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[Intervention Review]

Surgical methods for first trimester termination of pregnancy

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ABSTRACT

Background

Different surgical methods for termination of pregnancy have evolved over the years: Dilatation and curettage, power operated vacuum aspiration (VA), manual vacuum aspiration (MVA) or hysterotomy. Local or general anaesthesia is used for all methods. Preabortion medical or mechanical cervical preparation may reduce the incidence of cervical or uterine injuries.

Objectives

To compare the safety and efficacy of different surgical methods for first trimester abortion.

Search methods

The Cochrane Controlled Trials Register has been searched. A search of the reference lists of identified trials was performed. An additional MEDLINE search was done using the Internet search service Pub Med.

Selection criteria

Randomised controlled trials comparing different surgical methods for first trimester abortion were eligible.

Data collection and analysis

Trials under consideration were evaluated for methodological quality and appropriateness for inclusion. Eleven trials were included, resulting in 3 comparisons: 1) vacuum aspiration versus dilatation and curettage, 2) flexible versus rigid vacuum aspiration cannula, 3) manual vacuum aspiration versus electrical vacuum aspiration. Results are reported as risk ratio for dichotomous data and weighted mean differences for continuous data.

Main results

There were no reports of maternal deaths in the trials identified.
Vacuum aspiration versus dilatation and curettage:
There were no statistically significant differences for excessive blood loss, blood transfusion, febrile morbidity, incomplete or repeat uterine evacuation procedure, re-hospitalisation, post operative abdominal pain or therapeutic antibiotic use. Duration of operation was statistically significantly shorter with vacuum aspiration compared to D&C in both gestational age subgroups : < 9 weeks: weighted mean difference (WMD) -1.84 minutes, 95% confidence interval (CI) [-2.542,-1.138]; =/> 9 weeks: WMD -0.600 minutes, 95% CI [-1.166,-0.034]).
Flexible versus rigid vacuum aspiration cannula:

There were no statistically significant differences with regard to cervical injuries, febrile morbidity, blood transfusion, therapeutic antibiotic use, or incomplete or repeat uterine evacuation procedure.
Manual vacuum aspiration versus electrical vacuum aspiration:
Severe pain was reported less often with MVA compared to VA in women with < 9 weeks of amenorrhoea (RR 0.73; 95% CI 0.47 to 1.16). In women with amenorrhoea > 9 weeks, severe difficulty of the procedure was reported more frequently with MVA compared to VA (RR 5.7; 95%CI 2.45 to 13.28). There was no difference in cervical injuries, excessive blood loss, blood transfusion, febrile morbidity, repeat uterine evacuation, duration of operation and women's preference between the two groups.

Authors' conclusions

Complications for surgical first trimester abortion are rare. The included studies do not indicate overall benefits of one over the other method. MVA can be used for early first trimester surgical abortion, but maybe more difficult when used later in the first trimester. Duration of procedure is shorter with VA compared to D&C, which may be of importance when using local anaesthetics or for busy clinics. Outcomes such as women's satisfaction, the need for pain relief or surgeons preference for the instrument have been inadequately addressed. No long-term outcomes, such as fertility after surgical abortion, are available.

PLAIN LANGUAGE SUMMARY

The review found that both, D&C and vacuum aspiration, are safe and effective methods for first trimester termination of pregnancy and complications are rare.

There are several different surgical techniques for early termination of pregnancy (abortion in the first three months). These are dilatation and curettage (D&C to scrape out the contents of the uterus), vacuum aspiration (sucking out the contents of the uterus with a manual or power-operated device). Hysterotomy (surgery through the uterus, like caesarean section) is not commonly used. The cervix (opening of the uterus) can be prepared beforehand with hormones to minimise the risk of damage. The review found that both, D&C and vacuum aspiration, are safe and effective methods for first trimester termination of pregnancy and complications are rare. The review does not reveal women's or surgeons' preference of one method over the other.

BACKGROUND

Every year about 36-53 million unwanted pregnancies are terminated by induced abortion throughout the world (Henshaw 1990). The exact number is not known, as statistics on induced abortion are not always reliable due to underreporting, and as there is no satisfactory method to estimate the number of unsafe abortions. It is estimated that 30-50% of all women undergo at least one induced abortion during their lifetime (Van Look 1993).
Currently, some 63% of the world's population live in countries where abortion is available on request or where psycho-social factors are accepted as a valid indication. Deaths due to unsafe abortion are associated with infection, haemorrhage, uterine injury and the toxic effects of agents taken by mouth or injected into the uterus to induce abortion.

While induced abortion is safe in countries where the procedure is legal and appropriate services are widely available, the risk of suffering serious complications and perhaps death is considerable where the operation is performed by unqualified people under unhygienic conditions. Deaths related to unsafe abortions represent about one-fourth to one third of the estimated 500,000 maternal deaths that occur each year throughout the world, the vast majority in developing countries (Royston 1989).

In general, morbidity following the procedure seems to increase with the length of gestation. The likelihood of complications, including uterine perforation, cervical laceration, haemorrhage, incomplete removal of the fetus and placenta, and infection increases after the first trimester (Cunningham 1997). Surgical abortion at 7-9 weeks of gestation is associated with statistically significantly fewer complications than that performed at 9-14 weeks of amenorrhoea or in the second trimester. Complications are slightly more common up to 6 weeks of amenorrhoea than from 7 to 9 weeks (Heisterberg 1987).
Serious complications such as infections or haemorrhage, have been described more frequently in parous women and with increasing age (Buehler 1985). Within countries, morbidity rates decreased over the past 10-15 years as abortion has been provided earlier in pregnancy, better techniques have been developed and clinicians have become more skilled (Am Med Ass 1992).

Surgical methods for termination of pregnancy are described below.
Dilatation and curettage: the cervix is dilated until a forceps or curette of appropriate diameter can be inserted to remove the contents of the uterus. In some cases a sponge-holding forceps is used to remove larger parts of the contents.
Dilatation and electric vacuum aspiration: the cervix is dilated until a cannula of appropriate size can be inserted. The contents of the uterus are removed by suction through power operated vacuum aspiration. In some cases additional curettage of the uterus is performed.
Local or general anaesthesia is used for both methods. Preabortion medical or mechanical cervical preparation may reduce the incidence of cervical or uterine injuries (WHO 1981).
Manual vacuum aspiration (MVA): this is a uterine evacuation procedure using a hand-held vacuum syringe. Uterine contents are evacuated through a cannula into the syringe; local anaesthesia is commonly used (Gutmacher 1999).
If all procedures fail, then hysterotomy, although rarely used, might be performed to empty the contents of the uterus as a last resort.

This review aims to compare the safety and efficacy of different surgical methods for first trimester abortion.

OBJECTIVES

To compare the different surgical methods for first trimester abortion.

METHODS

Criteria for considering studies for this review

Types of studies

Randomised controlled trials comparing different surgical methods were considered. Trials were included on the basis of adequate concealment of allocation, randomisation procedure and follow-up.

Types of participants

Pregnant women in the first trimester, undergoing surgical abortion. Surgical abortion is usually the method used up to 14 weeks, therefore we included pregnancies up to 14 completed cardinal weeks of pregnancy (98 days from first day of the last menstrual period).

Types of interventions

Different surgical methods (manual vacuum aspiration, electric vacuum aspiration, dilatation and curettage) used for abortion, compared with each other.

Types of outcome measures

Primary outcomes:
* excessive blood loss as defined by trial authors
* blood transfusion
* uterine perforation
* cervical injury
* repeat uterine evacuation procedure
* febrile morbidity (raised body temperature) as defined by trial authors
* rehospitalisation
* death

Secondary outcomes:
* abdominal pain postoperatively (as described by the women or the use of analgesics),
* women's preference
* non-routine analgesic use postoperatively
* non-routine uterotonic use postoperatively
* non-routine antibiotic use postoperatively
* duration of operation
* hospital stay > 24 hours

Search methods for identification of studies

The Cochrane Controlled Trials register and MEDLINE were systematically searched. Reference lists of retrieved papers were searched. Experts at UNDP/UNFPA/WHO/World Bank Special Programme of Research in Human Reproduction (HRP) were contacted.
Electronic literature search of MEDLINE (with the Cochrane 3-stage search strategy) was conducted with the following key words:
1/ abortion
2/ surgical termination

3/ first trimester
4/ pregnan*
5/ curettage
6/ suction
7/ MVA (manual vacuum aspiration)
8/ vacuum aspiration (VA)

Data collection and analysis

The selection of trials for inclusion in the review has been performed independently by two authors after employing the search strategy described previously. Trials under consideration were evaluated for appropriateness for inclusion and methodological quality without consideration of their results. A score for concealment of allocation was assigned to each trial, using the criteria described in the Cochrane Handbook:
(A) adequate concealment of allocation
(B) unclear whether adequate concealment of allocation
(C) inadequate concealment of allocation (includes quasi-randomised studies)

Only trials scoring A or B were included in the review.

A form was designed to facilitate the process of data extraction which was performed by two reviewers independently. No discrepancies between reviewers in either the decision of inclusion/exclusion of studies or in data extraction occurred. Settings, countries, post randomisation exclusions and loss to follow-up data were systematically extracted. Data extraction for four publications in Chinese (Gan 2001, Fang 2004,Yin 2004, Yin 2005) was performed by one author (LC).
Data were processed by using RevMan software.

Trials were not excluded based on an arbitrary cut-off limit regarding losses to follow-up. Trials would be excluded if there are unexplained imbalances in different groups at follow-up and available outcome data. Subgroup analysis was performed for early and late first trimester abortions as the performance of some methods may differ with gestational age: (1) termination < 9 weeks of pregnancy (< 63 days), (2) termination =/> 9 weeks of pregnancy (=/> 63 days).

RESULTS

Description of studies

See: Table of included studies

Eleven trials met the inclusion criteria for this review, including 2164 women, resulting in three comparisons:

1) vacuum aspiration (VA) versus dilatation and curettage (D&C), 2 trials were included in this comparison (Lean 1976, Schweppe 1980).

2) metal (rigid) versus plastic (flexible) cannula includes one trial (Borko 1975)

3) manual vacuum aspiration (MVA) versus electrical vacuum aspiration (VA) includes eight trials (Bird 2003, Dean 2003, Edelman 2001, Fang 2004, Gan 2001, Hemlin 2001,Yin 2004,Yin 2005).

Seven trials have been conducted in Europe and USA in tertiary health centres or family planning clinics (Bird 2003, Borko 1975, Dean 2003, Edelman 2001, Hemlin 2001, Lean 1976, Schweppe 1980) and were published in English language journals. Four trials were conducted in tertiary health centres in China and published in Chinese medical journals (Fang 2004, Gan 2001,Yin 2004,Yin 2005). Duration of operation was reported without standard deviation (SD) in one trial and is included in the review in 'additional tables' section (Edelman 2001). In one trial (Schweppe 1980) a similar number of women in each group had the abortion procedure performed just before elective hysterectomy

See table of included studies for detailed description.

Risk of bias in included studies

Dean 2003 (Dean 2003) used computer generated random tables. Use of sequentially sealed, opaque envelopes for allocation concealment was described for one study (Dean 2003). Randomisation and allocation concealment were not further described in the other included studies.

Blinding to the intervention was not possible for the operator due to the type of intervention.

Effects of interventions

There were no reports of maternal deaths.
Two trials compared vacuum aspiration with dilatation and curettage:
There were no statistically significant differences in excessive blood loss, blood transfusion, febrile morbidity, incomplete or repeat uterine evacuation procedure, re-hospitalisation, postoperative abdominal pain or therapeutic antibiotic use. Duration of operation was statistically significantly shorter with vacuum aspiration compared to D&C in both subgroups : < 9 weeks: weighted mean difference (WMD) -1.84 minutes, 95% confidence interval (CI) [-2.542 to -1.138]; =/> 9 weeks: WMD -0.600 minutes, 95% CI [-1.166 to -0.034]).
There were no statistically significant differences with regard to cervical injuries, febrile morbidity, blood transfusion, therapeutic antibiotic use, or incomplete or repeat uterine evacuation procedure in the Borko trial, comparing flexible versus rigid vacuum aspiration cannula (Borko 1975).

In women with < 9 weeks amenorrhoea, uterine perforation occurred more often with VA compared to MVA in one trial (Yin 2005) but not in the other trials reporting on this outcome (Gan 2001, Hemlin 2001, Yin 2004) (RR 0.06; 95% CI 0.00 to 1.01). Severe pain was more often reported with VA compared to MVA in women with < 9 weeks of amenorrhoea (RR 0.73; 95% CI 0.47 to 1.16); there was no difference in women with amenorrhoea > 9 weeks for this outcome. Severe difficulty with the procedure described by the performing physician was more often reported with MVA compared to VA in women with amenorrhoea > 9 weeks (RR 5.7; 95%CI 2.45 to 13.28) (Dean 2003, Fang 2004). There was no difference in cervical injuries, excessive blood loss, blood transfusion, febrile morbidity, repeat uterine evacuation between the two groups. There was no difference in duration of operation in the one trial reporting on it (Hemlin 2001) or in women's preference for a method (Dean 2003).

