Combined Use of Vaginal Misoprostol with Intracervical Foley Catheter versus Vaginal Misoprostol alone in Induction of Labor at Term Pregnancy

Randomized Controlled Clinical Study

Thesis

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Huda Mohamed Elsayed Mohamed

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List of Abbreviations

Abb.	Full term

χ *.....: Chi square*
µg *.....: Microgram*
11 β -HSD1 *.....: 11 β-Hydroxy Steroid Type 1*
ACOG *.....: American College of Obstetricians and Gynecologists*
AJOG *.....: American Journal of Obstetrics and Gynecology*
AROM *.....: Artificial rupture of the membranes*
ATP *.....: Adenosine triphosphate*
BJOG *.....: British Journal of Obstetrics & Gynaecology*
C AMP *.....: Cyclic adenosine monophosphate*
C GMP *.....: Cyclic guanine monophosphate*
CBC *.....: Complete blood count*
CL *.....: Cervical length*
COX *.....: Cyclooxygenase enzyme*
CRH *.....: Corticotropin Releasing Hormone*
CTG *.....: Cardiotocography*
Cx43 *.....: Connexin 43*
DNA *.....: Deoxyribonucleic acid*
EFW *.....: Estimated fetal weight*
FC *.....: Foley's catheter*
FHR *.....: Fetal heart rate*
GR *.....: Glucocorticoid Receptor*
HETEs *.....: Hydroxy eicosatetraenoic acid*
HPA *.....: Hypothalamic Pituitary Axis*
HPETES *.....: Hydro peroxy eicosatetraenoic acid*
IMN *.....: Isosorbid Mononitrate*
INR *.....: International Normalized Ratio*
IOL *.....: Induction of labor*
LAPG *.....: Locally acting prostaglandins*
LMP *.....: Last menstrual period*

List of Abbreviations (Cont...)

Abb.	Full term

LT *.....: Leukotrienes*
mg *.....: Milligram*
mL *.....: Milliliter*
MLCK *.....: Myosin light chain kinase*
MMP *.....: Matrix Metalloproteinases*
mRNA *.....: Messenger ribonucleic acid*
mU *.....: Milliunits*
NICE *..... : The National Institute for Health and Care Excellence*
NO *.....: Nitric Oxide*
NST *.....: Non Stress Test*
PAF *.....: Platelet Activating Factor*
PG *.....: Prostaglandin*
PGDH *.....: Prostaglandin Dehydrogenase Enzyme*
PGES *.....: Prostaglandin E Synthase*
PO *.....: Per Os*
PR *.....: Per Rectum*
PT *.....: Prothrombin Time*
PTT *.....: Partial Thromboplastin Time*
PV *.....: Per Vagina*
RCT *.....: Randomized Controlled Trial*
ROMs *.....: Rupture of membranes*
SD *.....: Standard deviation*
SOGC *.....: The Society of Obstetricians and Gynaecologists*
TVU-CL *.....: Trans Vaginal U/S- Cervical Length*
TXA2 *.....: Thromboxane A2*

INTRODUCTION

The continuation of a woman's pregnancy requires that her cervix remains closed, rigid and that her uterus quiet and not contracting. Both of these conditions need to be reversed to initiate labor. The ways in which this is achieved are unknown but there is evidence that suggests the fetus itself plays an integral part. A woman's cervix, which contain little smooth muscle and is predominantly connective tissue with collagen as its main component, must undergo a process called ripening, where it becomes soft and pliable. This allows its shape to change from being long and closed to being thinned (effaced) and opening (dilating) ***(Adams and Griffin, 2017).***

Induction of labor is a common intervention in obstetric practice, which is a procedure used to stimulate uterine contractions during pregnancy to accomplish delivery prior to the onset of spontaneous labor ***(Aduloju and Akintayo, 2017).***

Laughon et al. (2012) demonstrated that over 40% of primiparous women, and over 30% of multiparous women, undergo labor induction.

The portion of pregnancies undergoing induction varies widely between countries, but it is estimated that approximately 20% of labors in the UK and USA are induced ***(Calder et al., 2008).***

Successful labor induction leads to a vaginal birth. A health care provider might recommend labor induction for various reasons, primarily when there's concern for a mother's health or a baby's health. Labor induction carries various risks, including infection and the need for a Cesarean section. Sometimes the benefits of labor induction outweigh the risks ***(ACOG, 2013).***

According to the American College of Obstetricians and Gynecologists (ACOG), labor should be induced only when it is more risky for the baby to remain inside the mother's uterus than to be born ***(Duro Gomez et al., 2016).***

