National Institute for Health and Care Excellence

Final

# Abortion care

## [N] Anaesthesia or sedation for surgical abortion

*NICE guideline NG140*

*Evidence reviews*

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*Final*

*These evidence reviews were developed by the National Guideline Alliance hosted by the Royal College of Obstetricians and Gynaecologists*

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# Contents

# Anaesthesia or sedation for surgical abortion?

## Review question

What is the optimal method of anaesthesia or sedation for surgical abortion?

### Introduction

The aim of this review is to determine the optimal method of anaesthesia or sedation for surgical abortion.

At the time of development, the title of this guideline was 'Termination of pregnancy' and this term was used throughout the guideline. In response to comments from stakeholders, the title was changed to 'Abortion care' and abortion has been used throughout. Therefore, both terms appear in this evidence report.

### Summary of the protocol

See Table 1 for a summary of the population, intervention, comparison and outcome (PICO) characteristics of this review.

**Table 1: Summary of the protocol (PICO table)**

| | |
|---|---|
| **Population** | Women who are having a uterine evacuation for surgical termination of pregnancy using electric or manual vacuum aspiration, or dilatation and evacuation. |
| **Intervention** | Local anaesthesia:<br>• Paracervical block<br>• Intracervical block<br>• Intrauterine installation<br>• Anaesthetic gel (e.g., lidocaine)<br><br>Conscious sedation:<br>• Oral or IV Benzodiazepines<br>• Zopiclone<br>• Nitrous oxide and oxygen mixture (Entonox or titrated nitrate)<br><br>Deep sedation:<br>• IV Benzodiazepines<br>• Propofol<br>• Ketamine<br><br>General anaesthesia:<br>• IV Benzodiazepines<br>• Propofol<br>• Sevoflurane<br>• Isoflurane<br>• Desflurane |

| | |
|---|---|
| | • Ketamine<br>• Thiopentone<br>• Etomodate |
| **Comparison** | • Local anaesthesia only versus conscious sedation (± local anaesthesia and/or IV or oral opioids)<br>• Local anaesthesia only versus deep sedation<br>• Local anaesthesia only versus general anaesthesia<br>• Conscious sedation (± local anaesthesia and/or IV or oral opioids) versus deep sedation<br>• Conscious sedation (± local anaesthesia and/or IV or oral opioids) versus general anaesthesia<br>• Deep sedation versus general anaesthesia<br>• Propofol (general anaesthesia) versus sevoflurane/ isoflurane/ desflurane (general anaesthesia)<br>• Oral conscious sedation (± local anaesthesia and/or IV or oral opioids) versus IV conscious sedation (± local anaesthesia and/or IV or oral opioids)<br>• Local anaesthesia method A versus local anaesthesia method B |
| **Outcome** | **Critical outcomes**<br>• Patient satisfaction<br>• Termination of pregnancy completed with intended method of sedation/anaesthesia<br>• Pain<br>**Important outcomes**<br>• Haemorrhage requiring transfusion or > 500ml of blood loss<br>• Nausea<br>• Vomiting<br>• Length of admission |

*IV: intravenous*

For further details see the full review protocol in appendix A.

## Clinical evidence

### Included studies

Only studies conducted from 1990 were considered for this review question, as propofol was licensed in the mid-1980's, using a cut off of 1990 gives time for anaesthetists to become experienced with the agent and not capture studies with a high complication rate due to inexperience.

Eleven randomised controlled trials (RCTs; number of participants, N=1,260) were included in the review (Allen 2009; Bayer 2015; Conti 2016; Edelman 2004; Edelman 2006; Mankowski 2009; Micks 2015; Nathan 1998; Raeder 1992; Wong 2002; Xu 2012).

Two RCTs compared local anaesthesia against conscious sedation (and local anaesthesia) (Bayer 2015; Wong 2002). One RCT compared deep sedation (and local anaesthesia) against general anaesthesia (Raeder 1992). Three RCTs compared propofol (general anaesthesia) against sevoflurane (general anaesthesia) (Micks 2015; Nathan 1998; Xu 2012). One RCT compared oral conscious sedation against intravenous (IV) conscious sedation (Allen 2009). Four RCTs compared different methods of administration for local anaesthesia (paracervical block versus intracervical block [n=1; Mankowski 2009],

paracervical block versus self-administered anaesthetic gel [n=1; Conti 2016], paracervical block and intrauterine infusion versus paracervical block alone [n=2; Edelman 2004; Edelman 2006]). No studies compared local anaesthesia against deep sedation or general anaesthesia, or conscious sedation against deep sedation or general anaesthesia.