DISCUSSION

This review focuses on efficacy and safety of different surgical abortion methods.
The interpretation needs to take into consideration that the outcomes are based on small sample sizes, sometimes on one

trial only. Mortality or major complications seem to be rare with the described methods, requiring a large sample size to detect meaningful differences. Serious complications such as mortality or perforation of the uterus are rare events and seem to be impractical for studying in randomised controlled trials. Nevertheless, the power of the review is rather limited even with more common outcomes. Furthermore, the methodological quality of the trials is not high. Insecure allocation concealment, when two different allocation procedures which are impossible to mask are compared, can introduce serious selection bias.

In a large multicentre cohort study, data from over 4400 women undergoing first trimester vacuum aspiration or D&C were analysed. The total complication rate varied with the gestational age and the method used. Vacuum aspiration was associated with lower rates of complications at 7 to 8 weeks gestation, similar rates at 9 to 12 weeks and higher rates after 12 weeks when compared to D&C. Major complication rates such as excessive blood loss, uterine injury, prolonged bleeding and repeat curettage and pelvic infection were higher in both groups with increased gestational age (Edelman 1974). VA was associated with higher repeat evacuation rates at all gestational ages.

In most trials included, the procedures were performed by experienced surgeons. In practice, however, surgical abortions are usually performed by junior staff and often unsupervised. Therefore, the complication rates may be higher. Edelman (Edelman 2001, Table 1) found that both, pain and duration of operation may be less with more experienced operators.

D&C continues to be used in many countries.The statistically significant reduction in operating time with vacuum aspiration (1.8 minutes) compared to D&C may be of importance for women undergoing the operation under local anaesthesia. Hand-held syringes for MVA are inexpensive, require little maintenance and can be the method of choice for early surgical abortion in resource restrained settings.

AUTHORS' CONCLUSIONS

Implications for practice

Complications with first trimester surgical abortions are rare. The included studies do not indicate overall benefits of one over the other method. The choice which method to use depends on the setting and the availability of the equipment. MVA can be used for early first trimester surgical abortion, but maybe more difficult when used later in the first trimester. Duration of procedure is shorter with VA compared to D&C, which may be of importance when using local anaesthetics or for busy clinics.

Implications for research

Some outcomes have not been adequately addressed in the trials included. For example, the need for pain relief, long-term consequences or physicians' preference for the instrument.

ACKNOWLEDGEMENTS

None

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* Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Bird 2003

Methods	Participants were randomly assigned
Participants	127 women recruited between June 2000 - September 2001 at family planning clinics in Portland, Baltimore and San Diego, USA; < 11 weeks gestation; aged 18 or older, good general and mental health, intrauterine pregnancy less than 11 weeks gestation (confirmed by date of last menstrual period and/or ultrasound), exclusion criteria: presence of any disorder requiring the abortion procedure to be performed in the operating room or other surgical setting, allergy to lidocaine, adnexal masses or tenderness on pelvic examination suggesting pelvic inflammatory disease, request for conscious sedation or general anesthesia.
Interventions	MVA vs VA; sedation/anaesthesia not described further, cervical preparation not mentioned
Outcomes	women's preference
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B-unclear

Borko 1975

Methods	Participants were randomly assigned using cards from envelopes.
Participants	300 healthy women at 7 - 10 weeks gestation (according to number of completed weeks from last menstrual period) at Maribor General Hospital (former Yugoslavia) 4 women were excluded from the analysis as they were found not to be pregnant at the time of intervention
Interventions	VA with rigid 8 mm cannula versus flexible 8 mm cannula paracervical block, oxytocin for all women sharp curette for checking the uterine cavity after the VA procedures done by 3 different surgeons

Borko 1975 *(Continued)*

Outcomes	1/)cannulae obstruction 2) incidence of complications 3) amount of tissue obtained with the curette check 4) time to perform the abortions
Notes	Physician was blinded at the follow-up examination Excessive blood loss was defined as >500ml

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Dean 2003

Methods	computer generated number tables
Participants	84 women recruited between June 2000 to December 2000 at San Francisco General Hospital, University California; USA; < 10 weeks of gestation; ; exclusion criteria: threatened or spontaneous abortion, early pregnancy failure, failed medical abortion, uterine anomalies or cervical or lower uterine segment myomas, suspected ectopic or molar pregnancy
Interventions	MVA vs VA; all women received paracervical bloc and diazepam; sharp curettage used at the end of procedure if necessary; cervical preparation not mentioned
Outcomes	disturbance of noise during procedure; pain during procedure assessed by treating physician; difficulty of procedure
Notes	4 crossovers from MVA to VA; ITT analysis; bothered by noise: MVA: 1/41; VA: 8/42

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Low risk	A - sequentially sealed opaque envelopes

Edelman 2001

Methods	'randomized' - no further explanation
Participants	114 women recruited between June 1999 to March 2000 at University Hospital (Planned Parenthood) Portland, USA; </= 77 days of LMP;
Interventions	MVA vs VA; all women received paracervical bloc; Diazepam p.o. on request; cervical preparation not mentioned
Outcomes	time needed for procedure; pain: at dilatation and at aspiration; 10 cm analogue scale for pain rating was used
Notes	women were asked if noise of the procedure subjectively increased pain: 44.6% MVA vs 58.5% VA

Edelman 2001 *(Continued)*

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - unclear

Fang 2004

Methods	'randomised' - no further explanation
Participants	300 women recruited between April - June 2003 at International Peace Maternity & Child Health Hospital, Shanghai, China; gestational age </= 10 weeks;
Interventions	MVA versus VA; cervical preparation not mentioned
Outcomes	pain during the procedure; blood loss, procedure complications, time of operation,dificulty of procedure
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B-unclear

Gan 2001

Methods	'randomised' - no further explanation
Participants	300 women recruited bewteen July 1999-march 2001 at Nan Ning Maternity and Child Health Hospital, Guangxi, China; gestational age: 31-42 days;
Interventions	MVA versus medical abortion (mifepristone 150mg + misoprostol 600ug po., MA) versus VA; MVA: n=100; MA: n=100; VA: n=100; cervical preparation for surgical methods not mentioned
Outcomes	pain during the procedure; blood loss, procedure complications and complications within 7-12 days; rehospitalisation, infection
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B- unclear

Hemlin 2001

Methods	randomised; numbered, sealed envelopes; used in numerical order

Hemlin 2001 *(Continued)*

Participants	200 women were recruited between September 1997- December 1999 in OBGYN department, Sweden; </= 56days of gestation; nulliparous and parous;
Interventions	MVA versus VA; women could choose either general anaesthesia or paracervical bloc; VA group: nulliparous women received Gemeprost suppositories pre-op
Outcomes	blood loss, procedure complications, rehospitalisation, infection
Notes	MVA: 2 cases had to be converted to VA due to repeat filling of the syringe before completion of procedure

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B- unclear

Lean 1976

Methods	Participants randomly assigned using cards in envelopes
Participants	420 healthy women at 6 - 12 weeks gestation (according to number of completed weeks from the last menstrual period) at Kandang Kerbeu Hospital, Singapore Exclusion criteria: preexisting medical conditions, ongoing abortion, need for general anaesthesia, concurrent surgery, request for IUD insertion at the same time
Interventions	VA versus D&C paracervical block for all women uterus explored with a sound after intervention all procedures done by the same surgeon
Outcomes	1) frequency of specific complications 2) frequency of a second precedure to complete the abortion 3) amount of estimated blood loss during the procedure 4) time required to perform the procedure
Notes	Excessive blood loss was defined as > 100ml (estimated by the operator)

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Schweppe 1980

Methods	Participants randomly assigned
Participants	47 healthy pregnant women at< 12 weeks gestation, undergoing legal abortion at the Frauenklinik in Münster, Germany
Interventions	VA versus metal curette 1) vacuum: elective vaginal hysterectomy in 3 women

Schweppe 1980 *(Continued)*

	2) metal curette: elective vaginal hysterectomy in 4 women histological evaluation of specimen (uteri)
Outcomes	1) estimated blood loss during the procedure 2) need to perform curette check after the VA 3/ frequency of specific complications 4) endometrial histology post abortion
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Yin 2004

Methods	'randomised' - no further explanation
Participants	150 women recruited at Obs/Gyn Department,Bai Yun Qu People's hospital, Guangzhou, China; gestational age:42-49 days;
Interventions	MVA versus medical abortion (mifepristone 150mg + misoprostol 600ug po., MA) versus VA; MVA: n=50; MA: n=50; VA: n=50; cervical preparation for surgical methods not mentioned
Outcomes	pain during the procedure; blood loss, procedure complications and complications within 7-12 days; rehospitalisation, infection
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B-unclear

Yin 2005

Methods	'randomised' - no further explanation
Participants	300 woman recruited at Obs/Gyn department, Zhengzhou Chinese Medicine hospital, Zhengzhou, China; gestational age:42-50 days
Interventions	MVA versus VA; cervical preparation not mentioned
Outcomes	blood loss, procedure complications,
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement

Yin 2005 *(Continued)*

Allocation concealment?	Unclear risk	B-unclear

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Poulsen 1982	Excluded because not randomised. 100 women treated with the Vabra ab aspirator folowed by 100 women treated by the conventional method. The requirement for dilatation by Hegar's method was less and the frequency of failure more when the Vabra ab aspirator was used.

Characteristics of studies awaiting assessment *[ordered by study ID]*

Bird 2001

Methods	to be retrieved
Participants	
Interventions	
Outcomes	
Notes	

Xu 2004

Methods	authors to be contacted about interventions
Participants	
Interventions	
Outcomes	
Notes	

DATA AND ANALYSES

Comparison 1. Vacuum aspiration versus dilatation and curettage

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Uterine perforation	1	47	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1.1 Amenorrhoea <9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.2 Amenorrhoea >9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.3 Duration of amenorrhoea not defined	1	47	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2 Cervical injury	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.1 Amenorrhoea <9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.2 Amenorrhoea >9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.3 Duration of amenorrhoea not defined	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
3 Excessive blood loss as defined by trial authors	2	257	Risk Ratio (M-H, Fixed, 95% CI)	1.02 [0.21, 4.95]
3.1 Amenorrhoea <9 weeks (approximately)	1	210	Risk Ratio (M-H, Fixed, 95% CI)	2.0 [0.18, 21.72]
3.2 Amenorrhoea >9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
3.3 Duration of amenorrhoea not defined	1	47	Risk Ratio (M-H, Fixed, 95% CI)	0.52 [0.05, 5.37]
4 Febrile morbidity as defined by trial authors	2	467	Risk Ratio (M-H, Fixed, 95% CI)	0.84 [0.26, 2.71]
4.1 Amenorrhoea <9 weeks (approximately)	1	210	Risk Ratio (M-H, Fixed, 95% CI)	0.67 [0.11, 3.91]
4.2 Amenorrhoea >9 weeks (approximately)	1	210	Risk Ratio (M-H, Fixed, 95% CI)	1.0 [0.14, 6.97]
4.3 Duration of amenorrhoea not defined	1	47	Risk Ratio (M-H, Fixed, 95% CI)	1.04 [0.07, 15.72]
5 Duration of operation	1	420	Mean Difference (IV, Fixed, 95% CI)	-1.09 [-1.53, -0.65]
5.1 Amenorrhoea <9 weeks (approximately)	1	210	Mean Difference (IV, Fixed, 95% CI)	-1.84 [-2.54, -1.14]
5.2 Amenorrhoea >9 weeks (approximately)	1	210	Mean Difference (IV, Fixed, 95% CI)	-0.60 [-1.17, -0.03]
5.3 Duration of amenorrhoea not defined	0	0	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
6 Blood transfusion	2	467	Risk Ratio (M-H, Fixed, 95% CI)	0.21 [0.01, 4.12]
6.1 Amenorrhoea <9 weeks (approximately)	1	210	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
6.2 Amenorrhoea >9 weeks (approximately)	1	210	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
6.3 Duration of amenorrhoea not defined	1	47	Risk Ratio (M-H, Fixed, 95% CI)	0.21 [0.01, 4.12]
7 Abdominal pain postoperatively	2	467	Risk Ratio (M-H, Fixed, 95% CI)	2.03 [0.38, 10.97]
7.1 Amenorrhoea <9 weeks (approximately)	1	210	Risk Ratio (M-H, Fixed, 95% CI)	3.0 [0.12, 72.81]
7.2 Amenorrhoea >9 weeks (approximately)	1	210	Risk Ratio (M-H, Fixed, 95% CI)	3.0 [0.12, 72.81]
7.3 Duration of amenorrhoea not defined	1	47	Risk Ratio (M-H, Fixed, 95% CI)	1.04 [0.07, 15.72]
8 Non-routine analgesic use postoperatively	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
8.1 Amenorrhoea <9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
8.2 Amenorrhoea >9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
8.3 Duration of amenorrhoea not defined	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
9 Non-routine uterotonic use postoperatively	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
9.1 Amenorrhoea <9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
9.2 Amenorrhoea >9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
9.3 Duration of amenorrhoea not defined	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
10 Non-routine antibiotic use postoperatively	1	420	Risk Ratio (M-H, Fixed, 95% CI)	0.8 [0.22, 2.94]
10.1 Amenorrhoea <9 weeks (approximately)	1	210	Risk Ratio (M-H, Fixed, 95% CI)	0.67 [0.11, 3.91]
10.2 Amenorrhoea >9 weeks (approximately)	1	210	Risk Ratio (M-H, Fixed, 95% CI)	1.0 [0.14, 6.97]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
10.3 Duration of amenorrhoea not defined	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
11 Incomplete evacuation	2	467	Risk Ratio (M-H, Fixed, 95% CI)	0.67 [0.11, 3.95]
11.1 Amenorrhoea <9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
11.2 Amenorrhoea >9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
11.3 Duration of amenorrhoea not defined	2	467	Risk Ratio (M-H, Fixed, 95% CI)	0.67 [0.11, 3.95]
12 Repeat uterine evacuation procedure	1	420	Risk Ratio (M-H, Fixed, 95% CI)	0.67 [0.11, 3.95]
12.1 Amenorrhoea <9 weeks (approximately)	1	210	Risk Ratio (M-H, Fixed, 95% CI)	1.0 [0.06, 15.78]
12.2 Amenorrhoea >9 weeks (approximately)	1	210	Risk Ratio (M-H, Fixed, 95% CI)	0.5 [0.05, 5.43]
12.3 Duration of amenorrhoea not defined	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
13 Hospital stay >24 hours	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
13.1 Amenorrhoea <9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
13.2 Amenorrhoea >9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
13.3 Duration of amenorrhoea not defined	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
14 Re-hospitalisation	2	467	Risk Ratio (M-H, Fixed, 95% CI)	1.13 [0.44, 2.86]
14.1 Amenorrhoea <9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
14.2 Amenorrhoea >9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
14.3 Duration of amenorrhoea not defined	2	467	Risk Ratio (M-H, Fixed, 95% CI)	1.13 [0.44, 2.86]
15 Death	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
15.1 Amenorrhoea <9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
15.2 Amenorrhoea >9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]