Cervical status is a good predictor of the likelihood of vaginal delivery when labor is induced. Any induction method is likely to be effective in a woman with a favorable cervix, whereas no method is highly successful when performed in a woman with a cervix that is unfavorable (i.e., firm, posterior, and neither dilated nor effaced). Therefore, if the cervix is unfavorable, a ripening process is generally employed prior to induction ***(Duro Gomez et al., 2016).***

Cervical ripening is a complex process that results in physical softening and distensibility of the cervix, ultimately leading to partial cervical effacement and dilatation. Remodeling of the cervix involves enzymatic dissolution of collagen fibrils, increase in water content, and chemical changes. These changes are induced by hormones (estrogen,

progesterone, relaxin), as well as cytokines, prostaglandins, and nitric oxide synthesis enzymes. The two major techniques for iatrogenic cervical ripening are (1) mechanical (physical) interventions, such as insertion of catheters or cervical dilators, and (2) application of cervical ripening agents, such as prostaglandins ***(Ezebialu et al., 2015).***

Common indications for induction of labor are post-term pregnancy, hypertensive disorders, prelabor rupture of membranes, diabetes in pregnancy, suspected intrauterine growth retardation, macrosomia. Moreover the rate of elective inductions i.e. induction without a medical indication, is rising rapidly. Reasons for wanting elective induction at term might include a women's physical discomfort, convenience of providers, or concern about the rapid progression of labor away from the hospital. Some clinicians may recommend elective induction due to concern about future complications ***(Boulvian, 2008).***

Methods for labor induction include both mechanical and pharmacological options. Pharmacological interventions to ripen the cervix as part of labor induction include administration of oxytocin, and prostaglandins delivered orally or vaginally. However, when induction of labor is attempted for a woman with an unfavorable cervix, other interventions used to assist the induction process, such as oxytocin or rupture of membranes, are connected with reduced effectiveness and high failure rates ***(Aduloju et al., 2016).***

Prostaglandins are frequently used for labor induction in pregnant women. The presence of cervical immaturity indicates the use of prostaglandin compounds, frequently followed by oxytocin infusion, prostaglandins are received orally or applied locally to the cervix or the vagina, to promote both cervical ripening and myometrial contractility ***(Sifakis et al., 2007).***

Various prostaglandins preparations including misoprostol vaginal tablets, dinoprostone vaginal gel and vaginal insert are commercially available to be used in labor induction. Misoprostol is a synthetic prostaglandin El analogue and has been reported to be a considerably safe and efficacious cervical ripener. It's inexpensive, easy to administer, stable at room temperature, does not require refrigeration. It acts as an effective myometrial stimulant of the pregnant uterus, selectively binding to EP-2/EP-3 prostaglandin receptors ***(Toppozada, 1994).***

In spite of different doses and routes of administration (sublingual, oral, vaginal), ideal dosage and mode of administration still remain to be controversial. Potential complications such as uterine rupture, tachysystole and uterine hyperstimulation should be emphasized with respect to adverse maternal-neonatal outcome ***(Ozkan et al., 2009).***

The use of Foley's catheter as a mechanical method for labor induction has been recommended in many developing countries. The reports from different countries have mentioned

excellent results with the use of Foley's catheter either alone or in combination with prostaglandins ***(Toppozada, 1994; Mekbib, 1994; Obed and Adewole, 1994; Atad et al., 1996; Jozwiak et al., 2013).*** Although the exact mode of action of Foley's catheter is not fully understood. Yet it has been postulated that the catheter stimulates various unspecified regions of the uterus, elevates its excitability and causes regular uterine contractions ***(Levine et al., 2016a).***

Embrey (1969) first described using a transcervical Foley's catheter for cervical ripening. ***Obed and Adewole (1994)*** documented its effectiveness by increasing "Bishop's Score" in women with unripe cervices. Since then two studies found transcervical Foley's catheter appears to offer significant advantages over prostaglandin preparations which has led to an increased use of transcervical Foley's catheter for preinduction cervical ripening and induction of labor ***(Sciscione et al., 2004; Levine et al., 2016b).***

AIM OF THE WORK

The aim of present study is to compare the safety and efficacy of vaginal misoprostol versus the combination of vaginal misoprostol and intracervical Foley catheter in induction of labor at term pregnancy.

1. Research Question:

Does vaginal misoprostol and the combined use of intracervical Foley catheter and vaginal misoprostol have the same safety and efficacy in women undergoing induction of labor at term pregnancy?

2. Research Hypothesis:

Null hypothesis: In women undergoing induction of labor at term pregnancy, using vaginal misoprostol alone has the same safety and efficacy than the combined use of intracervical Foley catheter with vaginal misoprostol.