Surgical procedures to evacuate incomplete miscarriage (Review)

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ABSTRACT

Background
Incomplete abortion is a major problem that should be effectively managed with safe and appropriate procedures. Surgical evacuation of the uterus for management of incomplete abortion usually involves vacuum aspiration or sharp curettage.

Objectives
To compare the safety and effectiveness of surgical uterine evacuation methods for management of incomplete abortion.

Search strategy
We searched the Cochrane Pregnancy and Childbirth Group trials register (December 2002), Medline from 1966, Popline from 1970, and the Cochrane Controlled Trials Register. Trials were also identified from reference lists of reviews. Date of last search: December 2002.

Selection criteria
Randomized trials where different surgical methods were used to manage incomplete abortion were eligible for inclusion.

Data collection and analysis
We extracted population characteristics, settings, and exclusion criteria, in addition to outcomes such as complications of the procedure, duration, need for re-evacuation, blood transfusion, and analgesia/anesthesia.

Main results
Two trials were included. Vacuum aspiration was associated with statistically significantly decreased blood loss (-17 mls weighted mean difference, 95% confidence interval (CI) -24 to -10 mls), less pain (relative risk (RR): 0.74, 95% CI 0.61, 0.90), and shorter duration of procedure (-1.2 minutes weighted mean difference, 95% CI -1.5 to -0.87 minutes), than sharp curettage, in the single study that evaluated these outcomes. Serious complications such as uterine perforation and other morbidity were rare and the sample sizes of the trials were not large enough to evaluate small or moderate differences.

Authors' conclusions
Vacuum aspiration is safe, quick to perform, and less painful than sharp curettage, and should be recommended for use in the management of incomplete abortion. Analgesia and sedation should be provided as necessary for the procedure.

PLAIN LANGUAGE SUMMARY

Vacuum aspiration is a safe and quick treatment for incomplete abortions

Bleeding and infection generally result if the uterus is not emptied after incomplete abortion (where parts of the products of conception are left in the uterus). The review of trials found that vacuum aspiration (a procedure that empties the uterus by using a vacuum source

with or without electricity) was safe, quick and easy to perform. It was also less painful than dilatation and curettage, which is often done under general anesthesia in an operating room.

BACKGROUND

Surgical evacuation of the uterus for management of incomplete abortion usually involves vacuum aspiration or sharp metal curettage (WHO 1995). Vacuum aspiration (also called suction curettage, menstrual regulation, endometrial aspiration, or mini-suction) utilises a vacuum source for the evacuation of the uterus. It can be performed on an outpatient basis with local anesthesia or analgesics. Vacuum aspiration can be used without electricity with a hand-held vacuum syringe (Manual Vacuum Aspiration). It can also be performed with an electric or foot-operated mechanical pump. Sharp metal curettage (also called D & C or dilatation and curettage) is often performed in an operating room under general anesthesia. In this method, a metal curette is used to evacuate the contents of the uterus. Sharp curettage is mostly performed without dilatation of the cervix, as the cervical canal is usually already open in incomplete abortion.

Many studies have documented the safety of vacuum aspiration (Greenslade 1993), and the World Health Organization (WHO) includes it as an essential obstetric service at the first level of care (WHO 1991). In most developed countries, vacuum aspiration has replaced sharp metal curettage, but still in many developing countries, physicians continue to use sharp metal curettage because they are not trained in vacuum aspiration, they do not have the necessary equipment to perform the procedure, or in some cases they are not convinced of the effectiveness of the procedure. Medical management of incomplete abortion is becoming increasingly common, but it may not be a feasible option in countries with limited health care resources, as it requires careful follow-up, continued access to medical care, and availability of relatively expensive drugs (Ballagh 1998).

Incomplete abortion is a major problem that should be effectively managed with safe and appropriate procedures. This review will attempt to evaluate the surgical procedures for uterine evacuation with regard to the most effective and safe strategy for the management of incomplete abortion.

OBJECTIVES

To compare the safety and effectiveness of surgical uterine evacuation methods for management of incomplete abortion.

