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Balloon catheter versus misoprostol for the induction of labor following pre-labor rupture of membranes at term

Submission date
01/02/2021

Recruitment status
No longer recruiting

Registration date
05/02/2021

Overall study status
Completed

Last Edited
19/12/2024

Condition category
Pregnancy and Childbirth

[_] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Background and study aims:
The rupture of membranes (also known as 'water breaking' due to loss of amniotic fluid via the vagina) usually occurs when a pregnancy has reached full term, either during, or at the beginning of, labor. Pre-labor rupture of membranes (PROM) is when this rupture occurs before labor has begun.

In Finland, almost a third of all deliveries are induced, which means that the labor process is initiated artificially. One of the most common reasons for induction of labor (IOL) is prolonged pre-labor rupture of membranes (prolonged PROM), which is when the membranes rupture but labor does not start within the following 24 h. PROM increases the risk for infection in mothers as well as newborns.

If the cervix is unfavorable when starting IOL (meaning it has not undergone the changes that make the spontaneous onset of labor likely), then priming of the cervix (i.e. softening) can increase the success of IOL and shorten labor duration. Priming can be done either mechanically with a balloon catheter or pharmaceutically (using medication) with misoprostol. Sometimes these methods are used in succession or in conjunction. Both types of priming are safe and efficient without increasing the risk of cesarean section or birth complications.

One concern about the use of balloon catheter for priming after rupture of membranes is that it could potentially lead to an increase of infections, and it is not recommended if patients test positive for GBS (group B Streptococcus- the most common cause of neonatal sepsis). A few small studies appear to disprove this concern.

The current practice in the participating hospital in this study during balloon catheter placement after PROM is the administration of routine antibiotics in advance to prevent possible infections (prophylactic). This was established based on previous studies, however, there is no scientific evidence for this. This routine prophylactic antibiotic use has been questioned due to rising concern about possible short term and long term effects on the newborn.

This study will compare the efficacy and safety of the two different priming methods in participants with prolonged PROM. Additionally, this study will assess the need for antibiotic prophylaxis and the incidence of infections of mothers and newborns in participants where the cervix is primed using the balloon catheter method. Finally, the study will investigate differences in birth experience and patient satisfaction.

Who can participate:
Women at least 18 years of age, in their first or any subsequent singleton pregnancy, with spontaneous rupture of membranes without the onset of labor within 18-48 hours, at term (≥ 37 gestational weeks), who need to be induced, who present with an unfavorable cervix (Bishop's score <6), whose fetus is in cephalic presentation and who have no colonization of Group B Streptococcus on vaginal and rectal swab.

What does the study involve:
Participation in this study is completely voluntary. Eligible women presenting to the participating hospital with PROM who need induction of labor will be asked to participate in the study. If, after receiving a preliminary information leaflet about the study, they are interested in participating, they will be given further information and asked for signed consent.

The parturient will then be allocated randomly (like a coin toss) to one of the two methods of cervical priming: either using a balloon catheter (mechanical) or misoprostol taken by mouth (using medication).

If the participant is allocated to the balloon catheter group, they will again be randomized (like a coin toss) into one of two groups: to receive a routine antibiotic to treat a possible bacterial infection or no routine antibiotic.

All participants will be asked to fill out a birth experience questionnaire.

What are the possible benefits and risks of participating?
According to national and international guidelines, women with prolonged PROM should be induced, to reduce the adverse effects of prolonged PROM. The priming method (either mechanical or pharmaceutical) is usually chosen at the discretion of the treating obstetrician, under consideration of patient preference. The participants of this study will also need to be induced for PROM. The difference to standard induction of labor outside the study is, that the priming method used will be determined at random rather than participant preference. Since both methods are well established in clinical practice, this should bring no disadvantage or risk to the participant.

The common clinical practice of routine antibiotics during balloon catheter induction is not based on scientific evidence. This study hopes to clarify the need, benefit, and/or risk of antibiotic use during balloon catheter induction.

Where is the study run from?
Department of Obstetrics and Gynaecology of Helsinki University Hospital (Finland)

When is the study starting and how long is it expected to run for?
From August 2020 until February 2028

Who is funding the study?
Helsinki University Hospital (Finland)

Who is the main contact?
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Type(s)
Scientific

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Additional identifiers

Clinical Trials Information System (CTIS)
Nil Known

Protocol serial number
TYH2019302

Study information

Scientific Title
Induction of labor with a balloon catheter versus oral misoprostol following term pre-labor rupture of membranes – a randomized controlled trial

Acronym
ILBOM-PROM

Study objectives
1. Induction of labor after prolonged spontaneous rupture of membranes in a term pregnancy is equally safe with a balloon catheter as with misoprostol
2. In the induction group with a balloon catheter, routine antibiotic prophylaxis does not have an effect on intrapartum infection rates

Ethics approval required
Old ethics approval format

Ethics approval(s)
Approved 02/12/2020, Helsinki University Central Hospital Ethics Committee (HUS Tutkimuseettiset toimikunnat, PO Box 705, Biomedicum Helsinki 2 C 7th floor, Tukholmankatu 8 C, 00029 Helsinki, Finland; +358 50 427 9493; piia.paavilainen@hus.fi), ref: HUS/2549/2020

Study design
Two-step randomized controlled trial

Primary study design
Interventional

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Premature rupture of membranes with the onset of labor more than 24 hours following rupture, prolonged rupture of membranes at term with an unfavorable cervix

Interventions
Randomization is performed by computer-sequenced block randomization technique in a two-step process, part A and B.
Patients are randomized in part A into the method of cervical priming (balloon catheter or oral misoprostol), and in part B (only if they are allocated to balloon catheter priming) into prophylactic antibiotics or no prophylactic antibiotics.

