RESEARCH ARTICLE

UPDATE Termination of mid-trimester pregnancies: misoprostol versus concurrent weighted Foley catheter and misoprostol [version 2; peer review: 1 approved, 1 approved with reservations, 1 not approved]

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Abstract

Objective: To investigate whether the use of a weighted trans-cervical fluid-filled Foley's catheter would improve the effectiveness of 400µg vaginal misoprostol regimen in terminating mid-trimester pregnancies.

Methods: This study was conducted at the department of Obstetrics and Gynecology, Menofya University Hospital in Egypt. Fifty eligible primigravidae were allocated into 2 groups. Termination was carried out in group I using vaginal misoprostol while in group II, a weighted fluid-filled intra-uterine Foley's catheter was inserted and a similar misoprostol regimen was followed as in group I.

Results: The combined group showed shorter induction to termination interval (15.6 ± 4.9 versus 21.9 ± 5.4 hours; $P < 0.05$). There was no significant difference in the occurrence of side effects between the groups.

Conclusion: A combination of a weighted Foley's catheter and 400µg of vaginal misoprostol every 4 hours is more effective than misoprostol alone in terminating mid-trimester gestations.

Keywords

Misoprostol, mid-trimester termination, Foley catheter

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Any reports and responses or comments on the article can be found at the end of the article.

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Editorial note:

Please note that the refereeing status of this article was changed from "indexed" to "[v1; ref status: approved 1, approved with reservations 1]".

When this article was first published, *F1000Research* was still in its beta phase; during this period articles that received any two of "Approved" or "Approved with Reservations" statuses from the reviewers were labelled as "indexed". When the journal was formally launched in January 2013, the requirements for indexing were tightened, and only articles that are given either two "Approved" or one "Approved" plus two "Approved with Reservations" statuses by the reviewers are labelled "indexed". The new criteria for "indexing" can still be met in the future if a new revised version receives the necessary approval status from the reviewers.

UPDATED Changes from Version 1

We would like to thank the reviewers for the time they spent reviewing our manuscript and the valuable comments they have made. We have revised the manuscript based on many of their suggestions but would like to respond to remaining few comments as follows:

1. We think that reporting the actual P value would confuse the reader with too many numbers and we feel that a P value mentioned to be either higher or lower than 0.05 would be simple and easier to illustrate a significant level. At higher levels of significance, we considered a cutoff point for p value of 0.01.
2. We think that it is a positive sign that the age and gestational age are close between the groups. If the difference is wide or statistically significant, it might have provided a bias to the results of the study.
3. Throughout this study we have not considered multiple testing. As shown in the methodology section, we only used the student t test, chi square test, or the Fisher's exact test when the contingency table contains values less than 6.

See referee reports

Introduction

The universal prenatal screening programs have lead to an increase in the diagnosis of congenital malformations with subsequent gradual increase in second trimester termination of pregnancy (TOP)¹. This represents 10–15% of total abortions performed worldwide².

Termination in the second trimester is more risky than during the first trimester³ and therefore; the pharmacologic management seems to be an appealing alternative to surgical evacuation. Misoprostol has been widely used in different dosages and routes for second-trimester pregnancy terminations. Doses ranging from 200 to 800 µg at intervals ranging from 3 to 12 hours have been described^{4–8}. High doses at short intervals have been linked to higher percentage of side effects.

Several studies have described the Foley's catheter as an effective method in ripening the cervix. Obed and Adewole (1994)⁹ showed that it increased the Bishop's score in women with unripe cervixes. Sciscione *et al.*¹⁰ stated that the Foley's catheter appears to be superior to prostaglandins for pre-induction cervical ripening. Its use is

common in poor countries because it is safe, inexpensive and have low incidence of contractile abnormalities¹¹.

This study was designed to investigate whether the insertion of a weighted fluid filled trans-cervical Foley's catheter would further improve the effectiveness of 400 µg vaginal misoprostol in terminating mid trimester pregnancies.