CRITERIA FOR CONSIDERING STUDIES FOR THIS REVIEW

Types of studies

Randomized trials with adequate allocation concealment, where different surgical methods were used to manage incomplete abortion, were eligible for inclusion. Trials with violations of allocated management, or exclusions after allocation not sufficient to materially affect outcomes were eligible.

Types of participants

All trials enrolling women with incomplete abortion were eligible, regardless of the cause of the incomplete abortion (i.e. spontaneous versus induced).

Types of intervention

Any type of vacuum aspiration versus dilatation and curettage (D & C) or simple curettage (without dilatation).

Comparison of different types of vacuum aspiration including the use of different cannulas or different sources of vacuum pressure (manual/syringe, electric).

Exclusion criteria:
(1) Studies comparing different methods of induced abortions (i.e. elective termination of pregnancy).
(2) Studies comparing different medical methods of termination of pregnancy.
(3) Studies comparing surgical with medical methods for the management of incomplete abortion.

Comparisons of types of anesthesia/analgesia and hospital versus outpatient care are not evaluated in this review.

Types of outcome measures

(1) Uterine perforation;
(2) need for re-evacuation/procedure failure;
(3) duration of procedure;
(4) post-abortal infection/sepsis;
(5) blood loss;
(6) duration of bleeding/vaginal discharge after procedure;
(7) side effects of procedure;
(8) need for anesthesia/analgesia;
(9) pain;
(10) need for blood transfusion;
(11) need for additional uterotonics;
(12) length of hospital stay;
(13) patient satisfaction.

Outcomes such as Ashermann Syndrome (uterine synechiae, adhesions of the uterine wall), infertility, incompetent cervix and ectopic pregnancy following surgical management of incomplete abortion are relevant and important outcomes. However, these are relatively infrequent, require long term follow-up (years) and are not amenable to diagnosis unless the woman wants future pregnancies and the problems become apparent. It is therefore not easy (if not impossible) to evaluate these outcomes with the randomized controlled trial methodology.

SEARCH METHODS FOR IDENTIFICATION OF STUDIES

See: methods used in reviews.

Electronic literature search of MEDLINE (1966 to December 2002) and POPLINE (1970 to December 2002) databases with the following disease terms:
(1) abortion, incomplete;
(2) abortion, curettage;
(3) abortion, induced;
(4) abortion, therapeutic;
(5) abortion, spontaneous;
(6) abortion, septic;
(7) miscarriage;
(8) termination of pregnancy;
(9) suction curettage;
(10) sharp curettage.

This review has drawn on the search strategy developed for the Pregnancy and Childbirth Group as a whole. Relevant trials were identified in the Group's Specialised Register of Controlled Trials. See Review Group's details for more information. Date of last search: December 2002.

Trials were also identified from the reference lists of reviews.

No study was excluded on the basis of the language in which it was written.

METHODS OF THE REVIEW

All trials identified with this search strategy were considered for inclusion and listed in this review. Trials with objectives other than surgical uterine evacuation methods for management of incomplete abortion and where no evidence of random allocation was found were excluded without further evaluation.

Trials remaining after this stage were critically appraised for methodological quality. Quality score for allocation concealment was given as described in the Cochrane Reviewers' Handbook (Clarke 2000). Briefly, trials which use secure concealment methods such as central randomization, sealed, opaque, consecutively numbered envelopes, were given a quality score of (A). Trials with unknown or unclear methods of concealment were given a quality score of (B). Inadequately concealed trials, such as those that use open randomization methods were given a quality score of (C).

Data extraction: In addition to pre-specified outcomes, the following characteristics of trials were extracted:

(1) country;
(2) settings (hospital/outpatient clinic);
(3) exclusion criteria;
(4) women excluded from analyses after randomization;
(5) loss to follow-up;
(6) use of antibiotics.

Loss to follow-up rate and reason for loss to follow-up were scrutinized, and trials where there was a high likelihood of attrition bias (imbalance in the loss to follow-up rates in study groups) were excluded.

Data extraction was performed by two reviewers independently, and any disagreement was resolved by discussion.