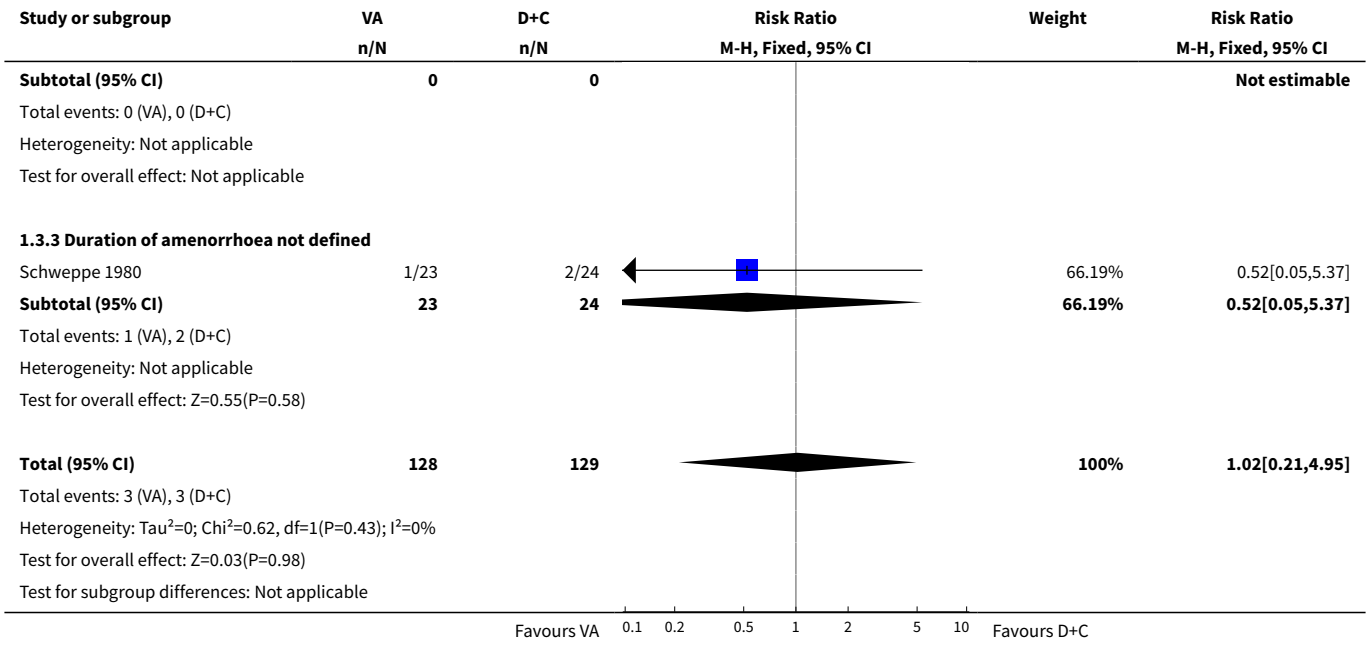
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
15.3 Duration of amenorrhoea not defined	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]

Analysis 1.1. Comparison 1 Vacuum aspiration versus dilatation and curettage, Outcome 1 Uterine perforation.

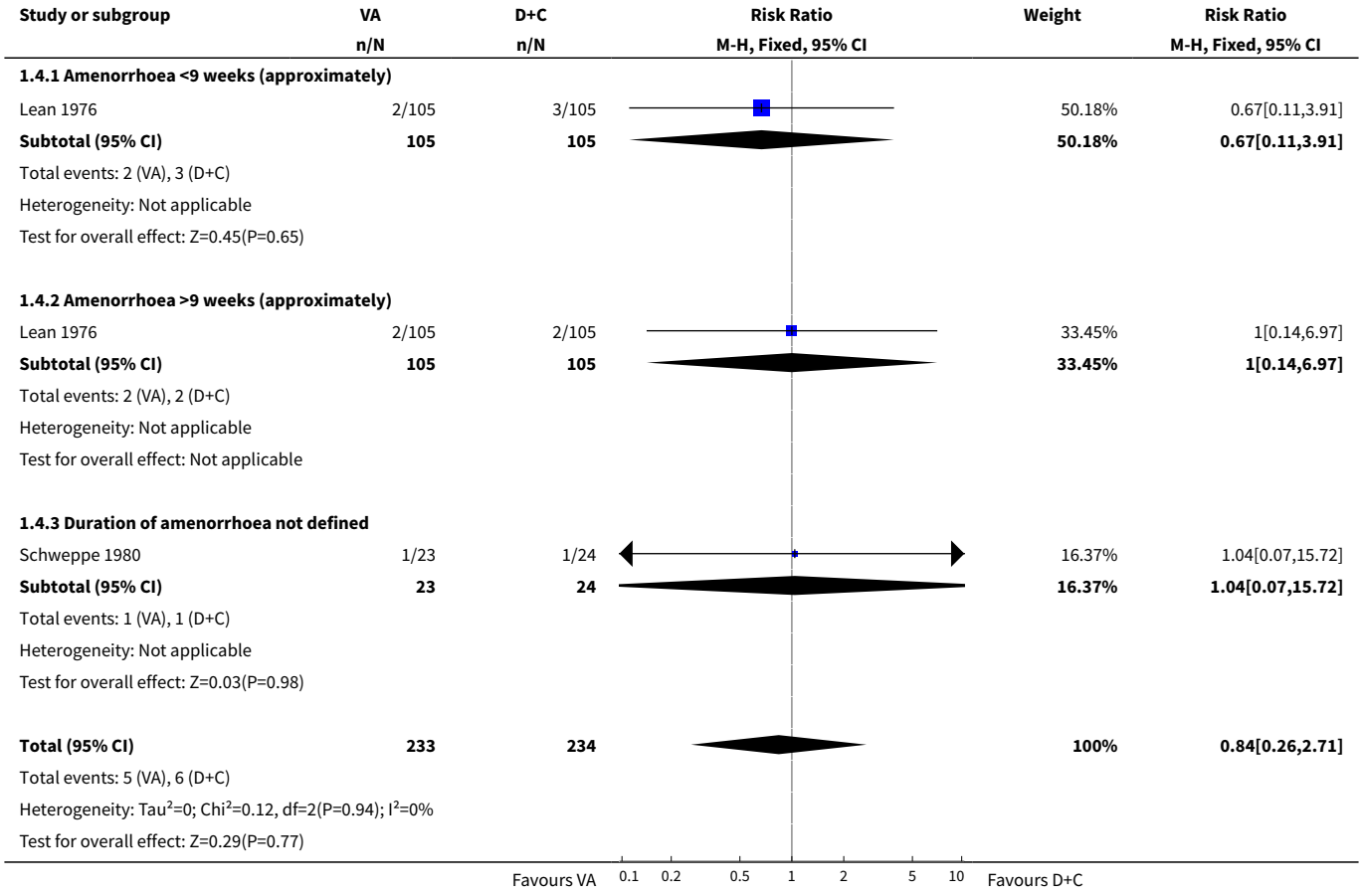
Study or subgroup	VA n/N	D+C n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
1.1.1 Amenorrhoea <9 weeks (approximately)					
Subtotal (95% CI)	**0**	**0**			**Not estimable**
Total events: 0 (VA), 0 (D+C)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
1.1.2 Amenorrhoea >9 weeks (approximately)					
Subtotal (95% CI)	**0**	**0**			**Not estimable**
Total events: 0 (VA), 0 (D+C)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
1.1.3 Duration of amenorrhoea not defined					
Schweppe 1980	0/23	0/24			Not estimable
Subtotal (95% CI)	**23**	**24**			**Not estimable**
Total events: 0 (VA), 0 (D+C)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
Total (95% CI)	**23**	**24**			**Not estimable**
Total events: 0 (VA), 0 (D+C)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
Test for subgroup differences: Not applicable					

Analysis 1.3. Comparison 1 Vacuum aspiration versus dilatation and curettage, Outcome 3 Excessive blood loss as defined by trial authors.

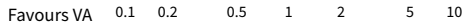
Study or subgroup	VA n/N	D+C n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
1.3.1 Amenorrhoea <9 weeks (approximately)					
Lean 1976	2/105	1/105		33.81%	2[0.18,21.72]
Subtotal (95% CI)	**105**	**105**		**33.81%**	**2[0.18,21.72]**
Total events: 2 (VA), 1 (D+C)					
Heterogeneity: Not applicable					
Test for overall effect: Z=0.57(P=0.57)					
1.3.2 Amenorrhoea >9 weeks (approximately)					



Analysis 1.4. Comparison 1 Vacuum aspiration versus dilatation and curettage, Outcome 4 Febrile morbidity as defined by trial authors.

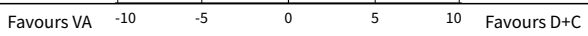


Study or subgroup	VA n/N	D+C n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
Test for subgroup differences: Not applicable					



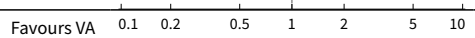
Analysis 1.5. Comparison 1 Vacuum aspiration versus dilatation and curettage, Outcome 5 Duration of operation.