None of the included studies reported subgroup data based on medical conditions or gestational age. However, 7 of the 11 RCTs only included women with gestational ages less than $14^{+0}$ weeks. An additional 2 studies only included women during the first-trimester but did not define the threshold for this in terms of gestational age; 1 of these trials (Conti 2016) used the preoperative use of misoprostol (normally given from 12 weeks in the included clinics) as the threshold. Only 1 RCT (Micks 2015) included women after $13^{+6}$ weeks' gestation. The remaining RCT (Nathan 1998) did not report the gestational ages included.

The included studies are summarised in Table 2.

See the literature search strategy in appendix B and study selection flow chart in appendix C.

### Excluded studies

Studies not included in this review with reasons for their exclusions are provided in appendix K.

## Summary of clinical studies included in the evidence review

A summary of the studies that were included in this review are presented in Table 2.

**Table 2: Summary of included studies**

| Study and setting | Population | Intervention/ comparison | Outcomes |
|---|---|---|---|
| Allen 2009<br><br>RCT<br><br>USA | n=130<br><br>English- or Spanish-speaking women ≥18 years old<br><br>$5^{+0}$ to $12^{+6}$ weeks' gestation | **Oral conscious sedation:** Two oral 5mg oxycodone tablets and 1 sublingual 1mg lorazepam tablet; 60 minutes later, 2 2ml syringes of saline<br><br>**IV conscious sedation:** Two oral placebo tablets and 1 sublingual placebo tablet (Vitamin C and Vitamin B12); 60 minutes later, 2ml IV fentanyl and 2ml IV midazolam | • Patient satisfaction<br>• Termination of pregnancy completed with intended method of sedation/ anaesthesia<br>• Pain<br>• Nausea<br>• Vomiting |
| Bayer 2015<br><br>RCT<br><br>USA | n=123<br><br>English- or Spanish-speaking women ≥18 years old; good general health; ≥100lbs<br><br>$6^{+0}$ to $10^{+6}$ weeks' gestation | **Conscious sedation (+ local anaesthesia):** 5mL oral cherry-flavoured 2 mg/mL midazolam syrup and PCB of 20ml buffered 1% lidocaine<br><br>**Local anaesthesia:** 5ml oral cherry-flavoured | • Patient satisfaction<br>• Pain<br>• Vomiting |

| Study and setting | Population | Intervention/ comparison | Outcomes |
|---|---|---|---|
| | | placebo syrup and PCB of 20ml buffered 1% lidocaine | |
| Conti 2016<br><br>RCT<br><br>USA | n=147<br><br>English- or Spanish-speaking women ≥18 years old; chosen IV sedation<br><br>First trimester (cut-off was administration of preoperative misoprostol which was normally given from 12 weeks at the included clinics) | **PCB:** 12ml of 1% lidocaine (total 120mg); 100mg IV fentanyl and 1mg IV midazolam<br><br>**Lidocaine gel:** 20ml of 2% lidocaine gel (total 400mg) self-administered vaginally; 100mg IV fentanyl and 1mg IV midazolam | • Patient satisfaction<br>• Pain |
| Edelman 2004<br><br>RCT<br><br>USA | n=80<br><br>English-speaking women ≥18 years old; good general health; >100lbs<br><br><11 weeks' gestation | **PCB + intrauterine infusion:** PCB of 1ml of 1% nonbuffered lidocaine on the anterior and posterior lip of the cervix and 4.5ml of 1% lidocaine at 4 and 8 o'clock position; 10ml 1% lidocaine intrauterine infusion<br><br>**PCB:** PCB of 1ml of 1% nonbuffered lidocaine on the anterior and posterior lip of the cervix and 4.5ml of 1% lidocaine at 4 and 8 o'clock position; 10ml sterile saline intrauterine infusion | • Patient satisfaction<br>• Pain |
| Edelman 2006<br><br>RCT<br><br>USA | n=77<br><br>English-speaking women ≥18 years old; good general health; >100lbs<br><br><11 weeks' gestation | **PCB + intrauterine infusion:** PCB of 1ml of 1% nonbuffered lidocaine on the anterior and posterior lip of the cervix and 4.5ml of 1% lidocaine at 4 and 8 o'clock position; 5ml 4% lidocaine intrauterine infusion<br><br>**PCB:** PCB of 1ml of 1% nonbuffered lidocaine on the anterior and posterior lip of the cervix and 4.5ml of 1% lidocaine at 4 and 8 | • Patient satisfaction<br>• Pain |