DESCRIPTION OF STUDIES

Twenty-five trials were identified and considered for inclusion in this review. Of these, twenty-three were excluded (reasons given in the tables), and two were included. The included trials were conducted in Singapore (Tan 1969) and Zimbabwe (Verkuyl 1993).

The included trials were relatively small, with 193 women in the Tan 1969 study and 357 women in the Verkuyl 1993 study. Both of the trials examined vacuum aspiration versus sharp metal curettage. No trial compared different cannula types in vacuum aspiration, or different sources of suction pressure. Verkuyl 1993 used plastic cannulae with suction pressure generated via a syringe, and Tan 1969 used metal cannulae with electrical power source for suction.

Both procedures were performed in the same outpatient operating theatre in Verkuyl 1993, and all patients received intravenous pethidine and diazepam. Anesthesia use or the settings of the procedures were not specified in Tan 1969.

None of the trials noted the etiology of the incomplete abortion (e.g. spontaneous or induced).

METHODOLOGICAL QUALITY

Allocation concealment was adequate in Verkuyl 1993 which used sealed, opaque, envelopes. Tan 1969 did not make note of the method of allocation concealment.

Given the nature of the intervention, it is not possible to blind the physicians performing the procedures to the method of uterine

evacuation. It is, however, possible to blind the evaluator who assessed complications during the follow-up visit. Verkuyl 1993 had blinding of the follow-up evaluator, but Tan 1969 made no mention of blinding of any of the outcome assessments.

Tan 1969 did not note any losses to follow-up. Verkuyl 1993 lost 22.9% in the vacuum aspiration group, and 25.8% in the sharp curettage group, to follow-up.

The main limitations of these studies are their small sample sizes with regard to serious morbidity, and the large loss to follow-up rate in the Verkuyl 1993 trial. Lack of blinding of outcome assessments is a limitation in Tan 1969.

RESULTS

The review includes data from two studies where vacuum aspiration was compared to sharp metal curettage. Uterine perforation and need for re-evacuation were evaluated by both trials. The remaining outcomes were evaluated by only one trial (Verkuyl 1993).

Vacuum aspiration was associated with decreased blood loss (-17 mls weighted mean difference, 95% confidence interval (CI) -24 to -10 mls), fewer women with blood loss greater than or equal to 100 mls, (relative risk (RR): 0.28, 95% CI 0.10, 0.73), and fewer women with a post-operative hemoglobin level less than 10g/dl (RR: 0.55, 95% CI 0.33, 0.90). Fewer women undergoing vacuum aspiration reported moderate to severe pain during the procedure (RR: 0.74, 95% CI 0.61, 0.90), and the duration of the procedure was shorter for vacuum aspiration than for sharp metal curettage (-1.2 mins. weighted mean difference, 95% CI -1.5 to -0.87 minutes).

The remaining findings were not statistically significant. For vacuum aspiration versus sharp curettage respectively, the results were as follows: uterine perforation 0/227 versus 1/221 (RR: 0.32, 95% CI 0.01, 7.76); need for re-evacuation 3/227 versus 2/236 (RR: 1.50, 95% CI 0.29, 7.83); incidence of sepsis 2/138 versus 7/132 (RR: 0.27, 95% CI 0.06, 1.29). Duration of bleeding after the procedure (-0.3 days weighted mean difference, 95% CI -1.3 to 0.7 days).

DISCUSSION

This review evaluates vacuum aspiration versus sharp metal curettage in the management of incomplete abortion. Two trials fit the criteria and are included.

The results indicate that vacuum aspiration is safe, quicker to perform, and less painful than sharp curettage, as evidenced by statistically significant findings of decreased blood loss, decreased perception of pain, and a shorter duration of the vacuum aspiration procedure. The conclusions of the review might be limited by the small number of trials evaluating these outcomes, and the large loss to follow-up rate in the Verkuyl 1993 trial.