Material and methods

This study was carried out at the department of Obstetrics and Gynecology, Menofya University Hospital, Egypt. Women were recruited and enrolled in the study from July 2011 till the end of April 2012. The institutional review board approved the protocol of the study and an informed consent was obtained from all participants. (see [Supplementary Material](#)).

Women enrolled were primigravidae with a singleton pregnancy at a gestational age ranging between 13–23 weeks with a fetal anomaly that is incompatible with life or a fetal demise within one week. We chose to enroll just primigravidae, because we believe that the induction to expulsion time should be considered separately for multiparous and nulliparous women. Furthermore, for multiparas, if a woman had 10 previous vaginal deliveries, she cannot be compared to a woman who had only one vaginal delivery even though both are considered as multipara. A separate analysis would be needed for primiparous women, and both low order and high order multiparous women. Gestational age was calculated from the date of the first day of last menstrual period and confirmed by a vaginal ultrasound scan. Women with any of the following were excluded from the study: 1) Previous uterine scar; 2) Contraindication to misoprostol; 3) Low lying placenta; 4) Operation on the cervix; 5) Chorioamnionitis.

In our institution, women with a planned a mid-trimester termination of pregnancy can have a varied and unpredictable response to the method of termination selected. The population of patients at the hospital we conducted the study is mainly illiterate. So, if a patient is assigned to a specific group, you must then to ask for that individual to sign a consent form. For the most, the perception is that their signature provides permission to perform a harmful procedure or a procedure with an unknown outcome. This apprehension leads to asking members of their family who are present what to do, and more often than not they change their mind about the specific line of management offered to them. Due to this uncertainty we were unable to ensure that the participants would accept the method they would receive under randomized conditions. Our expectation was that we would probably have too many withdrawals, and so we refrained from randomizing the participants to maintain our chosen cohort for the completion of the study. We assumed that a significant difference in the induction to abortion interval between both groups would be 3 hours. With an alpha of 0.05, 80% power and a 2 sided significance level of 0.05, we predicted a sample size of 50 women would be needed. Initially we planned to recruit 50 women divided equally between two groups. However, after starting enrollment, we were confronted with the fact that many women preferred to be enrolled in the combined group rather than the misoprostol only group. When patient number 50 was enrolled, there were 20 women assigned to group I and 30 women to group II.

All participants were subjected to complete history taking and thorough clinical examination. Induction of abortion was carried out in group I by inserting two tablets; each contains 200 micro-gram misoprostol (Segma pharmaceuticals, Egypt), in the posterior vaginal fornix every four hours. In group II, with the patient in the lithotomy position, the cervix was visualized using a Cusco's speculum and then sterilized with povidone iodine. The anterior lip of the cervix was grasped with a ring forceps and another ring forceps was then used to push the catheter through the cervix under direct visualization. The balloon was then inflated with 30 ml saline and the catheter was pulled back snugly against the internal os and taped to the inner aspect of thigh. A bag filled with saline was applied to the distal end of the catheter to provide moderate traction. Different filling volumes were used at different gestational ages. We used 250 ml. at 13–17 weeks, 300 ml. with ages at 18–20 weeks and 500 ml at gestational ages more than 20 weeks. The filled bag was approximately equivalent to 250, 300 and 500 grams in weight respectively. A 400 ug misoprostol vaginal dose “two tablets” was then inserted in the posterior vaginal fornix/4 hours as in group I. A maximum of 4 misoprostol doses was used in both groups. Each patient received 1 gram Ampicillin/6 hours as a prophylactic antibiotic. As soon as the catheter was expelled, re-assessment of the dilatation and effacement of the cervix was carried out. Oxytocin infusion was started 4 hours after the last dose of misoprostol in both groups according to the standard protocol in our department.