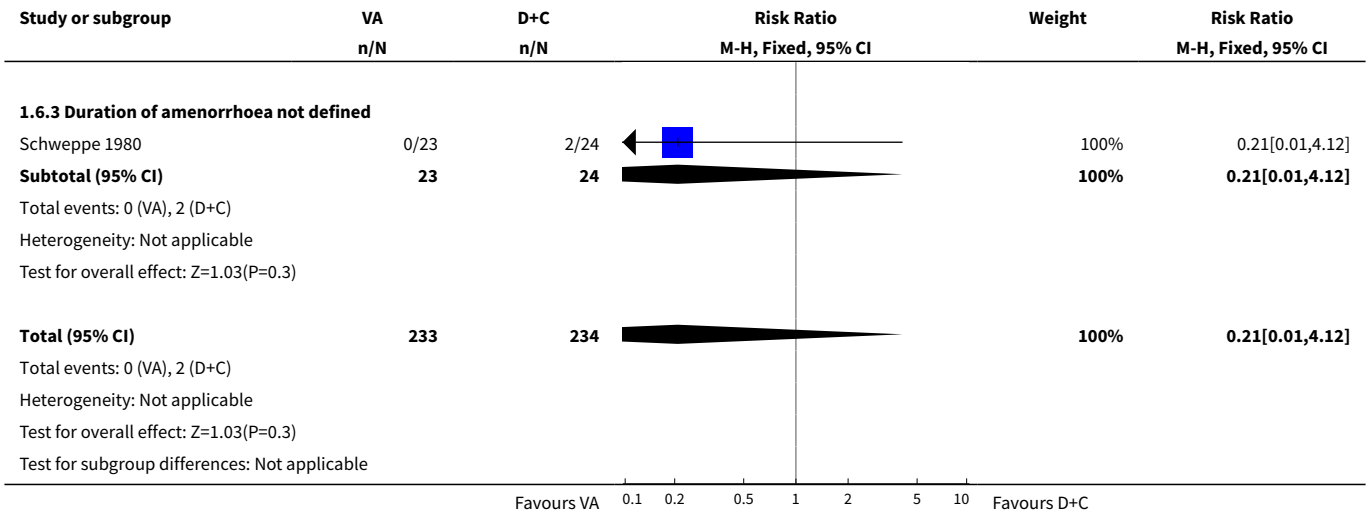
Study or subgroup	VA N	VA Mean(SD)	D+C N	D+C Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
1.5.1 Amenorrhoea <9 weeks (approximately)							
Lean 1976	105	5.2 (1.9)	105	7 (3.2)		39.41%	-1.84[-2.54,-1.14]
Subtotal ***	**105**		**105**			**39.41%**	**-1.84[-2.54,-1.14]**
Heterogeneity: Not applicable							
Test for overall effect: Z=5.14(P<0.0001)							
1.5.2 Amenorrhoea >9 weeks (approximately)							
Lean 1976	105	5 (1.7)	105	5.6 (2.4)		60.59%	-0.6[-1.17,-0.03]
Subtotal ***	**105**		**105**			**60.59%**	**-0.6[-1.17,-0.03]**
Heterogeneity: Not applicable							
Test for overall effect: Z=2.08(P=0.04)							
1.5.3 Duration of amenorrhoea not defined							
Subtotal ***	**0**		**0**				**Not estimable**
Heterogeneity: Not applicable							
Test for overall effect: Not applicable							
Total ***	**210**		**210**			**100%**	**-1.09[-1.53,-0.65]**
Heterogeneity: Tau^2=0; Chi^2=7.26, df=1(P=0.01); I^2=86.23%							
Test for overall effect: Z=4.84(P<0.0001)							
Test for subgroup differences: Chi^2=7.26, df=1 (P=0.01), I^2=86.23%							



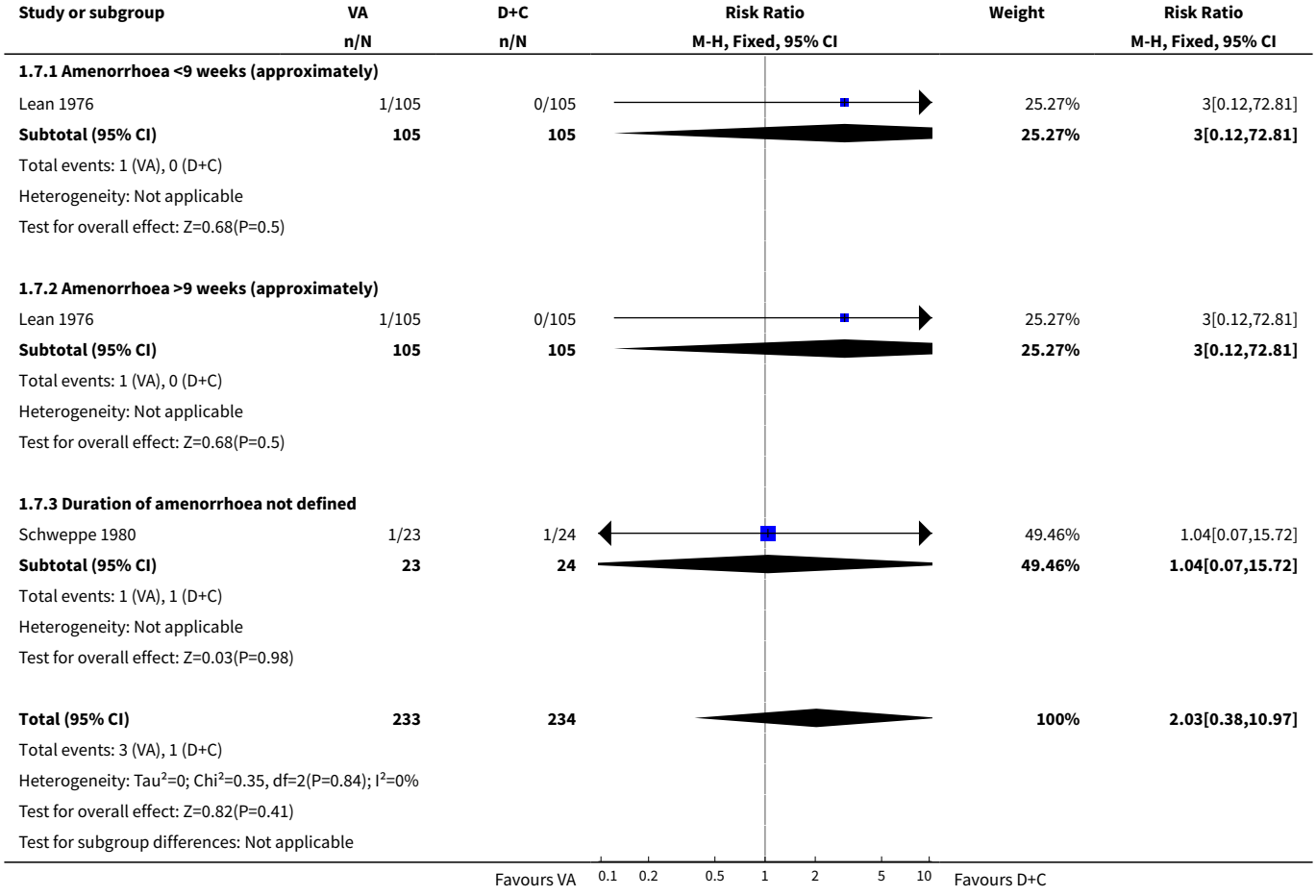
Analysis 1.6. Comparison 1 Vacuum aspiration versus dilatation and curettage, Outcome 6 Blood transfusion.

Study or subgroup	VA n/N	D+C n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
1.6.1 Amenorrhoea <9 weeks (approximately)					
Lean 1976	0/105	0/105			Not estimable
Subtotal (95% CI)	**105**	**105**			**Not estimable**
Total events: 0 (VA), 0 (D+C)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
1.6.2 Amenorrhoea >9 weeks (approximately)					
Lean 1976	0/105	0/105			Not estimable
Subtotal (95% CI)	**105**	**105**			**Not estimable**
Total events: 0 (VA), 0 (D+C)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					



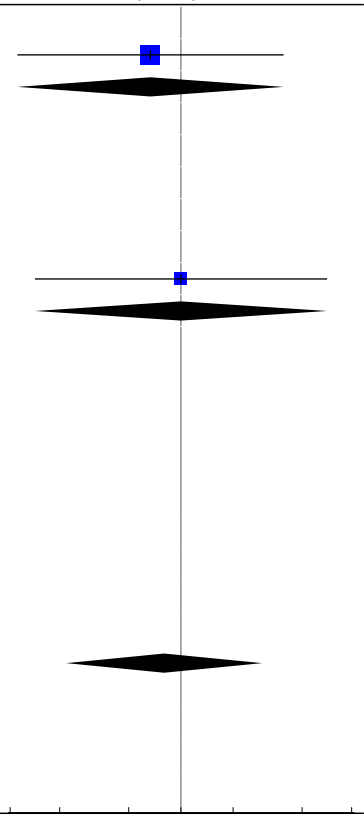


Analysis 1.7. Comparison 1 Vacuum aspiration versus dilatation and curettage, Outcome 7 Abdominal pain postoperatively.



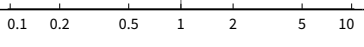
Analysis 1.10. Comparison 1 Vacuum aspiration versus dilatation and curettage, Outcome 10 Non-routine antibiotic use postoperatively.

Study or subgroup	VA n/N	D+C n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
1.10.1 Amenorrhoea <9 weeks (approximately)					
Lean 1976	2/105	3/105		60%	0.67[0.11,3.91]
Subtotal (95% CI)	**105**	**105**		**60%**	**0.67[0.11,3.91]**
Total events: 2 (VA), 3 (D+C)					
Heterogeneity: Not applicable					
Test for overall effect: Z=0.45(P=0.65)					
1.10.2 Amenorrhoea >9 weeks (approximately)					
Lean 1976	2/105	2/105		40%	1[0.14,6.97]
Subtotal (95% CI)	**105**	**105**		**40%**	**1[0.14,6.97]**
Total events: 2 (VA), 2 (D+C)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
1.10.3 Duration of amenorrhoea not defined					
Subtotal (95% CI)	**0**	**0**			**Not estimable**
Total events: 0 (VA), 0 (D+C)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
Total (95% CI)	**210**	**210**		**100%**	**0.8[0.22,2.94]**
Total events: 4 (VA), 5 (D+C)					
Heterogeneity: Tau^2=0; Chi^2=0.09, df=1(P=0.76); I^2=0%					
Test for overall effect: Z=0.34(P=0.74)					
Test for subgroup differences: Not applicable					



Analysis 1.11. Comparison 1 Vacuum aspiration versus dilatation and curettage, Outcome 11 Incomplete evacuation.

Study or subgroup	VA n/N	D+C n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
1.11.1 Amenorrhoea <9 weeks (approximately)					
Subtotal (95% CI)	**0**	**0**			**Not estimable**
Total events: 0 (VA), 0 (D+C)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
1.11.2 Amenorrhoea >9 weeks (approximately)					
Subtotal (95% CI)	**0**	**0**			**Not estimable**
Total events: 0 (VA), 0 (D+C)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
1.11.3 Duration of amenorrhoea not defined					
Lean 1976	2/210	3/210		100%	0.67[0.11,3.95]
Schweppe 1980	0/23	0/24			Not estimable



Study or subgroup	VA n/N	D+C n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
Subtotal (95% CI)	**233**	**234**		**100%**	**0.67[0.11,3.95]**
Total events: 2 (VA), 3 (D+C)					
Heterogeneity: Not applicable					
Test for overall effect: Z=0.45(P=0.66)					
Total (95% CI)	**233**	**234**		**100%**	**0.67[0.11,3.95]**
Total events: 2 (VA), 3 (D+C)					
Heterogeneity: Not applicable					
Test for overall effect: Z=0.45(P=0.66)					
Test for subgroup differences: Not applicable					