Uterine perforation is a serious complication of surgical evacuation procedures which is relatively rare with either of the approaches. Of the more than 200 patients included in each arm, perforation occurred in one case in the sharp curettage group, and none in the vacuum aspiration group. The need for re-evacuation was slightly lower in the vacuum aspiration group in Tan 1969 (1/89 versus 2/104), but higher in Verkuyl 1993 (2/138 versus 0/132). Given the rare occurrence of perforation and need for re-evacuation with either approach, very large trials would be needed to evaluate any significant differences between vacuum aspiration and sharp curettage. When other advantages of vacuum aspiration are considered, such a trial may not be justifiable.

Vacuum aspiration can be performed without the need for a fully equipped and staffed operating theatre as it can be done with or without electricity, under local anesthesia or sedation. It can therefore be performed in settings with limited resources, saving time and money, and possibly minimizing complications. Eliminating the need for transport to a better equipped facility might decrease the severity of an infection, or decrease blood loss and the subsequent need for transfusions.

In conclusion, the results of this review suggest that vacuum aspiration is at least as effective as sharp curettage, if not more effective in the management of incomplete abortion. However, sharp curettage continues to be used widely in many parts of the world. Some clinicians argue that in experienced hands it is safe and effective and are therefore reluctant to change to suction curettage. In such settings, a randomized controlled trial could be justified to convince the health workers of the safety and efficacy of suction curettage. It has been suggested that vacuum aspiration is more cost effective than sharp curettage (Greenslade 1993). Since the pain seems to be less and procedure time is shorter efforts should be put into wider dissemination and use of the vacuum aspiration technology around the world.

AUTHORS' CONCLUSIONS

Implications for practice

Vacuum aspiration is safe, quick to perform, and less painful than sharp curettage, and should be recommended for use in the management of incomplete abortion.

Implications for research

Different sources of vacuum pressure, cannula types, methods of analgesia, and duration of hospital stay have not been evaluated here and deserve to be reviewed and further researched if necessary. Comparing the effectiveness of vacuum aspiration with sharp

curettage could only be justified in the context of convincing health workers to use vacuum aspiration rather than sharp curettage.

POTENTIAL CONFLICT OF INTEREST

None known.

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- Duke University School of Medicine, North Carolina USA

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TABLES

Characteristics of included studies

Study	Tan 1969
Methods	The method of allocation is not stated. No mention of blinding of outcome assessments.

Participants	193 women presenting with incomplete abortion in a hospital in Singapore. - Exclusion criteria: women with missed abortion.
Interventions	Treatment with electric pump vacuum aspiration using metal cannulae 9mm to 16mm in diameter, versus sharp metal curettage.
Outcomes	Failure rate/need for re-evacuation (macroscopic and histologic evidence of retained products), any complications eg. perforated uterus.
Notes	- No mention was made of women excluded from analyses after randomization. - No mention was made of any loss to follow-up. - No mention was made of prophylactic antibiotic use. - No mention was made of anesthesia/analgesia use. - Cases were followed-up at two week intervals on two or more occasions to evaluate for complications.
Allocation concealment	B – Unclear

Study	**Verkuyl 1993**
Methods	Allocation was by means of a random number table, with group allocation sequentially placed in opaque, consecutively numbered envelopes. Follow-up evaluator was unaware of patients study group.
Participants	357 women presenting with incomplete abortion in a hospital in Zimbabwe. - Exclusion criteria: gestational age greater than 18 weeks, evidence of septicemia, peritonitis, severe hypovolemia requiring hospitalization.
Interventions	Treatment with manual vacuum aspiration using plastic cannulae of 8mm or 10mm, versus sharp metal curettage, both in the theatre.
Outcomes	Need for re-evacuation, pain severity, possible uterine perforation, sepsis, mean blood loss, blood loss >= 100ml, mean duration of procedure, duration >= 4 minutes, post-op hemoglobin level, post-op hemoglobin level <= 10g/dl, hemoglobin level difference, mean duration of bleeding post evacuation.
Notes	- 41 (22.9%) women in the suction curettage group, and 46 (25.8%) in the sharp curettage group were lost to follow up and were excluded from some of the analyses. - No mention was made of prophylactic antibiotic use. - All patients received IV pethidine and diazepam. Ergometrine was also given routinely. - Patients were followed-up on post-evacuation day 14.
Allocation concealment	A – Adequate