The patient was assessed every 4 hours for vital signs, cervical dilatation, expulsion of fetus and occurrence of complications such as nausea, vomiting, abdominal pain and infection. All patients received intravenous oxytocin 20 IU after expulsion of the fetus to help placental separation and delivery. Retained placenta was considered if no manifestations for placental separation appeared 30 minutes after fetal expulsion. The patient was anesthetized and manual separation of the placenta was carried out. Surgical evacuation was performed if any remnant of conception such as missed placental lobe or piece of membranes was suspected to be retained inside the uterus.

After placental expulsion, mothers were observed for the presence of uterine atony and post abortive bleeding. This was assessed by counting the number and change in the weight of the sanitary pads used by the patient. Bleeding was considered average if less than 200 cc and excessive if more than 200 cc.

The measured primary outcome parameter was the induction to abortion interval. Secondary parameters were: 1) Occurrence of side effects; 2) Need for manual separation of the placenta; 3) The need for surgical evacuation; and 4) Occurrence of post-abortive bleeding.

For the purpose of statistical analysis, women enrolled were categorized into 3 groups according to gestational age (Table 1). Early mid trimester group between 13 to 17 weeks, mid mid-trimester group 18–20 weeks and late mid trimester group 21 to 23 weeks.

Results were tabulated and analyzed on an IBM personal computer using Epi Info, version 6, a word-processing database and statistics program. Descriptive statistics was expressed as mean and standard

Table 1. The three categories of patients in the misoprostol group and the combined group according to gestational age.

Gestational age	Misoprostol group (n=20)	Combined group (n=30)	P
13–17 weeks	7 (35%)	11 (36.7%)	>0.05
18–20 weeks	7 (35%)	9 (30%)	>0.05
21–23 weeks	6 (30%)	10 (33.3%)	>0.05

Table 2. The primary outcome parameter in the misoprostol group and the combined group according to gestational age.

Gestational age	Misoprostol group	Combined group	P
13–17 weeks	(n=7)	(n=11)	
Induction to abortion interval	14.6 ± 2.67	10.8 ± 3.91	<0.05
Expulsion of fetus			
-At 4 hours	0/7	0/11	
-At 8 hours	0/7	5/11	>0.05
-At 12 hours	2/7	10/11	<0.05
-At 16 hours	5/7	11/11	>0.05
-At 20 hours	7/7	11/11	
-At 24 hours	0/7	0/11	
-At > 24 hours	0	0	
18–20 weeks	(n=7)	(n=9)	
Induction to abortion interval	22.3 ± 3.76	16.7 ± 3.21	<0.01
Expulsion of fetus			
-At 4 hours	0/7	0/9	
-At 8 hours	0/7	3/9	>0.05
-At 12 hours	0/7	4/9	>0.05
-At 16 hours	1/7	7/9	<0.05
-At 20 hours	2/7	8/9	>0.05
-At 24 hours	4/7	9/9	>0.05
-At > 24 hours	3/7	0/9	>0.05
21–23 weeks	(n=6)	(n=10)	
Induction to abortion interval	26.15 ± 4.30	19.6 ± 4.11	<0.01
Expulsion of fetus			
-At 4 hours	0/6	0/10	
-At 8 hours	0/6	2/10	>0.05
-At 12 hours	0/6	6/10	>0.05
-At 16 hours	0/6	6/10	>0.05
-At 20 hours	0/6	7/10	<0.05
-At 24 hours	0/6	8/10	<0.01
-At > 24 hours	6/6	2/10	<0.01

deviation. The student t test was used to evaluate independent variables that are normally distributed. The Chi square test was used to compare 2 rates unless the number in the contingency table was < 6 where Fisher's exact test was used. A significant statistical level was considered if $P < 0.05$.