| Study and setting | Population | Intervention/ comparison | Outcomes |
|---|---|---|---|
| | | o'clock position; 5ml sterile saline intrauterine infusion | |
| Mankowski 2009<br><br>RCT<br><br>USA | n=132<br><br>≥98lbs (further inclusion criteria not reported)<br><br><12 weeks' gestation | **PCB:** 20ml local anaesthetic (5ml 1% lidocaine, 5 units vasopressin, 5ml 8% sodium bicarbonate) injected at the cervicovaginal junction<br><br>**Intracervical block:** 20ml local anaesthetic (5ml 1% lidocaine, 5 units vasopressin, 5ml 8% sodium bicarbonate) injected into the cervical stroma | • Pain<br>• Nausea<br>• Vomiting |
| Micks 2015<br><br>RCT<br><br>USA | n=160<br><br>Women ≥16 years old<br><br>18-24 weeks' gestation | **Sevoflurane:** Sevoflurane and oxygen mixture (concentration not reported) delivered through face mask; IV propofol, IV midazolam, IV fentanyl, IV oxytocin and inhaled nitrous oxide (doses not reported)<br><br>**Control:** IV propofol, IV midazolam, IV fentanyl, IV oxytocin and inhaled nitrous oxide (doses not reported) | • Patient satisfaction<br>• Termination of pregnancy completed with intended method of sedation/anaesthesia<br>• Pain<br>• Haemorrhage requiring transfusion or > 500ml of blood loss<br>• Nausea<br>• Vomiting |
| Nathan 1998<br><br>RCT<br><br>France | n=52<br><br>Women >18 years old; ASA grade I<br><br>Gestational age not reported | **Sevoflurane:** Induced using the single breath vital capacity technique with 8% sevoflurane in 6 $1min^{-1}$ oxygen; maintained with 2-3% sevoflurane in 2 $1min^{-1}$ fresh gas flow including nitrous oxide<br><br>**Propofol:** Induced with propofol (dose not reported) and maintained with 60% nitrous oxide | • Pain<br>• Nausea<br>• Vomiting |
| Raeder 1992<br><br>RCT | n=59<br><br>50-80kg; ASA grade I or II | **Deep sedation (+ local anaesthesia):** 0.1mg/kg IV midazolam and 0.01mg/kg IV alfentanil before PCB with 2 10ml | • Patient satisfaction<br>• Pain |

| Study and setting | Population | Intervention/ comparison | Outcomes |
|---|---|---|---|
| Norway | First trimester (not defined) | of 20mg/ml mepivacaine and 0.005mg/ml adrenaline<br><br>**General anaesthesia:** 0.01mg/kg IV alfentanil 1 minute before 2mg/kg bolus injection propofol; women breathed 75% nitrous oxide in oxygen by mask | |
| Wong 2002<br><br>RCT<br><br>China | n=100<br><br>Women aged >16 years; normal general and gynaecological exam<br><br><12 weeks' gestation | **Conscious sedation (+ local anaesthesia):** 2mg IV midazolam and 25micrograms IV fentanyl were given 2 minutes prior to PCB with 10ml 1% lignocaine<br><br>**Local anaesthesia:** PCB with 10ml 1% lignocaine | • Patient satisfaction |
| Xu 2012<br><br>RCT<br><br>China | N=200<br><br>Electrical suction aspiration<br><br><10 weeks' gestation | **Sevoflurane:** 8% sevoflurane with oxygen through spontaneous breathing with a face mask<br><br>**Propofol:** 1.5 to 2.5mg/kg IV propofol | • Patient satisfaction |

*ASA grade: American Society of Anesthesiologists physical status classification; IV: intravenous; min: minute; PCB: paracervical block; RCT: randomised controlled trial*

See the full evidence tables in appendix D and the forest plots in appendix E.

## Quality assessment of clinical studies included in the evidence review

See the clinical evidence profiles in appendix F.

## Economic evidence

### Included studies

A systematic review of the economic literature was conducted but no economic studies were identified which were applicable to this review question.

A single economic search was undertaken for all topics included in the scope of this guideline. Please see supplementary material 2 for details.

### Excluded studies

No full-text copies of articles were requested for this review and so there is no excluded studies list.

## Economic model

No economic modelling was undertaken for this review because the committee agreed that other topics were higher priorities for economic evaluation.