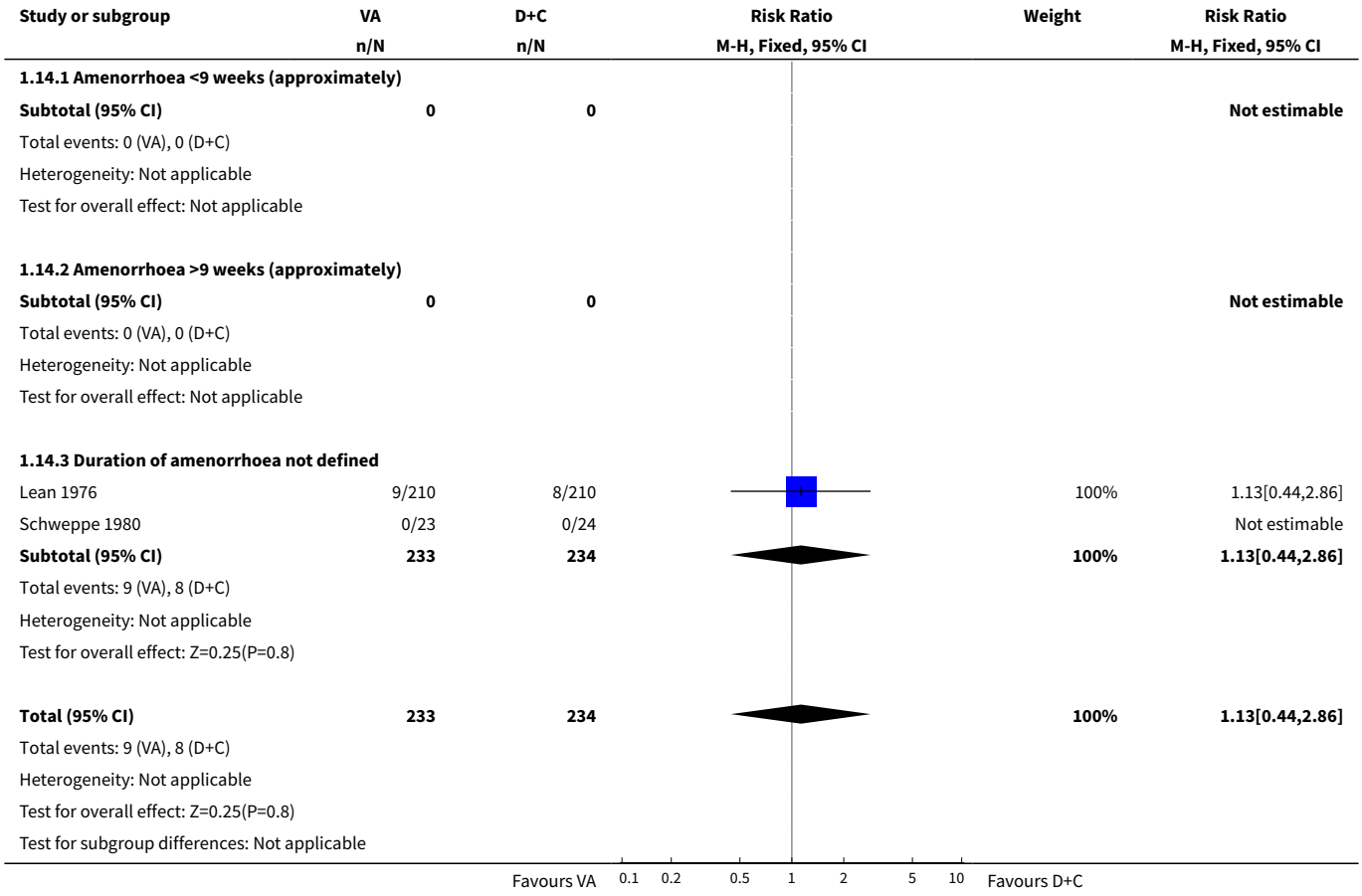
Favours VA 0.1 0.2 0.5 1 2 5 10 Favours D+C

Analysis 1.12. Comparison 1 Vacuum aspiration versus dilatation and curettage, Outcome 12 Repeat uterine evacuation procedure.

Study or subgroup	VA n/N	D+C n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
1.12.1 Amenorrhoea <9 weeks (approximately)					
Lean 1976	1/105	1/105		33.33%	1[0.06,15.78]
Subtotal (95% CI)	**105**	**105**		**33.33%**	**1[0.06,15.78]**
Total events: 1 (VA), 1 (D+C)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
1.12.2 Amenorrhoea >9 weeks (approximately)					
Lean 1976	1/105	2/105		66.67%	0.5[0.05,5.43]
Subtotal (95% CI)	**105**	**105**		**66.67%**	**0.5[0.05,5.43]**
Total events: 1 (VA), 2 (D+C)					
Heterogeneity: Not applicable					
Test for overall effect: Z=0.57(P=0.57)					
1.12.3 Duration of amenorrhoea not defined					
Subtotal (95% CI)	**0**	**0**			**Not estimable**
Total events: 0 (VA), 0 (D+C)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
Total (95% CI)	**210**	**210**		**100%**	**0.67[0.11,3.95]**
Total events: 2 (VA), 3 (D+C)					
Heterogeneity: $Tau^2=0$; $Chi^2=0.14$, df=1(P=0.71); $I^2=0\%$					
Test for overall effect: Z=0.45(P=0.66)					
Test for subgroup differences: Not applicable					

Favours VA 0.1 0.2 0.5 1 2 5 10 Favours D+C

Analysis 1.14. Comparison 1 Vacuum aspiration versus dilatation and curettage, Outcome 14 Re-hospitalisation.



Comparison 2. Flexibel versus rigid vacuum aspiration cannula

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Uterine perforation	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.1 Amenorrhoea <9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.2 Amenorrhoea >9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.3 Duration of amenorrhoea not defined	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2 Cervical injury	1	296	Risk Ratio (M-H, Fixed, 95% CI)	2.92 [0.12, 71.12]
2.1 Amenorrhoea <9 weeks (approximately)	1	296	Risk Ratio (M-H, Fixed, 95% CI)	2.92 [0.12, 71.12]
2.2 Amenorrhoea >9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]

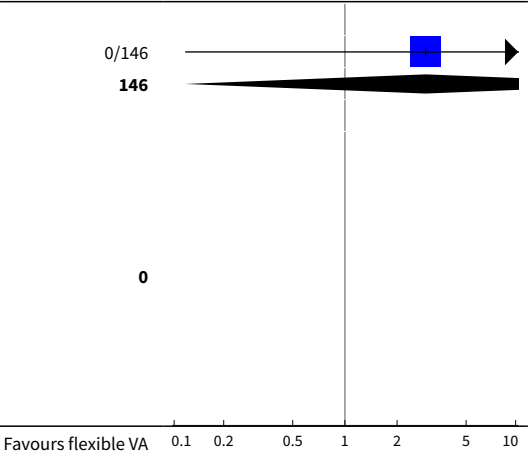
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
2.3 Duration of amenorrhoea not defined	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
3 Excessive blood loss as defined by trial authors	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
3.1 Amenorrhoea <9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
3.2 Amenorrhoea >9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
3.3 Duration of amenorrhoea not defined	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
4 Febrile morbidity as defined by trial authors	1	296	Risk Ratio (M-H, Fixed, 95% CI)	1.56 [0.52, 4.65]
4.1 Amenorrhoea <9 weeks (approximately)	1	296	Risk Ratio (M-H, Fixed, 95% CI)	1.56 [0.52, 4.65]
4.2 Amenorrhoea >9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
4.3 Duration of amenorrhoea not defined	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
5 Duration of operation	0	0	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.1 Amenorrhoea <9 weeks (approximately)	0	0	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.2 Amenorrhoea >9 weeks (approximately)	0	0	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.3 Duration of amenorrhoea not defined	0	0	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
6 Blood transfusion	1	296	Risk Ratio (M-H, Fixed, 95% CI)	0.32 [0.01, 7.90]
7 Abdominal pain postoperatively	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
7.1 Amenorrhoea <9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
7.2 Amenorrhoea >9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
7.3 Duration of amenorrhoea not defined	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
8 Non-routine analgesic use postoperatively	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]

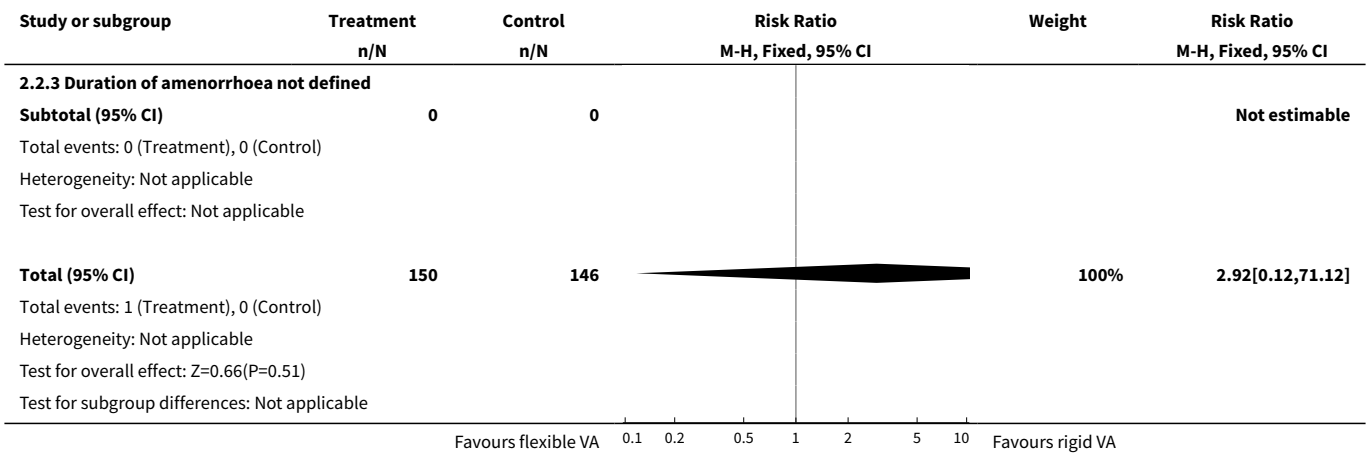
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
8.1 Amenorrhoea <9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
8.2 Amenorrhoea >9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
8.3 Duration of amenorrhoea not defined	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
9 Non-routine uterotonic use postoperatively	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
9.1 Amenorrhoea <9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
9.2 Amenorrhoea >9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
9.3 Duration of amenorrhoea not defined	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
10 Non-routine antibiotic use postoperatively	1	296	Risk Ratio (M-H, Fixed, 95% CI)	0.97 [0.14, 6.82]
10.1 Amenorrhoea <9 weeks (approximately)	1	296	Risk Ratio (M-H, Fixed, 95% CI)	0.97 [0.14, 6.82]
10.2 Amenorrhoea >9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
10.3 Duration of amenorrhoea not defined	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
11 Incomplete evacuation	1	296	Risk Ratio (M-H, Fixed, 95% CI)	2.43 [0.48, 12.34]
11.1 Amenorrhoea <9 weeks (approximately)	1	296	Risk Ratio (M-H, Fixed, 95% CI)	2.43 [0.48, 12.34]
11.2 Amenorrhoea >9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
11.3 Duration of amenorrhoea not defined	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
12 Repeat uterine evacuation procedure	1	296	Risk Ratio (M-H, Fixed, 95% CI)	1.36 [0.44, 4.20]
12.1 Amenorrhoea <9 weeks (approximately)	1	296	Risk Ratio (M-H, Fixed, 95% CI)	1.36 [0.44, 4.20]
12.2 Amenorrhoea >9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
12.3 Duration of amenorrhoea not defined	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
13 Hospital stay >24 hours	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
13.1 Amenorrhoea <9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
13.2 Amenorrhoea >9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
13.3 Duration of amenorrhoea not defined	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
14 Re-hospitalisation	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
14.1 Amenorrhoea <9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
14.2 Amenorrhoea >9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
14.3 Duration of amenorrhoea not defined	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
15 Death	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
15.1 Amenorrhoea <9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
15.2 Amenorrhoea >9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
15.3 Duration of amenorrhoea not defined	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]

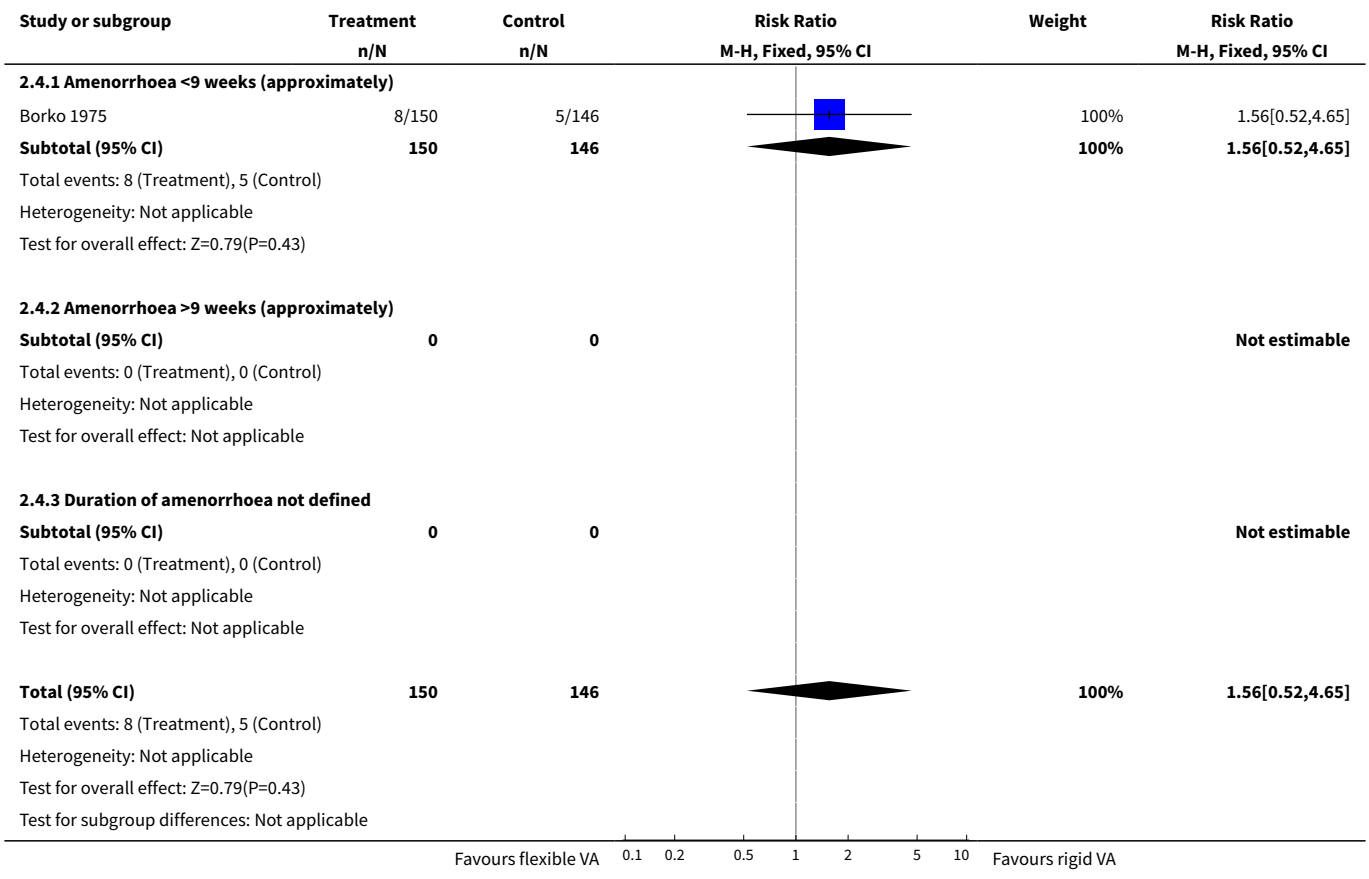
Analysis 2.2. Comparison 2 Flexibel versus rigid vacuum aspiration cannula, Outcome 2 Cervical injury.