Results

The groups were equal at the baseline characteristics. Age of mothers was not significantly different between both groups (27.93 ± 6.48 years in group I versus 27.19 ± 5.23 years in group II; $P > 0.05$). There was no significant difference in gestational age at enrollment (18.0 ± 2.41 weeks in group I versus 17.9 ± 2.88 weeks in group II; $P > 0.05$). We subdivided participants into 3 groups according to gestational age and we had a separate statistical analysis for each group. Women enrolled were categorized into 3 groups as shown in Table 1.

Table 3 shows that the secondary outcome parameters are not statistically different between both groups. Table 4 reports the side effects in both groups.

Discussion

This study showed that the combination of Foley's catheter and misoprostol resulted in a significantly shorter induction to abortion interval compared to misoprostol alone. Because we used similar misoprostol dose in both groups, this decrease in duration was attributed to the use of weighted Foley's catheter with moderate traction applied over its distal end. Early studies comparing the Foley catheter with PGE2 tablets found no difference in the termination time between both methods^{12,13}. No traction was applied in either

Table 3. The secondary outcome parameters in the misoprostol group and the combined group according to gestational age.

Gestational age	Misoprostol group	Combined group	P
13–17 weeks	(n=7)	(n=11)	
Manual separation of placenta	0	0	
Surgical evacuation	3/7	2/11	>0.05
Blood loss (<200 ml)	6/7	10/11	>0.05
Blood loss (>200 ml)	1/7	1/11	>0.05
18–20 weeks	(n=7)	(n=9)	
Manual separation of placenta	2/7	1/9	>0.05
Surgical evacuation	1/7	1/9	>0.0
Blood loss (<200 ml)	6/7	7/9	>0.05
Blood loss (>200 ml)	1/7	2/9	>0.05
21–23 weeks	(n=6)	(n=10)	
Manual separation of placenta	3/6	2/10	>0.05
Surgical evacuation	0	0	
Blood loss (<200 ml)	4/6	7/10	>0.05
Blood loss (>200 ml)	2/6	3/10	>0.05

Table 4. Side effects in the misoprostol group and the combined group.

Gestational age	Misoprostol group	Combined group	P
13–17 weeks	(n=7)	(n=11)	
Nausea	2/7	4/11	>0.05
Vomiting	2/7	4/11	>0.05
Abdominal pain	1/7	4/11	>0.05
Infection	1/7	0/7	>0.05
18–20 weeks	(n=7)	(n=9)	
Nausea	2/7	2/9	>0.05
Vomiting	2/7	2/9	>0.05
Abdominal pain	2/7	4/9	>0.05
Infection	0/7	1/7	>0.05
21–23 weeks	(n=6)	(n=10)	
Nausea	3/6	4/10	>0.05
Vomiting	3/6	4/10	>0.05
Abdominal pain	3/6	6/10	>0.05
Infection	0/7	1/7	>0.05

of these studies. Bani-Irshaid *et al.*¹⁴ compared the efficacy and safety of Foley catheter (with and without traction) and prostaglandin E2 vaginal tablets in terminating second and early third trimester pregnancies in 258 women. They concluded that the efficacy of the Foley's catheter can be enhanced with the use of traction to give similar results to prostaglandin E2. No studies have compared the use of prostaglandin E1 vaginal tablets alone versus its combined use with Foley's catheter in terminating mid trimester gestations. The catheter exerts its effect by disrupting the integrity of amnion-chorion and myometrium in addition to cervical collagen increasing prostaglandin and cytokines release rendering the uterus susceptible^{15–17}.