## Evidence statements

## Comparison 1. Local anaesthesia versus conscious sedation (and local anaesthesia)

### Critical outcomes

#### *Patient satisfaction – would recommend to friend*

RCT evidence showed a lower clinically important difference in the rate of women that would recommend their anaesthesia method to a friend in the 'local anaesthesia' group compared with the 'conscious sedation (and local anaesthesia); group (1 RCT, n=122; RR=0.76 [95% CI 0.60, 0.96]; moderate quality).

#### *Patient satisfaction – overall satisfaction*

RCT evidence showed a lower clinically important difference in the rate of women rating overall satisfaction as 'excellent' (1 RCT, n=100; RR=0.10 [95% CI 0.01, 0.75]; high quality); and there was a higher clinically important difference in rates of women rating overall satisfaction as 'fair' (1 RCT, n=100; RR=1.67 [95% CI 1.08, 2.57]; moderate quality) in the 'local anaesthesia' group compared with the 'conscious sedation (and local anaesthesia)' group. RCT evidence did not detect a clinically important difference in the rate of women rating overall satisfaction as 'satisfactory' (1 RCT, n=100; RR=0.60 [95% CI 0.29, 1.24]; low quality) or 'unsatisfactory' (1 RCT, n=100; RR=1.43 [95% CI 0.59, 3.45]; low quality) between the 'local anaesthesia' group and the 'conscious sedation (and local anaesthesia)' group; however there was uncertainty around the estimate. However, RCT evidence did not detect a clinically important difference in patient satisfaction between the 'local anaesthesia' group and the 'conscious sedation (and local anaesthesia)' group when measured on a 100mm visual analogue scale 30 minutes post-operation (1 RCT, n=122; MD=-0.60 [95% -7.42, 6.22]; high quality) or 3 days post-operation (1 RCT, n=85; (MD=-9.20 [95% CI -20.25, 1.85]; moderate quality); however there was uncertainty around the estimates. .

#### *Patient satisfaction – anxiety control (100mm visual analogue scale)*

RCT evidence showed a lower clinically important difference in patient satisfaction measured as anxiety control in the 'local anaesthesia' group compared with the 'conscious sedation (and local anaesthesia)' group 30 minutes post-operation (1 RCT, n=122; MD=-12.80 [95% CI -22.47, -3.23]; moderate quality) and 3 days post-operation (1 RCT, n=85; MD=-14.50 [95% CI -27.29, -1.71]; moderate quality).

#### *Patient satisfaction – pain control (100mm visual analogue scale)*

RCT evidence did not detect a clinically important difference in patient satisfaction measured as pain control between the 'local anaesthesia' group and the 'conscious sedation (and local anaesthesia) group 30 minutes post operation (1 RCT, n=122; MD=-6.8 [95% CI -17.11, 3.51]; moderate quality) or 3 days post-operation (1 RCT, n=85; MD=-11.6 [95% CI -24.56, 1.36]; moderate quality); however there was uncertainty around the estimates.

***Termination of pregnancy completed with intended method of sedation/ anaesthesia***

No evidence was identified to inform this outcome.

***Pain – during aspiration (100mm visual analogue scale)***

RCT evidence did not detect a clinically important difference in pain during aspiration between the 'local anaesthesia' group and the 'conscious sedation (and local anaesthesia)' group (1 RCT, n=123; MD=4.2 [95% CI -3.35, 11.75]; moderate quality); however there was uncertainty around the estimate.

**Important outcomes**

***Haemorrhage requiring transfusion or > 500ml of blood loss***

No evidence was identified to inform this outcome.

***Nausea***

No evidence was identified to inform this outcome.

***Vomiting – 30 minutes post-operation***

RCT evidence did not detect a clinically important difference in the rate of vomiting between the 'local anaesthesia' group and the 'conscious sedation (and local anaesthesia)' group (1 RCT, n=122; RR=1.00 [95% CI 0.06, 15.62]; low quality); however there was uncertainty around the estimate.

***Length of admission***

No evidence was identified to inform this outcome.

## Comparison 2. Deep sedation (and local anaesthesia) versus general anaesthesia

**Critical outcomes**

***Patient satisfaction – would have same anaesthesia again***

RCT evidence did not detect a clinically important difference in the rate of women who would have the same anaesthesia again between the 'deep sedation (and local anaesthesia)' group and the 'general anaesthesia' group (1 RCT, n=59; RR=1.07 [95% CI 0.83, 1.37]; low quality); however there was uncertainty around the estimate.

***Termination of pregnancy completed with intended method of sedation/ anaesthesia***

No evidence was identified to inform this outcome.

