pregnancies with a medical complication, such as hypertension or diabetes mellitus, that warrants delivery or pregnancies reaching 41 weeks age of gestation with no complications. The biophysical profile of the fetus included was either an 8/8 or 10/10 to exclude pregnancies already with

fetal compromise. Although it is already proven that the use of Biophysical profile over intrapartum fetal heart rate monitoring does not reduce perinatal death or frequency of low Apgar scores, it is still prudent to assess the biophysical profile to document fetal acidemia or oligohydramnios, which significantly increases risk of an intrapartum fetal demise, especially if there is a planned intervention. A normal score may be predictive of the absence of fetal compromise at that time but not of the delivery outcome especially in high-risk pregnancies because deterioration in the maternal clinical status can also affect the fetal status⁹.

In this preliminary result, there seems to be a higher rate of cesarean section deliveries (69%), six (46%) of which for nonreassuring fetal status, 2 (15%) for arrest in cervical dilatation, and 1 (8%) for intraamniotic infection. However, no immediate correlation between those that delivered by cesarean section for nonreassuring fetal status and evening primrose oil capsule can be made because the interval from intervention to delivery ranges from 9 to 70 hours. Furthermore, patients included were at baseline, high-risk for cesarean section even prior to the intervention. In fact, patients who delivered for nonreassuring fetal status had an average age of gestation of 40.5 weeks and 2 had concomitant severe preeclampsia. The patient that developed intraamniotic infection was already 41 weeks, had amniotomy 36 hours prior to delivery at 3cm cervical dilatation for labor augmentation, from which the amniotic fluid was noted to be thickly meconium stained.

The preliminary results show promise regarding the use of evening primrose oil gel capsule for cervical ripening. It is however limited by the small number of participants

as well as the quasi-experimental design, which restricts the association not only of the adverse events/outcomes but also the favorable results. Continuation of the study is recommended to further strengthen the above findings.

CONCLUSION

There is a statistically and clinically significant change in the Bishop score before and 4 hours after insertion of six Evening primrose oil capsules. Particularly, there were statistically significant changes in dilatation, consistency and effacement.

LIMITATION

Since this is a preliminary study, the internal validity of evening primrose oil capsule was tested using a quasi-experimental cross-sectional study design. No comparison to current drugs in use was done. Time to active phase of labor or time to delivery was not included as outcomes. The sample size was also small, thus, may have a lower statistical power.

RECOMMENDATIONS

A case-control study is recommended to test the effects of evening primrose oil capsule compared to other pharmacologic agents in use. A larger sample size is also suggested to better see the true effect of evening primrose oil capsule. Other parameters should also be tested to determine the specific effects of evening primrose oil capsule in labor induction. ■

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