The induction to delivery interval increased with increasing gestational age in both groups. We also had rates of fetal expulsion of 100% in both groups at a gestational age between 13–17 weeks which decreased with advancement of gestational age. This is in agreement with other investigators' findings. Gómez *et al.* in 2009¹⁸ found that the mean induction-to-abortion interval increases by 4 hours after 20 weeks GA. Ashok, *et al.*, 2003¹⁹ in another study on mid-trimester medical termination of pregnancy concluded that the induction to abortion interval was significantly longer in the higher gestational age pregnancies. Similar finding were reported by Dilbaz *et al.*²⁰ in pregnancies between 13–20 weeks. We used a misoprostol dose of 400 microgram administered every 4 hours. Doses of 600 and 800 µg have shown comparable successful abortion rates but were associated with high rates of side effects^{21,22}. Wong and colleagues compared the efficacy and side effects of 400 microgram misoprostol administered every 3 and every 6 hours. They concluded that the three-hour regime was more effective in terms of a significantly shorter drug administration to abortion interval on the expense of more side effects. We had no significant difference

in the incidence of side effects between both groups. Side effects are less common with the vaginal route compared to other routes of administration²³.

In the present study, there was no significant difference in the need for post abortive manual separation of the placenta. Surgical evacuation should only be considered if there is clinical evidence that the abortion is incomplete²⁴. In the current study an incidence of 20% was reported in the misoprostol group while only 10% required surgical evacuation in the combined group. Ashok *et al.* 2003¹⁹ studied midtrimester medical termination of pregnancy using misoprostol and concluded that surgical evacuation of the uterus under general anesthesia was required to complete the abortion in 8.1% of women. In 2005 report from the Scottish group estimated the rate of surgical evacuation as low as 2.5%²⁵. The high incidence of surgical evacuation in this study may reflect the inadequate experience dealing with second trimester abortions. Cases of induced abortion in our society are few because they are considered illegal unless performed to save a maternal life. Our findings showed that the majority of cases who required surgical evacuation in both groups were between 13–17 weeks (5/7). This is in agreement with the results of other investigators²⁶. It is probably wise to inform women undergoing pregnancy termination early in the second trimester of

possible higher chance of incomplete abortion. There was no statistically significant difference in the amount of blood loss between both groups.

To conclude, the use of a weighted trans-cervical Foley's catheter filled with 30 ml saline improve the effectiveness of 400 µg vaginal misoprostol in terminating mid trimester pregnancies as reflected by a shorter induction to delivery interval with no significant increase in the incidence of side effects.

Author contributions

AS, conceived the study and designed it, HS Enrolled participants and collected the scientific material, MK shared the design of the study and wrote the manuscript, ES collected scientific material and performed the statistical analysis and DM enrolled participants.

Competing interests

No competing interests were disclosed.

Grant information

The author(s) declared that no grants were involved in supporting this work.

Supplementary information – protocol of the study

Introduction

Second trimester or mid-trimester is a period ranging from 14th to 28th weeks of gestation. It is subdivided into an early period between 14th and 20th weeks and a late period between 20th and 28th weeks²⁷.

There is gradual increase in second trimester terminations of pregnancies because of the availability of prenatal screening programs allowing the diagnosis of congenitally malformed fetuses¹.

Cervical ripening before surgical termination is an effective method for reducing the complications associated with suction curettage. It is a routine before second-trimester dilation and evacuation²⁸. Misoprostol, a prostaglandin E1 analogue, is commonly used for this purpose²⁹. It is also useful for elective medical abortion and evacuation of the uterus in cases of embryonic or fetal death²⁸. The vaginal route of administration is favored compared to other methods in clinical routine owing to its high clinical efficacy and lack of gastrointestinal side effects³⁰.

Several studies have described that the Foley's catheter as an effective method in ripening the cervix. Obed and Adewole⁹ showed that

it increased the Bishop's score in women with unripe cervixes in a way comparable to that of prostaglandins.

Objective of the study

This study was designed to investigate whether the insertion of a weighted fluid filled trans-cervical Foley's catheter would improve the effectiveness of 400 µg vaginal misoprostol in terminating mid trimester pregnancies.

Patients and methods

This comparative study will be carried out at the department of Obstetrics and Gynecology Department, Menofya University Hospitals. Participants will be women with an indication for second trimester termination. Eligible women will be those with BMI ranging between 20–30 with singleton pregnancies at a gestational age between 14–23 weeks. Pregnancies sonographically diagnosed with a fetal anomaly incompatible with life or a fetal demise within one week will be enrolled.