***Pain***

RCT evidence showed a lower clinically important difference in the rate of pain during the hospital stay (1 RCT, n=59; RR=0.33 [95% CI 0.17, 0.67]; moderate quality) and pain measured continuously on an 11=point sale (1 RCT, n=59; MD=-1.00 [95% CI -1.77, -0.23]; low quality) in the 'deep sedation (and local anaesthesia)' group compared with the 'general anaesthesia' group. However, RCT evidence did not detect a clinically important difference in the rate of pain during travel home (1 RCT, n=59; RR=0.18 [95% CI 0.02, 1.45]; very low quality) or during the following night and day (1 RCT, n=59; RR=0.90 [95% CI 0.39, 2.08];

very low quality) between the ‘deep sedation (and local anaesthesia)’ group and the ‘general anaesthesia’ group; however there was uncertainty around the estimates.

**Important outcomes**

***Haemorrhage requiring transfusion or > 500ml of blood loss***

No evidence was identified to inform this outcome.

***Nausea***

No evidence was identified to inform this outcome.

***Vomiting***

No evidence was identified to inform this outcome.

***Length of admission***

No evidence was identified to inform this outcome.

## Comparison 3. Propofol (general anaesthesia) versus sevoflurane (general anaesthesia)

**Critical outcomes**

***Patient satisfaction – overall satisfaction***

RCT evidence showed no clinically important difference in the rate of overall satisfaction (1 RCT, n=200; RR=0.99 [95% CI 0.91, 1.08]; moderate quality) or satisfaction measured continuously on a 10cm visual analogue scale (1 RCT, n=160; MD=-0.10 [95% CI -0.49, 0.29]; high quality) between the ‘propofol’ group and the ‘sevoflurane’ group.

***Patient satisfaction – would recommend to friend (10cm visual analogue scale)***

RCT evidence showed no clinically important difference in the rate of women who would recommend their anaesthesia method to a between the ‘propofol’ group and the ‘sevoflurane’ group (1 RCT, n=160; MD=-0.10 [95% CI -0.48, 0.28]; high quality).

***Termination of pregnancy completed with intended method of sedation/ anaesthesia***

RCT evidence showed no clinically important difference in the rate of abortion being completed with intended method of sedation/anaesthesia between the ‘propofol’ group and the ‘sevoflurane’ group (1 RCT, n=160; RR=1.03 [95% CI 0.98, 1.07]; high quality).

***Pain***

RCT evidence did not detect a clinically important difference in the rate of pain during recovery (1 RCT, n=52; RR=5.00 [95% CI 0.25, 99.34]; very low quality), 24 hours post-operation (1 RCT, n=45; RR=1.28 [95% CI 0.53, 3.08]; very low quality); however there was uncertainty around the estimate. The evidence showed there was no clinically important difference when measured continuously on a 10cm visual analogue scale upon waking from anaesthesia (1 RCT, n=160; MD=0.20 [95% CI -0.50, 0.90]; high quality) or upon discharge (1 RCT, n=160; MD=-0.20 [95% CI -0.89, 0.49]; high quality) between the ‘propofol’ group and the ‘sevoflurane’ group.

### Important outcomes

#### *Haemorrhage requiring transfusion or > 500ml of blood loss*

RCT evidence did not detect a clinically important difference in the rate of haemorrhage requiring transfusion or >500ml blood loss between the 'propofol' and 'sevoflurane' group (1 RCT, n=160; RR=0.20 [95% CI 0.01, 4.10]; moderate quality); however there was uncertainty around the estimate.

#### *Nausea*

RCT evidence did not detect a clinically important difference in the rate of nausea between the 'propofol' group and the 'sevoflurane' group (2 RCTs, n=205; RR=0.52 [95% CI 0.19, 1.46]; very low quality); however there was uncertainty around the estimate.

#### *Vomiting*

RCT evidence did not detect a clinically important difference in the rate of vomiting between the 'propofol' group and the 'sevoflurane' group (2 RCTs, n=205; RR=0.54 [95% CI 0.19, 1.54]; very low quality); however there was uncertainty around the estimate.

#### *Length of admission*

No evidence was identified to inform this outcome.