Study or subgroup	Treatment n/N	Control n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
2.2.1 Amenorrhoea <9 weeks (approximately)					
Borko 1975	1/150	0/146		100%	2.92[0.12,71.12]
Subtotal (95% CI)	**150**	**146**		**100%**	**2.92[0.12,71.12]**
Total events: 1 (Treatment), 0 (Control)					
Heterogeneity: Not applicable					
Test for overall effect: Z=0.66(P=0.51)					
2.2.2 Amenorrhoea >9 weeks (approximately)					
Subtotal (95% CI)	**0**	**0**			**Not estimable**
Total events: 0 (Treatment), 0 (Control)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					

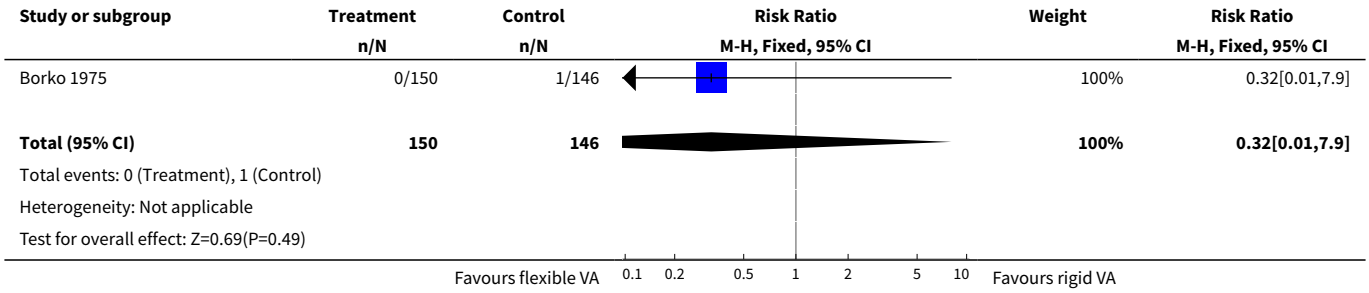




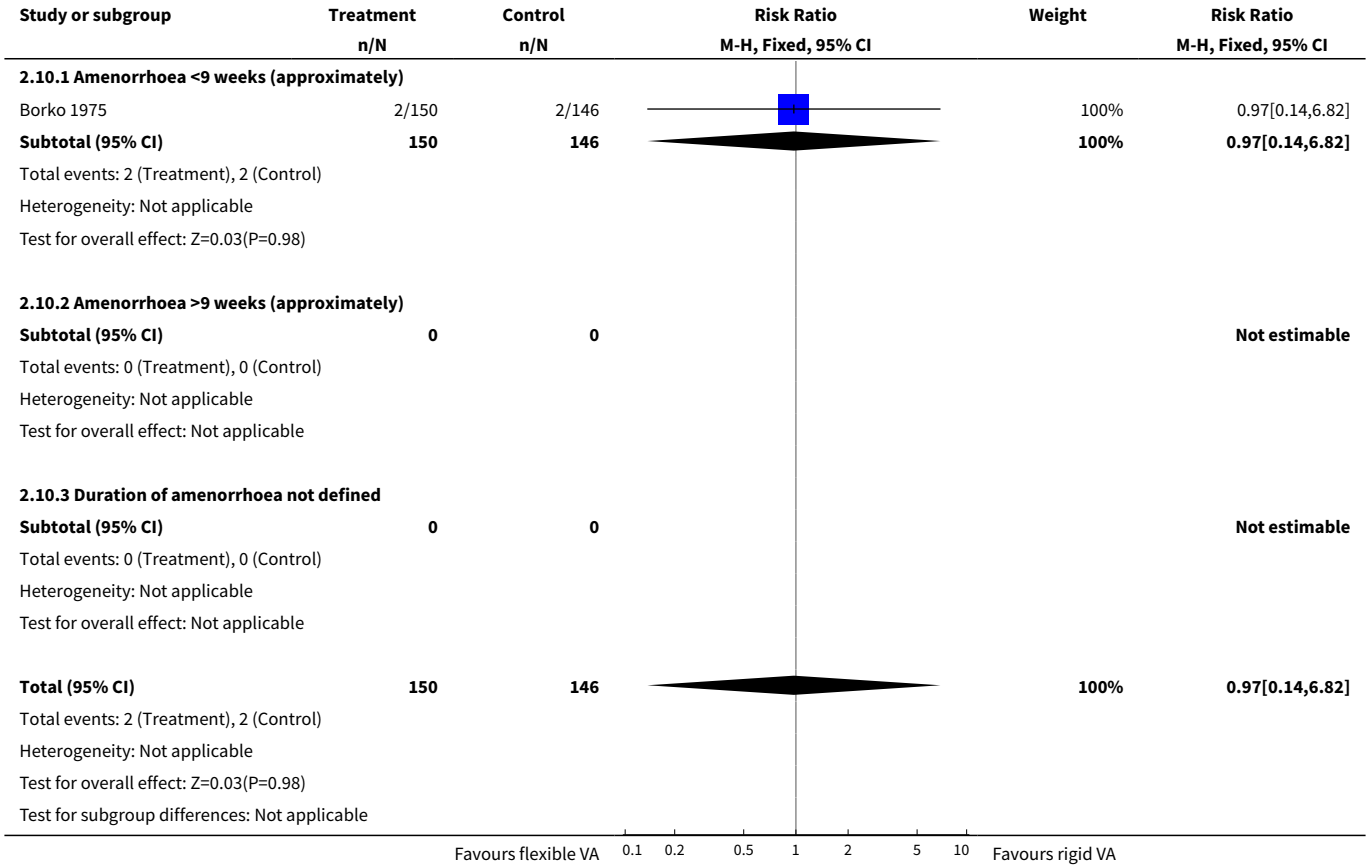
Analysis 2.4. Comparison 2 Flexibel versus rigid vacuum aspiration cannula, Outcome 4 Febrile morbidity as defined by trial authors.



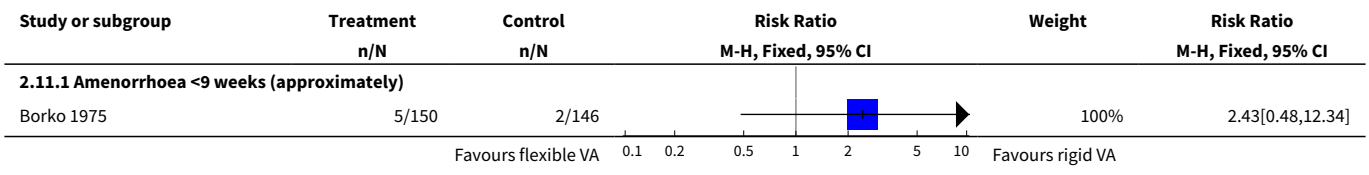
Analysis 2.6. Comparison 2 Flexibel versus rigid vacuum aspiration cannula, Outcome 6 Blood transfusion.



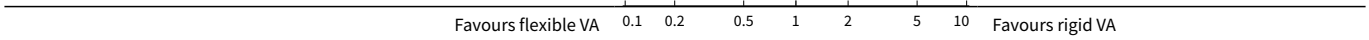
Analysis 2.10. Comparison 2 Flexibel versus rigid vacuum aspiration cannula, Outcome 10 Non-routine antibiotic use postoperatively.



Analysis 2.11. Comparison 2 Flexibel versus rigid vacuum aspiration cannula, Outcome 11 Incomplete evacuation.

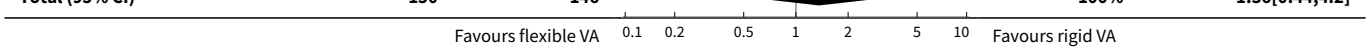


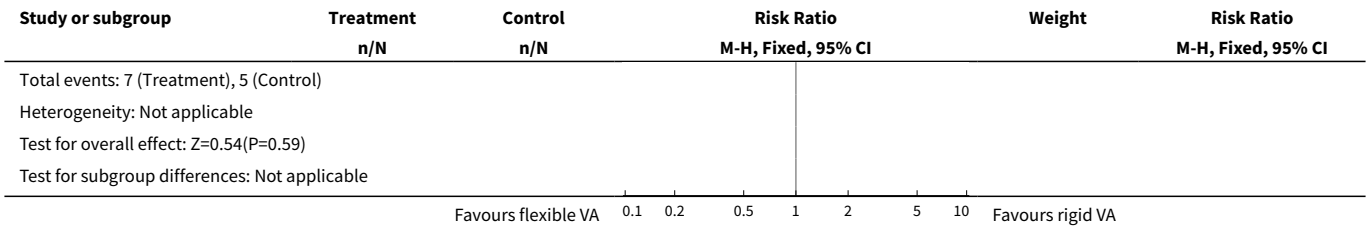
Study or subgroup	Treatment n/N	Control n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
Subtotal (95% CI)	**150**	**146**		**100%**	**2.43[0.48,12.34]**
Total events: 5 (Treatment), 2 (Control)					
Heterogeneity: Not applicable					
Test for overall effect: Z=1.07(P=0.28)					
2.11.2 Amenorrhoea >9 weeks (approximately)					
Subtotal (95% CI)	**0**	**0**			**Not estimable**
Total events: 0 (Treatment), 0 (Control)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
2.11.3 Duration of amenorrhoea not defined					
Subtotal (95% CI)	**0**	**0**			**Not estimable**
Total events: 0 (Treatment), 0 (Control)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
Total (95% CI)	**150**	**146**		**100%**	**2.43[0.48,12.34]**
Total events: 5 (Treatment), 2 (Control)					
Heterogeneity: Not applicable					
Test for overall effect: Z=1.07(P=0.28)					
Test for subgroup differences: Not applicable					



Analysis 2.12. Comparison 2 Flexibel versus rigid vacuum aspiration cannula, Outcome 12 Repeat uterine evacuation procedure.