IV = intravenous

Characteristics of excluded studies

Study	**Reason for exclusion**
Allen 1971	No randomized or quasi-randomized comparisons were made. The trial evaluated different forms of analgesia for curettage in incomplete abortion.
Antonovski 1975	This randomized trial compared metal versus plastic cannulae for induced abortions.
Balogh 1982	No randomized or quasi-randomized comparisons were made. The trial evaluated vacuum aspiration in induced abortions.
Blumenthal 1994	No randomized or quasi-randomized comparisons were made. The trial involved a time and cost analysis for management of incomplete abortion with MVA.
Caceres 1981	Multiple unsuccessful attempts were made to get this manuscript.
Cheng 1976	This randomized trial compared inpatient versus outpatient management of induced abortion.
El Kabarity 1985	Multiple unsuccessful attempts were made to get this manuscript.

Characteristics of excluded studies (*Continued*)

Farell 1982	No randomized or quasi-randomized comparisons were made. The trial examined treatment of consecutive patients with suction curettage.
Filshie 1973	No randomized or quasi-randomized comparisons were made. The trial examined treatment of consecutive patients with suction curettage.
Fonseca 1997	This randomized trial evaluated cost and duration of hospital stay. The data presented was not suitable for extraction. Unsuccessful attempts were made to get additional data.
Gruenberger 1979	The trial evaluated different forms of analgesia for suction curettage.
Henderson Lewis 1979	Multiple unsuccessful attempts were made to get this manuscript.
Hill 1971	No randomized or quasi-randomized comparisons were made. The trial compared consecutive patients undergoing sharp curettage to those undergoing vacuum curettage during another time period.
Johnson 1993	No randomized or quasi-randomized comparisons were made. This trial involved a cost analysis for treatment of incomplete abortion with MVA and sharp curettage.
Kizza 1990	This trial was not randomized, as allocation was by alternation. Manual vacuum aspiration was compared to sharp metal curettage in women with incomplete abortion.
Lean 1976	This randomized trial compared dilatation and curettage and vacuum aspiration for induced abortion.
Lukman 1996	No randomized or quasi-randomized comparisons were made. The trial evaluated vacuum aspiration and sharp curettage for management of incomplete abortion.
Magnelli 1992	It was not clear whether this trial was randomized. Women with incomplete abortion, stillbirths, molar pregnancy, retained products, and anembryonic pregnancy were treated with either suction curettage or sharp curettage.
Magotti 1995	This was a quasi-randomized trial, but the data was not complete and suitable for extraction. Unsuccessful attempts were made to get additional data.
Mahomed 1994	No randomized or quasi-randomized comparisons were made. The trial evaluated vacuum aspiration and sharp curettage for management of incomplete abortion.
Rashid 1970	No randomized or quasi-randomized comparisons were made. The trial examined treatment of consecutive patients with suction curettage.
Ricalde 1997	No randomized or quasi-randomized comparisons were made. The trial examined vacuum aspiration and dilatation and curettage for incomplete abortion.
Suter 1970	No randomized or quasi-randomized comparisons were made. The trial examined treatment of consecutive patients with suction curettage.

MVA = manual vacuum aspiration

ANALYSES

Comparison 01. Any type of Vacuum Aspiration (VA) versus Sharp Metal Curettage (SMC)

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Uterine perforation	2	448	Relative Risk (Fixed) 95% CI	0.32 [0.01, 7.76]
02 Need for re-evacuation of uterus	2	463	Relative Risk (Fixed) 95% CI	1.50 [0.29, 7.83]
03 Sepsis	1	270	Relative Risk (Fixed) 95% CI	0.27 [0.06, 1.29]
04 Moderate to severe pain during procedure	1	357	Relative Risk (Fixed) 95% CI	0.74 [0.61, 0.90]
05 Blood loss >= 100ml	1	357	Relative Risk (Fixed) 95% CI	0.28 [0.10, 0.73]
06 Blood loss (mls)	1	357	Weighted Mean Difference (Fixed) 95% CI	-17.10 [-24.05, -10.15]