Part A of randomization (method of cervical priming) is performed 18-48 h after spontaneous rupture of membranes, if the parturient does not have vaginal or rectal colonization of Group B Streptococcus (assessed using a swab test), the cervix is deemed unfavorable (Bishop score <6), and regular labor contractions have not yet started.

In part A the parturient is allocated to one of two groups:
1. Misoprostol group. A 25 µg oral Misoprostol dose will be self-administered by the parturient

every 2 h, until regular labor contractions begin, or for a maximum of 8 doses. When the cervix is deemed favorable, amniotomy of a potential intact lower pole is performed. If spontaneous labor contractions do not start after amniotomy, Oxytocin is started, at the earliest 4 h after the last dose of misoprostol. If, after a course of a maximum of 8 doses of misoprostol, the cervix is still deemed unfavorable, the priming of the cervix is considered failed within the framework of the study, and induction of labor will be continued according to local protocol at the discretion of the treating clinician.
2. Balloon catheter group. A single balloon catheter is placed trans-cervically, either with manual insertion during vaginal examination or during speculum examination. The balloon is then inflated with 50-80 ml of sterile saline solution. The balloon catheter can remain in place until spontaneous expulsion or for a maximum of 12 h, after which it will be emptied and removed. If, after spontaneous expulsion or removal of the balloon catheter, the cervix is deemed favorable, amniotomy of a potential intact lower pole is performed. If spontaneous labor contractions do not start within 1-2 h of amniotomy, Oxytocin is started. If, after spontaneous expulsion or removal of the balloon catheter, the cervix is still deemed unfavorable, the priming of the cervix is considered failed within the framework of the study, and induction of labor will be continued according to local protocol at the discretion of the treating clinician.

Part B of randomization is performed only when the parturient is placed in the balloon catheter group and will be allocated to one of two groups:
1. Routine prophylactic antibiotic group. The parturient will be given, according to hospital protocol, a routine prophylactic antibiotic of G-Penicillin 5 million units at balloon catheter placement. After the initial dose, the parturient will receive a dose of G-Penicillin 2 million units every four hours, until expulsion or removal of the balloon catheter. In the case of Penicillin allergy, the antibiotic of choice is Clindamycin 900mg every eight hours.
2. No routine prophylactic antibiotic group. The parturient receives no routine prophylactic antibiotic for the duration of the retention of the balloon catheter.

All participants receive, on admission/at induction, the CEQ2 birth experience questionnaire and will be asked to fill it out within one month of delivery and return it as soon as possible. The questionnaire is available in Finnish, Swedish, and English.

Intervention Type
Drug

Phase
Not Applicable

Drug/device/biological/vaccine name(s)
misoprostol, procaine benzylpenicillin, clindamycin

Primary outcome(s)
1. Incidence of different modes of delivery (vaginal birth, assisted vaginal birth, or caesarean section), maternal infection, and newborn infection collected from patient records between hospital admission and discharge

Key secondary outcome(s))
1. Maternal complications of delivery (such as retention of placenta, hemorrhage, birth canal tears, and intrapartum or postpartum infection) collected from patient records between hospital admission and discharge
2. Primary assessment of the newborn measured using Apgar score at 1 and 5 min after birth,

and using umbilical vein pH and base excess, need for intubation, and need for NICU admission collected from patient records between hospital admission and discharge
3. Birth experience measured using the Childbirth Experience Questionnaire (CEQ2) completed within 1 month after delivery

Completion date
31/12/2023

Eligibility

Key inclusion criteria
1. Aged ≥18 years
2. Primiparous or multiparous women with singleton pregnancy
3. Gestational age ≥37 weeks (term)
4. Spontaneous rupture of membranes without the onset of labor within 18-48 h
5. Unfavorable cervix (Bishops score <6)
6. Cephalic presentation of fetus
7. No colonization of Group B Streptococcus on vaginal and rectal swab

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
18 years

Sex
Female

Total final enrolment
180

Key exclusion criteria
1. Pre-term pre-labor rupture of membranes (<37 gestational weeks)
2. Clinical signs of infection (such as vaginitis, chorionamnionitis)
3. Active infection or carrier of human immunodeficiency virus (HIV), hepatitis B, or hepatitis C
4. Type 1 diabetes
5. Group B Streptococcal colonization of vagina and/or rectum (detected by swab test)
6. Any acute condition, maternal or fetal, requiring the immediate delivery of the fetus
7. Intrauterine growth restriction
8. Macrosomia or weight estimation ≥4.5 kg
9. Fetus in any other presentation than cephalic (such as breech or transverse)
10. Previous caesarean section or any other uterotomy (such as myomectomy)

11. Insufficient understanding or language deficiency to comprehend the patient guide and consent form
12. Refusal of participation or refusal for signed consent

Date of first enrolment
01/02/2021

Date of final enrolment
31/12/2023

Locations

Countries of recruitment
Finland

Study participating centre
Helsinki University Hospital
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Sponsor information

Organisation
Helsinki University Central Hospital

ROR
https://ror.org/02e8hzf44

Funder(s)

Funder type
Hospital/treatment centre

Funder Name
Helsingin ja Uudenmaan Sairaanhoitopiiri

Alternative Name(s)
Helsinki University Central Hospital, HUS

Funding Body Type
Government organisation

Funding Body Subtype
Local government

Location
Finland

Results and Publications

Individual participant data (IPD) sharing plan
The data sharing plans for the current study are unknown and will be made available at a later date

IPD sharing plan summary
Data sharing statement to be made available at a later date

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article		19/12/2024	19/12/2024	Yes	No
Participant information sheet		06/11/2020	01/03/2021	No	Yes