ORIGINAL ARTICLE

Routine ultrasound guided evacuation of first trimester missed abortion versus blind evacuation

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KEYWORDS
Missed abortion; Surgical evacuation; Ultrasound

Abstract  Background: The clinical management of miscarriage has changed little over the years and many women undergo surgical uterine evacuation. Surgical evacuation of the uterine contents in missed abortion is a challenge to the obstetrician as it is done blindly. The current study recommends the use of ultrasound guided surgical evacuation. It serves two important advantages; the first is to complete evacuation without the need of additional step. The second is to protect against uterine perforation.

Outcome measures: The primary outcome measures were intraoperative and short-term complications (anesthetic complication, hemorrhage, ongoing pregnancy, cervical trauma, uterine perforation, need for laparoscopy and/or laparotomy, repeat evacuation, and infection). The secondary outcomes were the blood loss, procedure time, and convalescence time.

Design: A controlled trial.

Setting: Elbadr Hospital, Benha, Egypt.

Participants: Women undergoing STOP (surgical termination of pregnancy) in the first trimester.

Methods: Two hundred cases who refused medical evacuation of proved missed abortion were divided in two groups. Group one (one hundred patients) in whom surgical evacuation was done under sonographic guidance. Group two (one hundred patients) in whom surgical evacuation was done without sonographic guidance.

Results: Group one cases showed no surgical failure in contrast to 10 cases from group two who failed with contents presented after evacuation (failure rate 10%).

Conclusions: Surgical evacuation under sonographic guidance is recommended because there are no surgical failures.
1. Introduction

It has been estimated that over 10 to 20% of pregnancies result in miscarriages, and that the majority occurs in the first trimester (1–3).

Clinical research has established suction curettage (vacuum aspiration) as the safest technique for uterine evacuation for induced abortion in the first trimester (4).

However, there are inherent risks related to the invasive nature of the procedure. STOP requires dilatation of the cervix.

The technique of dilating the cervix has remained largely unchanged since Alfred Hegar first demonstrated the procedure in 1874 (5).

The surgeon judges the completeness of the operation by subjective perception. The operation is generally considered safe, but a short-term complication rate of 6–10% has been reported (6–8).

With continuous ultrasound guidance, it should be possible to accurately identify the axis and the size of the uterus, position of the gestational sac, monitor the insertion of surgical instruments into the uterine cavity and the progress of the operation to confirm its safe completion.

The potential advantage of using ultrasonography in the management of elective STOP was described in the seventies in a series of case reports (9).

At present ultrasonography is not considered to be an essential prerequisite of abortion in all cases (2), however several reports describe its use to guide difficult therapeutic abortions (10–12), or to manage the complications (13,14).

A retrospective study has shown that the routine use of intraoperative ultrasonography reduces the incidence of uterine perforation during second trimester surgical abortion (15).

The objective of this study was to investigate in, controlled trial whether first trimester STOP under continuous ultrasound guidance is safer than the conventional procedure without ultrasound guidance.

2. Subjects and method

The study population consisted of the women undergoing STOP in the first trimester at the Elbadr hospital, Benha city, Egypt.

The participation was voluntary and an informed written consent was obtained in each case.

All women with confirmed intrauterine pregnancy with no contraindication to STOP under general anesthesia were included in the study.

2.1. Eligibility criteria

Gestational age more than 13 weeks or any suspicion of an ectopic pregnancy was the exclusion criteria.

2.2. Design

This was a controlled trial with two study arms. The participants were divided into two groups according to the use of ultrasound guidance.

Group one has the STOP (surgical termination of pregnancy) in the conventional way without the use of intra-operative ultrasound, and group two under continuous real-time ultrasound guidance.

All participants had a clinical history taken and general physical examination performed in the clinic.

An ultrasound examination was performed to confirm intrauterine pregnancy, to determine the gestational age, and number of gestational sacs and fetuses.

Any incidental findings, such as the presence of a uterine fibroids or ovarian cyst were recorded.

The operations were performed as a day case under general anesthesia.

The procedure done under ultrasound guidance had their entire operation monitored with real-time ultrasound A 3.5 MHz convex mindray (6600) China (abdominal transducer was used for this purpose).