07 Post-op hemoglobin level < 10g/dl	1	270	Relative Risk (Fixed) 95% CI	0.55 [0.33, 0.90]
08 Duration of procedure (minutes)	1	357	Weighted Mean Difference (Fixed) 95% CI	-1.20 [-1.53, -0.87]
09 Duration of bleeding (days)	1	270	Weighted Mean Difference (Fixed) 95% CI	-0.30 [-1.30, 0.70]
10 Need for additional uterotonics	0	0	Relative Risk (Fixed) 95% CI	Not estimable

INDEX TERMS

Medical Subject Headings (MeSH)

Abortion, Incomplete [*surgery]; Dilatation and Curettage [*methods]; Treatment Outcome; Vacuum Curettage

MeSH check words

Female; Humans; Pregnancy

COVER SHEET

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GRAPHS AND OTHER TABLES

Analysis 01.01. Comparison 01 Any type of Vacuum Aspiration (VA) versus Sharp Metal Curettage (SMC), Outcome 01 Uterine perforation

Review: Surgical procedures to evacuate incomplete miscarriage

Comparison: 01 Any type of Vacuum Aspiration (VA) versus Sharp Metal Curettage (SMC)

Outcome: 01 Uterine perforation

Study	MVA n/N	SMC n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
× Tan 1969	0/89	0/89		0.0	Not estimable
Verkuyl 1993	0/138	1/132		100.0	0.32 [0.01, 7.76]
Total (95% CI)	227	221		100.0	0.32 [0.01, 7.76]
Total events: 0 (MVA), 1 (SMC)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.70 p=0.5					

Analysis 01.02. Comparison 01 Any type of Vacuum Aspiration (VA) versus Sharp Metal Curettage (SMC), Outcome 02 Need for re-evacuation of uterus

Review: Surgical procedures to evacuate incomplete miscarriage

Comparison: 01 Any type of Vacuum Aspiration (VA) versus Sharp Metal Curettage (SMC)

Outcome: 02 Need for re-evacuation of uterus

Study	VA n/N	SMC n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Tan 1969	1/89	2/104		78.3	0.58 [0.05, 6.34]
Verkuyl 1993	2/138	0/132		21.7	4.78 [0.23, 98.73]
Total (95% CI)	227	236		100.0	1.50 [0.29, 7.83]
Total events: 3 (VA), 2 (SMC)					
Test for heterogeneity chi-square=1.16 df=1 p=0.28 I^2 =14.1%					
Test for overall effect z=0.48 p=0.6					

Analysis 01.03. Comparison 01 Any type of Vacuum Aspiration (VA) versus Sharp Metal Curettage (SMC), Outcome 03 Sepsis

Review: Surgical procedures to evacuate incomplete miscarriage

Comparison: 01 Any type of Vacuum Aspiration (VA) versus Sharp Metal Curettage (SMC)

Outcome: 03 Sepsis

Study	VA n/N	SMC n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Verkuyl 1993	2/138	7/132		100.0	0.27 [0.06, 1.29]
Total (95% CI)	138	132		100.0	0.27 [0.06, 1.29]
Total events: 2 (VA), 7 (SMC)					
Test for heterogeneity: not applicable					
Test for overall effect z=1.64 p=0.1					

Analysis 01.04. Comparison 01 Any type of Vacuum Aspiration (VA) versus Sharp Metal Curettage (SMC), Outcome 04 Moderate to severe pain during procedure

Review: Surgical procedures to evacuate incomplete miscarriage

Comparison: 01 Any type of Vacuum Aspiration (VA) versus Sharp Metal Curettage (SMC)

Outcome: 04 Moderate to severe pain during procedure

Study	VA n/N	SMC n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Verkuyl 1993	85/179	114/178		100.0	0.74 [0.61, 0.90]
Total (95% CI)	179	178		100.0	0.74 [0.61, 0.90]
Total events: 85 (VA), 114 (SMC)					
Test for heterogeneity: not applicable					
Test for overall effect z=3.10 p=0.002					