Study or subgroup	Treatment n/N	Control n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
2.12.1 Amenorrhoea <9 weeks (approximately)					
Borko 1975	7/150	5/146		100%	1.36[0.44,4.2]
Subtotal (95% CI)	**150**	**146**		**100%**	**1.36[0.44,4.2]**
Total events: 7 (Treatment), 5 (Control)					
Heterogeneity: Not applicable					
Test for overall effect: Z=0.54(P=0.59)					
2.12.2 Amenorrhoea >9 weeks (approximately)					
Subtotal (95% CI)	**0**	**0**			**Not estimable**
Total events: 0 (Treatment), 0 (Control)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
2.12.3 Duration of amenorrhoea not defined					
Subtotal (95% CI)	**0**	**0**			**Not estimable**
Total events: 0 (Treatment), 0 (Control)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
Total (95% CI)	**150**	**146**		**100%**	**1.36[0.44,4.2]**





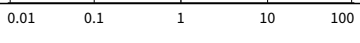
Comparison 3. Manual vacuum aspiration versus electrical vacuum aspiration

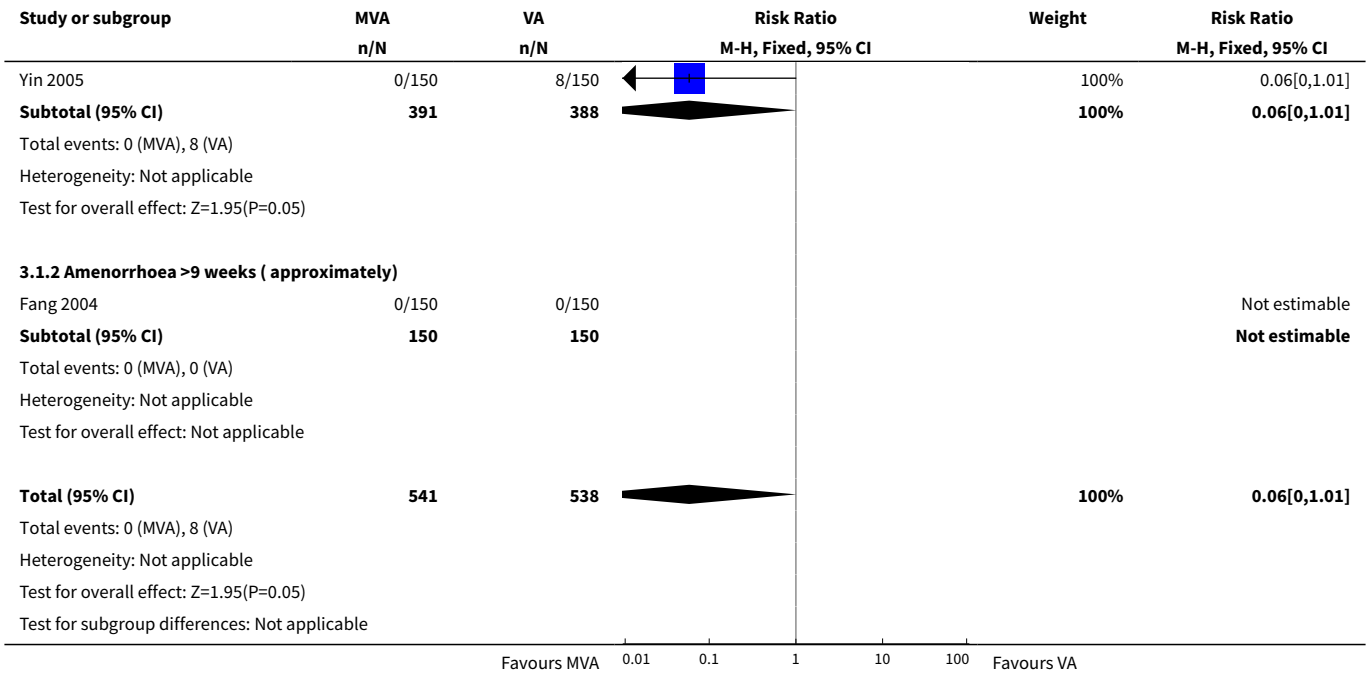
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Uterine perforation	5	1079	Risk Ratio (M-H, Fixed, 95% CI)	0.06 [0.00, 1.01]
1.1 Amenorrhoea <9 weeks (approximately)	4	779	Risk Ratio (M-H, Fixed, 95% CI)	0.06 [0.00, 1.01]
1.2 Amenorrhoea >9 weeks (approximately)	1	300	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2 Cervical injury	4	900	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.1 Amenorrhoea <9weeks (approximately)	3	600	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.2 Amenorrhoea >9 weeks (approximately)	1	300	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
3 Excessive blood loss as defined by trial authors	6	1162	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
3.1 Amenorrhoea <9weeks (approximately)	4	779	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
3.2 Amenorrhoea >9weeks (approximately)	2	383	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
4 Febrile morbidity (as defined by the trial authors)	1	179	Risk Ratio (M-H, Fixed, 95% CI)	0.97 [0.14, 6.72]
4.1 Amenorrhoea <9 weeks (approximately)	1	179	Risk Ratio (M-H, Fixed, 95% CI)	0.97 [0.14, 6.72]
5 Duration of operation	1	83	Mean Difference (IV, Fixed, 95% CI)	0.53 [-0.72, 1.78]
5.1 Amenorrhoea <9 weeks (approximately)	0	0	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.2 Amenorrhoea >9 weeks (approximately)	1	83	Mean Difference (IV, Fixed, 95% CI)	0.53 [-0.72, 1.78]
6 Repeat uterine evacuation procedure	6	1162	Risk Ratio (M-H, Fixed, 95% CI)	1.00 [0.42, 2.37]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
6.1 Amenorrhoea <9 weeks (approximately)	4	779	Risk Ratio (M-H, Fixed, 95% CI)	0.99 [0.40, 2.48]
6.2 Amenorrhoea >9 weeks (approximately)	2	383	Risk Ratio (M-H, Fixed, 95% CI)	1.02 [0.07, 15.84]
7 Blood transfusion	4	900	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
7.1 Amenorrhoea <9 weeks (approximately)	3	600	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
7.2 Amenorrhoea >9 weeks (approximately)	1	300	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
8 Rehospitalisation	1	179	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
8.1 Amenorrhoea <9 weeks (approximately)	1	179	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
9 Death	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
10 severe pain (as described by the woman)	4		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
10.1 Amenorrhoea <9 weeks (approximately)	2	300	Risk Ratio (M-H, Fixed, 95% CI)	0.02 [0.00, 0.15]
10.2 Amenorrhoea >9 weeks (approximately)	2	383	Risk Ratio (M-H, Fixed, 95% CI)	0.73 [0.47, 1.16]
11 Procedure perceived as difficult by the provider	2	383	Risk Ratio (M-H, Fixed, 95% CI)	5.70 [2.45, 13.28]
11.1 Amenorrhoea <9 weeks (approximately)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
11.2 Amenorrhoea >9 weeks (approximately)	2	383	Risk Ratio (M-H, Fixed, 95% CI)	5.70 [2.45, 13.28]
12 Women's preference (would choose same method again)	1	83	Risk Ratio (M-H, Fixed, 95% CI)	1.17 [0.90, 1.53]

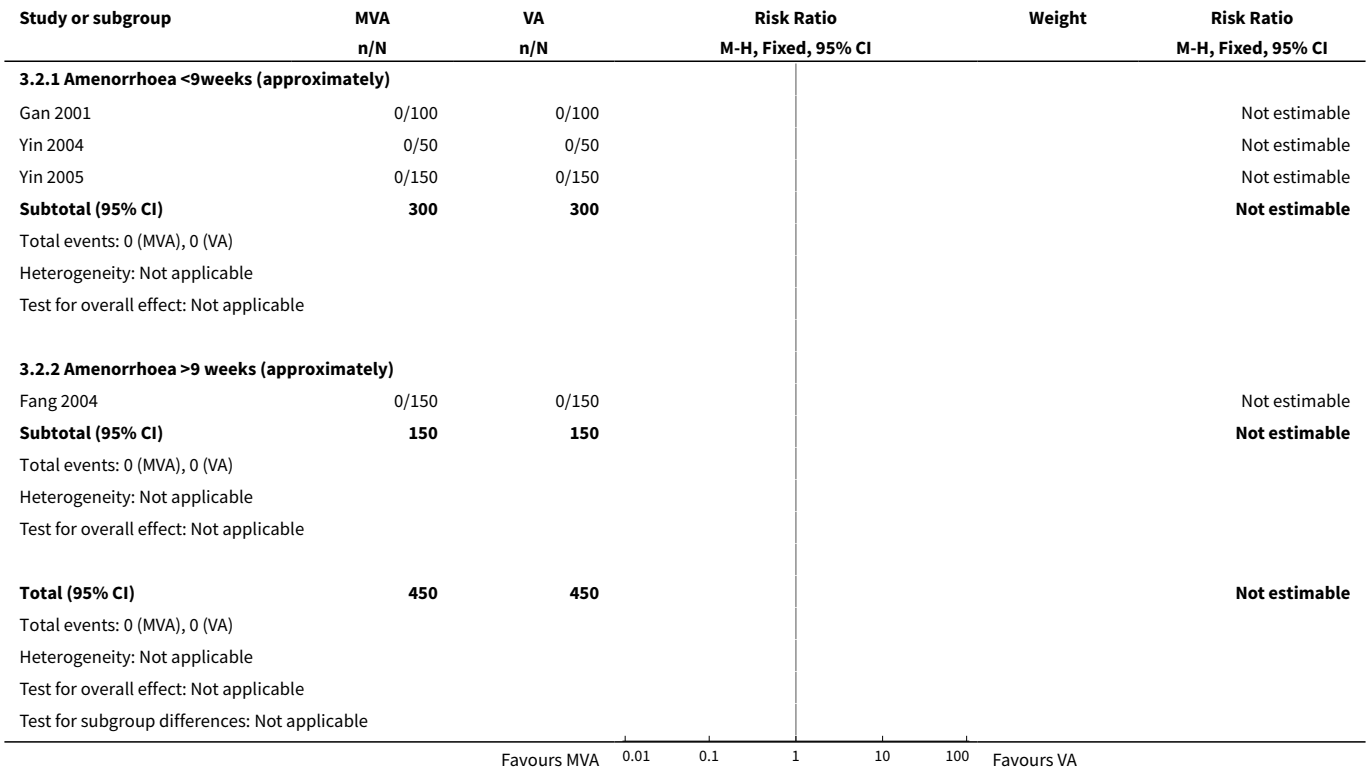
Analysis 3.1. Comparison 3 Manual vacuum aspiration versus electrical vacuum aspiration, Outcome 1 Uterine perforation.

Study or subgroup	MVA n/N	VA n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
3.1.1 Amenorrhoea <9 weeks (approximately)					
Gan 2001	0/100	0/100			Not estimable
Hemlin 2001	0/91	0/88			Not estimable
Yin 2004	0/50	0/50			Not estimable



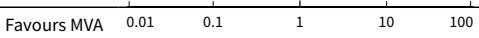


Analysis 3.2. Comparison 3 Manual vacuum aspiration versus electrical vacuum aspiration, Outcome 2 Cervical injury.



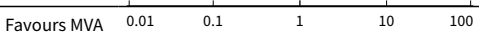
Analysis 3.3. Comparison 3 Manual vacuum aspiration versus electrical vacuum aspiration, Outcome 3 Excessive blood loss as defined by trial authors.

Study or subgroup	MVA n/N	VA n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
3.3.1 Amenorrhoea <9weeks (approximately)					
Gan 2001	0/100	0/100			Not estimable
Hemlin 2001	0/91	0/88			Not estimable
Yin 2004	0/50	0/50			Not estimable
Yin 2005	0/150	0/150			Not estimable
Subtotal (95% CI)	**391**	**388**			**Not estimable**
Total events: 0 (MVA), 0 (VA)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
3.3.2 Amenorrhoea >9weeks (approximately)					
Dean 2003	0/41	0/42			Not estimable
Fang 2004	0/150	0/150			Not estimable
Subtotal (95% CI)	**191**	**192**			**Not estimable**
Total events: 0 (MVA), 0 (VA)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
Total (95% CI)	**582**	**580**			**Not estimable**
Total events: 0 (MVA), 0 (VA)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
Test for subgroup differences: Not applicable					



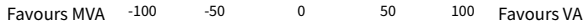
Analysis 3.4. Comparison 3 Manual vacuum aspiration versus electrical vacuum aspiration, Outcome 4 Febrile morbidity (as defined by the trial authors).

Study or subgroup	MVA n/N	VA n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
3.4.1 Amenorrhoea <9 weeks (approximately)					
Hemlin 2001	2/91	2/88		100%	0.97[0.14,6.72]
Subtotal (95% CI)	**91**	**88**		**100%**	**0.97[0.14,6.72]**
Total events: 2 (MVA), 2 (VA)					
Heterogeneity: Not applicable					
Test for overall effect: Z=0.03(P=0.97)					
Total (95% CI)	**91**	**88**		**100%**	**0.97[0.14,6.72]**
Total events: 2 (MVA), 2 (VA)					
Heterogeneity: Not applicable					
Test for overall effect: Z=0.03(P=0.97)					



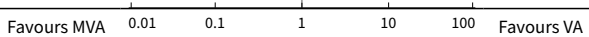
Analysis 3.5. Comparison 3 Manual vacuum aspiration versus electrical vacuum aspiration, Outcome 5 Duration of operation.

Study or subgroup	MVA N	MVA Mean(SD)	VA N	VA Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
3.5.1 Amenorrhoea <9 weeks (approximately)							
Subtotal ***	**0**		**0**				**Not estimable**
Heterogeneity: Not applicable							
Test for overall effect: Not applicable							
3.5.2 Amenorrhoea >9 weeks (approximately)							
Dean 2003	41	6 (2.8)	42	5.5 (3)		100%	0.53[-0.72,1.78]
Subtotal ***	**41**		**42**			**100%**	**0.53[-0.72,1.78]**
Heterogeneity: Not applicable							
Test for overall effect: Z=0.83(P=0.4)							
Total ***	**41**		**42**			**100%**	**0.53[-0.72,1.78]**
Heterogeneity: Not applicable							
Test for overall effect: Z=0.83(P=0.4)							
Test for subgroup differences: Not applicable							



Analysis 3.6. Comparison 3 Manual vacuum aspiration versus electrical vacuum aspiration, Outcome 6 Repeat uterine evacuation procedure.