2.3. Sample size calculation

The following simple formula (Daniel, 1999)

\[ n = \frac{Z^2 \times P(1 - P)}{D^2} \]

In which:

- \( Z \) = Area under normal curve corresponding to the desired confidence level.
- \( P \) = True proportion of factor in the population, or the expected frequency value.
- \( D \) = Maximum difference between the sample mean and the population mean, Or expected frequency value minus (−) worst acceptable value.
- \( Z \) = Area under normal curve corresponding to the desired confidence level.

Confidence level/value for \( Z \)
- 90%/1.645
- 95%/1.960
- 99%/2.575
- 99.9%/3.29

2.4. Operative procedure

The women were allowed to empty their urinary bladder before induction of anesthesia, but catheterization was not performed.

After positioning the patient appropriately on the operating table, bimanual pelvic examination was performed under anesthesia to assess the axis and the size of the uterus.
A Sim’s speculum was inserted into the vagina; the cervix was visualized and grasped using the Vulsellum forceps. The cervical canal was dilated gradually with Hegar dilators up to the size corresponding to the weeks of gestation. The uterine cavity was evacuated using a plastic cannula attached to an electric suction apparatus. Negative pressure of 75 mmHg was used. The aspirate was examined to confirm the presence of products of conception. The completeness of the evacuation was checked by gentle sharp curettage and final suctioning at the end of procedure. All patients received 5 IU of syntocinon intravenously during the procedure. The women in the intervention group had a preliminary scan to assess the size and axis of the uterus, and position and size of the pregnancy while the surgeon cleaned and draped the operation site. The transducer was held on the abdomen to obtain a longitudinal image of the uterus and cervix and provide the surgeon with a visual reference of the gestational sac, cervical canal and any instruments passed into the uterus. The progress of the operation was continuously monitored as the uterine contents were evacuated under visual control. It was possible to keep the dilators and the suction cannula under constant view by slightly tilting the transducer as required. Advancement of any instrument was allowed only under direct ultrasound control. The completeness of the evacuation was confirmed by the scan in these cases. Patients were allowed home about 4-6 h after the operation. Analgesics were routinely prescribed. Routine hospital follow up was arranged two weeks after discharge.

2.5. Data collection

Baseline information including age, number of previous pregnancies and their outcomes, gestational age, number of fetuses, and any incidental findings, such as fibroids or ovarian cysts were recorded for each participant (the hospital sheet).

2.5.1. The primary outcomes were intra-operative and short-term complications

Hemorrhage (measured blood loss including products of conception > 500 ml), cervical trauma (cervical laceration requiring suture or false passage), uterine perforation, retained products of conception (RPOC) requiring repeat evacuation, and infection.

The infection was defined as a temperature of 38.8°C on at least two occasions, or endometritis (abnormal vaginal discharge from the hospital, which they were requested to complete and return in 2 weeks after the operation.

The participants were provided with a questionnaire on discharge from the hospital, which they were requested to complete and return in 2 weeks after the operation. They were asked to state the number of days of bleeding requiring sanitary protection, pain requiring pain killers, disrupted daily routine (convalescence time).

The participants not returning the questionnaire by 4 weeks were interviewed by telephone.

2.6. Statistical methods

The data were analyzed using (Smith Statistical Package) Version 2.80 (2005) by Gary Smith.

$t$-test for parametric data were performed and calculated the relative risk (RR) with 95% confidence intervals (CI). All tests were performed two-sided and the differences were considered statistically significant if the $P$-value was < 0.05.

3. Results

A total of two hundred women attended the clinic (Elbadr hospital) in between June 2012 and June 2013. The demographic and baseline clinical data are summarized in Table 1; there were no statistically significant differences between the study groups.

The ultrasound images were found to be satisfactory by the surgeon for the visualization of the uterus and its contents, guiding the instruments, monitoring the progress of the operation, and confirming the completeness of the uterine evacuation in all but one case.

Among women having the procedure under ultrasound guidance only one out of 100 (1%) had complications compared to 18 out of 100 (18%) among the control group regarding the main outcomes Table 2.