The procedure will be explained to all women and an informed consent will be obtained from all participants. All women enrolled will have the following routine work up:

1. Complete history taking.

2. Thorough clinical examination with special emphasis on:-

- Pulse, blood pressure and temperature.
- Nausea (mild, moderate and severe).
- Vomiting (mild, moderate and severe).
- Abdominal pain (mild: less or equal to menstrual cramps, moderate: slightly stronger than menstrual cramps & severe: double strength of menstrual cramps). Women with mild pain will receive no analgesia while those with moderate pain will receive diclofenac sodium & women with severe pain will receive pethidine.
- Cervical dilatation and consistency by vaginal digital examination (Firm or Soft).
- Presence or absence of vaginal bleeding.
- Watery vaginal discharge.

3. Laboratory investigations:

- Complete blood picture.
- Prothrombin time, bleeding time, clotting time and INR.
- Liver enzymes.
- Kidney function.
- Random blood sugar.

4. Pelvic ultrasound to detect:

Number of gestations, viability and gestational age.

Women with any of the following will be excluded from the study:

1. Previous uterine surgery.
2. Contra-indication to misoprostol. E.g. bronchial asthma and coronary heart disease.
3. Low lying placenta.
4. Operation on the cervix.
5. Chorioaminitis (diagnosed by leucocytic count >12000, positive CRP & fever >38).

Fifty women will be recruited and will be divided into 2 equal groups. In group A, termination will be induced by inserting 400 micrograms vaginal misoprostol (2 misotac tablets-sigma pharmaceuticals) every four hours while in group B. termination will be induced by inserting a 16 F Foley's catheter trans-cervically

then inflating its balloon by (30 ml–50 ml) saline. A bag filled with saline will be applied to the distal end of the catheter to provide moderate traction. Different volumes will be used at different gestational ages; 250 ml. at 13–17 weeks, 300 ml. with ages at 18–20 weeks and 500 ml at gestational ages more than 20 weeks. The filled bag is approximately equivalent to 250, 300 and 500 grams in weight respectively. The same dose of misoprostol as in group A (400 ug/ 4 hours) will be used as well.

The outcome parameters that will be measured in this study are:-

1. Induction to expulsion interval.
2. Maternal side effects (nausea, vomiting, abdominal pain, rupture of membranes, sepsis, manual separation of the placenta, surgical evacuation and hemorrhage). The amount of vaginal bleeding will be assessed by counting the number and change in the weight of the pads changed by the patient from the start of induction till complete expulsion has occurred. Hemorrhage will be considered as average if less than 200 cc and excessive if more than 200 cc.

Participants will be assessed every 4 hours for vital signs, cervical dilatation, expulsion of fetus and occurrence of complications.

The steps of the procedure in the Foley's catheter group:

1. Speculum insertion and exposure to the cervix.
2. Sterilization with povidine iodine.
3. Holding the anterior lip of the cervix with ring forceps.
4. Foley's catheter will be inserted till it passed the internal os (about 5 cm of the catheter was passed through the cervical canal).
5. Inflation of the balloon by 30 ml saline for women at 14–18 weeks and by 50 ml for 19–23 weeks.
6. The ring forceps and the speculum will be removed.
7. 400 ug misoprostol wetted with saline will be inserted in the posterior vaginal fornix.

All patients will receive 20 mIU intravenous oxytocin after expulsion of the fetus. If the placenta does not separate in 30 minutes, the patient will be anaesthetized and undergo manual separation of the placenta or surgical evacuation.

All women will be observed for the occurrence of side effects during the procedure and for the first 12 hours after termination.

Results will then be tabulated and statistically analyzed. Results will then be compared to those of other investigators.