Study or subgroup	MVA n/N	VA n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
3.6.1 Amenorrhoea <9 weeks (approximately)					
Gan 2001	1/100	3/100		29.94%	0.33[0.04,3.15]
Hemlin 2001	2/91	2/88		20.29%	0.97[0.14,6.72]
Yin 2004	2/50	1/50		9.98%	2[0.19,21.36]
Yin 2005	4/150	3/150		29.94%	1.33[0.3,5.86]
Subtotal (95% CI)	**391**	**388**		**90.14%**	**0.99[0.4,2.48]**
Total events: 9 (MVA), 9 (VA)					
Heterogeneity: Tau^2=0; Chi^2=1.4, df=3(P=0.71); I^2=0%					
Test for overall effect: Z=0.02(P=0.99)					
3.6.2 Amenorrhoea >9 weeks (approximately)					
Dean 2003	1/41	1/42		9.86%	1.02[0.07,15.84]
Fang 2004	0/150	0/150			Not estimable
Subtotal (95% CI)	**191**	**192**		**9.86%**	**1.02[0.07,15.84]**
Total events: 1 (MVA), 1 (VA)					
Heterogeneity: Not applicable					
Test for overall effect: Z=0.02(P=0.99)					
Total (95% CI)	**582**	**580**		**100%**	**1[0.42,2.37]**
Total events: 10 (MVA), 10 (VA)					
Heterogeneity: Tau^2=0; Chi^2=1.4, df=4(P=0.84); I^2=0%					
Test for overall effect: Z=0.01(P=0.99)					
Test for subgroup differences: Not applicable					

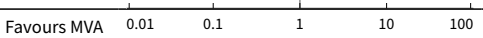


Analysis 3.7. Comparison 3 Manual vacuum aspiration versus electrical vacuum aspiration, Outcome 7 Blood transfusion.

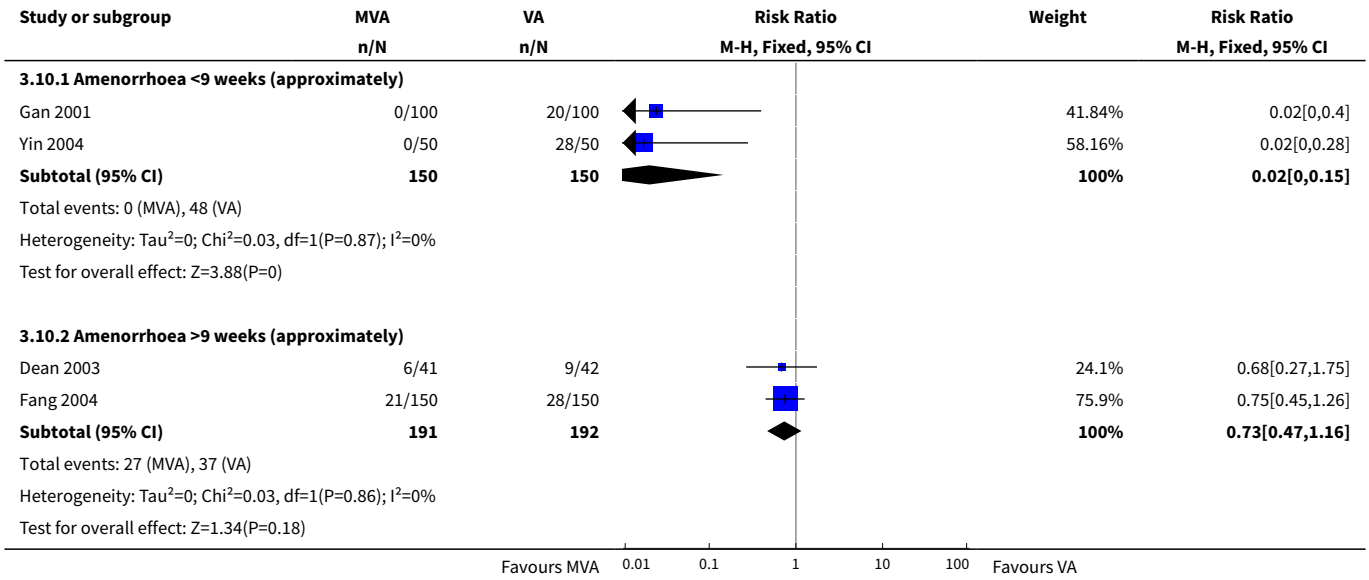
Study or subgroup	MVA n/N	VA n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
3.7.1 Amenorrhoea <9 weeks (approximately)					
Gan 2001	0/100	0/100			Not estimable
Yin 2004	0/50	0/50			Not estimable
Yin 2005	0/150	0/150			Not estimable
Subtotal (95% CI)	**300**	**300**			**Not estimable**
Total events: 0 (MVA), 0 (VA)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
3.7.2 Amenorrhoea >9 weeks (approximately)					
Fang 2004	0/150	0/150			Not estimable
Subtotal (95% CI)	**150**	**150**			**Not estimable**
Total events: 0 (MVA), 0 (VA)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
Total (95% CI)	**450**	**450**			**Not estimable**
Total events: 0 (MVA), 0 (VA)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
Test for subgroup differences: Not applicable					

Analysis 3.8. Comparison 3 Manual vacuum aspiration versus electrical vacuum aspiration, Outcome 8 Rehospitalisation.

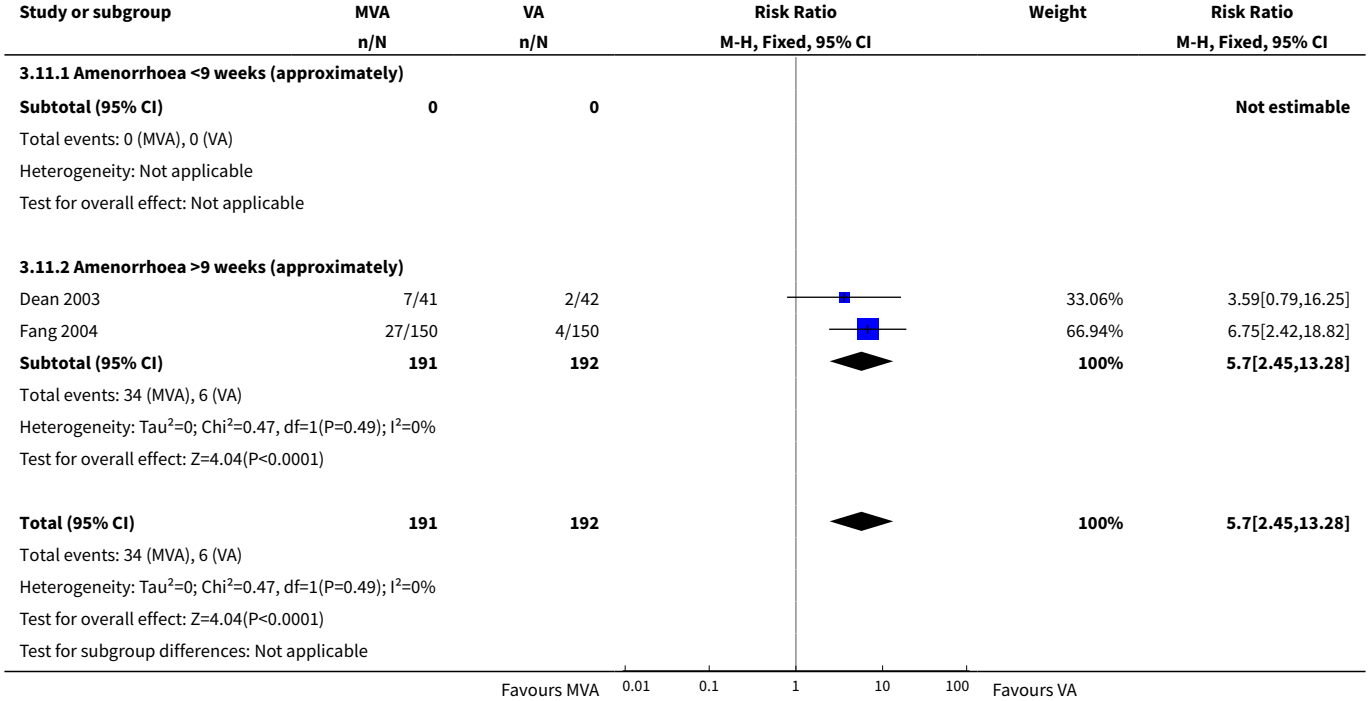
Study or subgroup	MVA n/N	VA n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
3.8.1 Amenorrhoea <9 weeks (approximately)					
Hemlin 2001	0/91	0/88			Not estimable
Subtotal (95% CI)	**91**	**88**			**Not estimable**
Total events: 0 (MVA), 0 (VA)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
Total (95% CI)	**91**	**88**			**Not estimable**
Total events: 0 (MVA), 0 (VA)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					



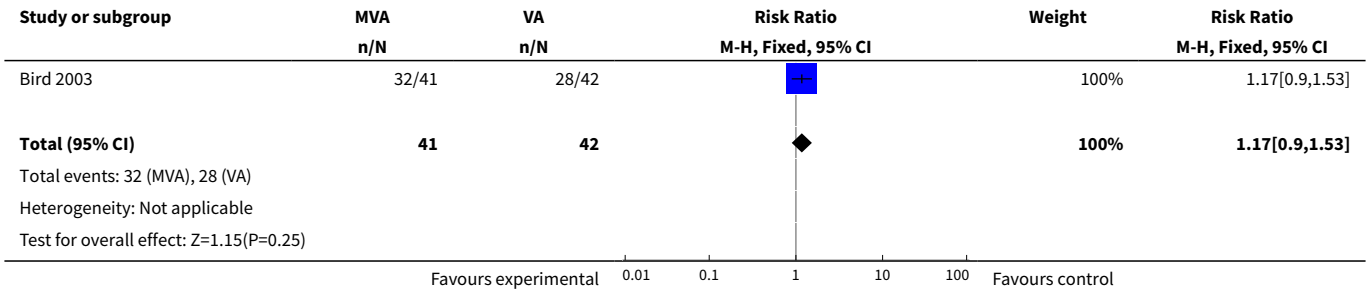
Analysis 3.10. Comparison 3 Manual vacuum aspiration versus electrical vacuum aspiration, Outcome 10 severe pain (as described by the woman).



Analysis 3.11. Comparison 3 Manual vacuum aspiration versus electrical vacuum aspiration, Outcome 11 Procedure perceived as difficult by the provider.



Analysis 3.12. Comparison 3 Manual vacuum aspiration versus electrical vacuum aspiration, Outcome 12 Women's preference (would choose same method again).



ADDITIONAL TABLES

Table 1. Additional data

		Edelman 2001
Outcome	Duration of operation (minutes)	**MVA:** combined: 6.9; resident: 7.8; faculty: 5.4 **VA:**combined:5.7;resident:7; faculty: 4.3
	Pain during procedure (cm; using 10cm analog scale)	**MVA**: **during dilatation**: combined:4.3.; resident: 4.6; faculty: 4; **with aspiration**: combined: 5; resident: 5.1; faculty: 5 **VA: during dilatation:** combined 4.4; resident: 5.1; faculty: 3.5; **with aspiration**: combined: 5.5; resident: 5.8; faculty: 4.9

WHAT'S NEW

Date	Event	Description
1 March 2009	New search has been performed	New trials included; new comparison added

HISTORY

Protocol first published: Issue 4, 2000
Review first published: Issue 4, 2001

Date	Event	Description
15 April 2008	Amended	Converted to new review format.
26 July 2001	New citation required and conclusions have changed	Substantive amendment

CONTRIBUTIONS OF AUTHORS

RK had the idea and wrote the review, AF and GJH extracted and entered the data. LC extracted the data for the Chinese language studies. GJH and AC read, edited and advised on the text of the review.

DECLARATIONS OF INTEREST

None

SOURCES OF SUPPORT

Internal sources

- Department of Obstetrics and Gynaecology, University of Geneva, Switzerland.
- University of the Witwatersrand, Johannesburg, South Africa.
- Geneva Foundation for Medical Education and Research; Geneva, Switzerland.

External sources

- Department of Reproductive Health and Research, World Health Organization, Switzerland.

INDEX TERMS

Medical Subject Headings (MeSH)

Abortion, Induced [adverse effects] [*methods]; Dilatation and Curettage; Pregnancy Trimester, First; Vacuum Curettage

MeSH check words

Female; Humans; Pregnancy