Analysis 01.05. Comparison 01 Any type of Vacuum Aspiration (VA) versus Sharp Metal Curettage (SMC), Outcome 05 Blood loss >= 100ml

Review: Surgical procedures to evacuate incomplete miscarriage

Comparison: 01 Any type of Vacuum Aspiration (VA) versus Sharp Metal Curettage (SMC)

Outcome: 05 Blood loss >= 100ml

Study	VA n/N	SMC n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Verkuyl 1993	5/179	18/178		100.0	0.28 [0.10, 0.73]
Total (95% CI)	179	178		100.0	0.28 [0.10, 0.73]
Total events: 5 (VA), 18 (SMC)					
Test for heterogeneity: not applicable					
Test for overall effect z=2.60 p=0.009					

Analysis 01.06. Comparison 01 Any type of Vacuum Aspiration (VA) versus Sharp Metal Curettage (SMC), Outcome 06 Blood loss (mls)

Review: Surgical procedures to evacuate incomplete miscarriage

Comparison: 01 Any type of Vacuum Aspiration (VA) versus Sharp Metal Curettage (SMC)

Outcome: 06 Blood loss (mls)

Study	VA N	VA Mean(SD)	SMC N	SMC Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Verkuyl 1993	179	19.20 (25.60)	178	36.30 (39.80)		100.0	-17.10 [-24.05, -10.15]
Total (95% CI)	179		178			100.0	-17.10 [-24.05, -10.15]
Test for heterogeneity: not applicable							
Test for overall effect z=4.82 p<0.00001							

Analysis 01.07. Comparison 01 Any type of Vacuum Aspiration (VA) versus Sharp Metal Curettage (SMC), Outcome 07 Post-op hemoglobin level < 10g/dl

Review: Surgical procedures to evacuate incomplete miscarriage

Comparison: 01 Any type of Vacuum Aspiration (VA) versus Sharp Metal Curettage (SMC)

Outcome: 07 Post-op hemoglobin level < 10g/dl

Study	VA n/N	SMC n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Verkuyl 1993	20/138	35/132		100.0	0.55 [0.33, 0.90]
Total (95% CI)	138	132		100.0	0.55 [0.33, 0.90]
Total events: 20 (VA), 35 (SMC)					
Test for heterogeneity: not applicable					
Test for overall effect z=2.39 p=0.02					

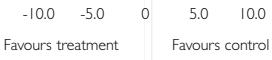
Analysis 01.08. Comparison 01 Any type of Vacuum Aspiration (VA) versus Sharp Metal Curettage (SMC), Outcome 08 Duration of procedure (minutes)

Review: Surgical procedures to evacuate incomplete miscarriage

Comparison: 01 Any type of Vacuum Aspiration (VA) versus Sharp Metal Curettage (SMC)

Outcome: 08 Duration of procedure (minutes)

Study	VA N	VA Mean(SD)	SMC N	SMC Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Verkuyl 1993	179	2.20 (1.40)	178	3.40 (1.80)		100.0	-1.20 [-1.53, -0.87]
Total (95% CI)	179		178			100.0	-1.20 [-1.53, -0.87]
Test for heterogeneity: not applicable							
Test for overall effect z=7.03 p<0.00001							



Analysis 01.09. Comparison 01 Any type of Vacuum Aspiration (VA) versus Sharp Metal Curettage (SMC), Outcome 09 Duration of bleeding (days)

Review: Surgical procedures to evacuate incomplete miscarriage

Comparison: 01 Any type of Vacuum Aspiration (VA) versus Sharp Metal Curettage (SMC)

Outcome: 09 Duration of bleeding (days)

Study	VA		SMC		Weighted Mean Difference (Fixed)	Weight	Weighted Mean Difference (Fixed)
	N	Mean(SD)	N	Mean(SD)	95% CI	(%)	95% CI
Verkuyl 1993	138	4.90 (3.80)	132	5.20 (4.50)		100.0	-0.30 [-1.30, 0.70]
Total (95% CI)	138		132			100.0	-0.30 [-1.30, 0.70]
Test for heterogeneity: not applicable							
Test for overall effect z=0.59 p=0.6