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Nathan S. Fox

Department of Obstetrics, Gynecology, and Reproductive Science, Mount Sinai School of Medicine, New York, NY, USA

I have reviewed the second version of the article, however I still have reservations about it:

1. Even though the authors explained why they did not randomize the work it is still something that is required for a study of this type.
2. There are only two baseline characteristics (age and gestational age) which I don't think are sufficient.
3. I still maintain the authors should report that actual p-value. I disagree with their assertion that it would "confuse the reader with too many numbers".
4. With regards to the newly added power analysis, I am unable to reproduce their calculation and thus I think it is mathematically incorrect. Furthermore, since they planned on subdividing the groups by gestational age, this means they are underpowered for each of the subgroups.
5. I also find it hard to believe that the data was normally distributed in such a small sample size. In the subgroup analysis, there were only a handful of patients in each arm. A t-test cannot be the appropriate statistical test.

Competing Interests: No competing interests were disclosed.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Reviewer Report 07 February 2013

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Vikram Talaulikar

Department of Obstetrics and Gynaecology, St. George's University of London, London, UK

I have read through the revised manuscript. The authors have responded to most queries satisfactorily. Although a randomization and higher sample size would have been ideal, the present results do suggest benefit from a balloon catheter in addition to misoprostol. I am now happy to give approved status to the article.

Competing Interests: No competing interests were disclosed.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Version 1

Reviewer Report 12 November 2012

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Nathan S. Fox

Department of Obstetrics, Gynecology, and Reproductive Science, Mount Sinai School of Medicine, New York, NY, USA

This is an interesting study examining the additional benefit of transcervical Foley in second trimester termination of pregnancy with misoprostol. Overall, this study is valuable, but I have a few reservations regarding their methodology.

1. The authors should explain why this was not randomized. It seems like a relatively simple thing to do and it would improve the methods significantly.
2. The authors list more baseline characteristics. Especially considering this was not blinded, how are we to be sure that the groups were equal at baseline?
3. The authors should report the actual p-value, not just whether it was less than or greater than 0.05.
4. How did the authors determine their sample size of 50? There was no power analysis done. A

skeptical reader might conclude that the study was stopped only because statistical significance was reached.

5. With so few patients, was the primary outcome normally distributed? If not, the t-test would not be the appropriate statistical test.

Competing Interests: No competing interests were disclosed.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Reviewer Report 03 November 2012

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Vikram Talaulikar

Department of Obstetrics and Gynaecology, St. George's University of London, London, UK

It is an interesting study adding to the emerging recent evidence on the efficacy of balloon catheters for cervical ripening and induction of labour. However, the above issues need to be addressed in order for the conclusions to be valid:

1. Allocation is by patient choice. Without true randomization the potential for bias exists.
2. How were the sample numbers calculated (power)?
3. Introduction of mechanical devices such as a balloon catheter through cervix into uterine cavity may lead to increased incidence of infection. Although this was an outcome measure in the study protocol, there was no mention of infection rates (whether they were the same or were higher) in the results section – this would have been important if the results are to be useful for general populations in future. Ampicillin was used prophylactically in the combined group – were the authors worried about sepsis too?
4. The age and gestational ages in comparison groups look remarkably similar!
5. Why were only primigravid women chosen?
6. The authors should avoid multiple statistical testing which makes the conclusions invalid.

Competing Interests: No competing interests were disclosed.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Reviewer Report 02 November 2012

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Nathalie Kapp

Department of Reproductive Health and Research, World Health Organization, Geneva 27, CH, Switzerland

The statistical analysis used by the authors is inappropriate as they did multiple testing, and the primary outcome needs a time-to-event analysis (like a survival analysis).

As women chose their treatment group, the conclusions cannot be stated as one may about results from an RCT, given the potential for bias.

Competing Interests: No competing interests were disclosed.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to state that I do not consider it to be of an acceptable scientific standard, for reasons outlined above.

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