The failure rate in the ultrasound guided group is zero compared to 10 cases (10%) of the group without ultrasound guidance Table 2.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Baseline characteristics.</th>
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<tbody>
<tr>
<td>Variable</td>
<td>STOP with US (100)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>25 (SD = 6.38)</td>
</tr>
<tr>
<td>Twin pregnancy</td>
<td>1</td>
</tr>
<tr>
<td>Nullipara</td>
<td>77</td>
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<table>
<thead>
<tr>
<th>Table 2</th>
<th>Intraoperative and short-term complications (primary outcomes).</th>
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<tbody>
<tr>
<td>Complications</td>
<td>STOP with US</td>
</tr>
<tr>
<td>Cervical trauma</td>
<td>0</td>
</tr>
<tr>
<td>Failed procedure</td>
<td>0</td>
</tr>
<tr>
<td>Infection</td>
<td>1</td>
</tr>
</tbody>
</table>

Intraoperative bleeding and postoperative analgesic requirements were significantly higher in STOP without ultrasound Table 3.
4. Discussion

Missed abortion is a big problem in female reproductive period. Advances in drugs allow safe evacuation of the uterine contents and avoid the use of surgical evacuation. Many cases refuse the medical termination of missed abortion or the medical termination failed to evacuate the uterine contents.

Surgical termination of missed abortion which was done blindly carries the risk of uterine perforation and incomplete evacuation.

Ultrasound guided evacuation of the uterine contents in missed abortion have the advantage of complete evacuation and also avoids the risk of uterine perforation (16,17).

This study concluded that intraoperative ultrasound guidance has a significant beneficial effect in reducing the recognized complications of first trimester.

The differences were especially obvious for short-term complications, such as RPOC and infection.

With the use of ultrasound guidance it may be possible to virtually eliminate the complications related to the blind nature of the conventional procedure, i.e. ongoing pregnancy, false passage caused by the dilators, uterine perforation, and RPOC.

There were no such complications in this study when ultrasound guidance was used. Whereas ten women in the control group required repeat evacuation for RPOC.

Uterine perforation during suction curettage is a potentially dangerous complication but can go unrecognized on many occasions (18).

Intra-operative ultrasonography not only provides visual guidance to the surgeon to direct the instruments and minimize the risk of perforation but also provides confirmation of suspected perforation and may enable completion of the evacuation (19).

The rate of significant hemorrhage (blood loss > 500 ml) was equal in both groups and no patient required blood transfusion. However, measured intraoperative blood loss was significantly less in the intervention group.

The amount of blood loss at STOP is related to the gestational age and the operative time. As the mean gestation was similar in the both study groups it is possible that the reduction in blood loss was mainly due to the reduction in the procedure time.

The time required to evacuate the uterine contents was significantly shorter when ultrasound guidance was used.

This may be mainly due to reduction in time required to determine the completeness of abortion by repeated check curettage and suctioning.

Sharp curettage, has been associated with increased risk of uterine perforation during suction termination (20).

There are no data to suggest that check curettage reduces the risk of retained products or failed abortion.

However many clinicians check the completeness of the procedure by gentle sharp curettage followed by final suctioning.

With the use of ultrasonography it should be possible to confirm the completeness of evacuation without resorting to check curettage and avoid associated risk of uterine perforation or excessive curettage leading to Asherman syndrome (21).

A significant number of patients in the control group had vaginal bleeding requiring sanitary protection for more than a week and required analgesics for a longer time compared to those having STOP under ultrasound guidance.

The convalescence time was longer in women who had their operation without ultrasound guidance and they were more likely to see a doctor following the operation.

This may again be related to longer postoperative pain and bleeding in this group of patients.

Capsi et al. (22) used real-time ultrasound guidance in 20 cases and ultrasound examination before and after the procedure in 80 cases of early pregnancy termination (menstrual regulation) and found this to be safer than the conventional procedure. Whether an approach of performing a scan preoperatively followed by another scan at the end of the procedure will have a similar effect in terms of outcomes needs to be investigated.

5. Conclusion

The use of intraoperative continuous real-time ultrasound guidance is associated with a significant reduction in the complications of STOP in the first trimester and appears to be safer than the conventional procedure without ultrasound.

Conflict of interest

We have no conflict of interest to declare.

References


<table>
<thead>
<tr>
<th>Table 3 Secondary outcomes.</th>
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<tbody>
<tr>
<td>Outcome</td>
</tr>
<tr>
<td>Intraoperative bleeding (ml)</td>
</tr>
<tr>
<td>Procedure time (s) &gt; 25 min</td>
</tr>
<tr>
<td>Analgesic requirement (days)</td>
</tr>
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(21)