## Comparison 4. Oral conscious sedation versus intravenous conscious sedation

### Critical outcomes

#### *Patient satisfaction – pain control*

RCT evidence showed a lower clinically important difference in the rate of pain control being rated as 'completely/mostly acceptable' (1 RCT, n=130; RR=0.65 [95% CI 0.50, 0.83]; moderate quality) a higher clinically important difference in the rate of pain control being rated as 'somewhat acceptable' (1 RCT, n=130; RR=3.38 [95% CI 1.66, 6.87]; high quality) , and the rate of pain control being rated as 'mostly/completely unacceptable' (1 RCT, n=130; RR=1.00 [95% CI 0.21, 4.77]; low quality) did not detect a clinically important difference between the 'oral conscious sedation' group and the 'intravenous conscious sedation' group; however there was uncertainty around the estimate..

#### *Patient satisfaction – would recommend to friend*

RCT evidence did not detect a clinically important difference in the rates of women who would 'definitely/probably' recommend their anaesthesia method to a friend (1 RCT, n=130; RR=0.87 [95% CI 0.75, 1.00]; moderate quality), 'don't know' if they would recommend their anaesthesia method to a friend (1 RCT, n=130; RR=5.00 [95% CI 0.60, 41.63]; low quality), or would 'probably/definitely not' recommend their anaesthesia method to a friend between the 'oral conscious sedation' group and the 'intravenous conscious sedation' group. (1 RCT, n=130; RR=2.00 [95% CI 0.63, 6.32]; low quality); however there was uncertainty around the estimates.

#### *Patient satisfaction – would choose same method again*

RCT evidence showed a lower clinically important difference in the rate of women who would 'definitely/probably' choose the same method again (1 RCT, n=130; RR=0.77 [95% CI 0.65, 0.91]; moderate quality), a higher clinically important difference in the rate of women who

would 'probably/definitely not' choose the same method again (1 RCT, n=130; RR=3.50 [95% CI 1.22, 10.07]; moderate quality), and did not detect a clinically important difference in the rate of women who 'don't know' if they would choose the same method again (1 RCT, n=130; RR=9.00 [95% CI 0.49, 163.85]; low quality) between the 'oral conscious sedation' group and the 'intravenous conscious sedation' group; however there was uncertainty around the estimates.

***Termination completed with intended method of sedation/anaesthesia***

RCT evidence showed there was no clinically important difference in the rate of abortion being completed with the intended method of sedation/anaesthesia between the 'oral conscious sedation' group and the 'intravenous conscious sedation' group (1 RCT, n=130; RR=1.00 [95% CI 0.97, 1.03]; high quality).

***Pain – intraoperative***

RCT evidence showed a higher clinically important difference in intraoperative pain measured continuously on a 100-point scale (1 RCT, n=130; MD=24.90 [95% CI 16.01, 33.79]; high quality) and the rate of pain being rated as 'severe' (1 RCT, n=130; RR=3.00 [95% CI 1.60, 5.62]; high quality), a lower clinically important difference in the rate of pain being rated as 'mild' (1 RCT, n=130; RR=0.32 [95% CI 0.18, 0.55]; high quality), and did not detect a clinically important difference in the rate of pain being rated as 'moderate' (1 RCT, n=130; RR=1.35 [95% 0.80, 2.29]; moderate quality) between the 'oral conscious sedation' group and the 'intravenous conscious sedation' group; however there was uncertainty around the estimates.

***Pain – postoperative (100-point scale)***

RCT evidence did not detect a clinically important difference in postoperative pain between the 'oral conscious sedation; group and the 'intravenous conscious sedation' group (1 RCT, n=130; MD=7.30 [95% CI 1.01, 13.59]; moderate quality); however there was uncertainty around the estimates. .

**Important outcomes**

***Haemorrhage requiring transfusion or > 500ml of blood loss***

No evidence was identified to inform this outcome.

***Nausea – postoperative***

RCT evidence showed a higher clinically important difference in the rate of postoperative nausea in the 'oral conscious sedation' group compared with the 'intravenous conscious sedation' group (1 RCT, n=130; RR=1.91 [95% CI 1.00, 3.63]; moderate quality).

***Vomiting – postoperative***

RCT evidence did not detect a clinically important difference in the rate of postoperative vomiting between the 'oral conscious sedation' group and the 'intravenous conscious sedation' group (1 RCT, n=130; RR=2.50 [95% CI 0.83, 7.57]; moderate quality); however there was uncertainty around the estimates.

***Length of admission***

No evidence was identified to inform this outcome.

## Comparison 5. Local anaesthesia method A versus local anaesthesia method B

### Critical outcomes

***Patient satisfaction – overall satisfaction (100mm VAS)***

#### Paracervical block versus lidocaine gel

RCT evidence did not detect a clinically important difference in overall satisfaction between the 'paracervical block' group and the 'lidocaine gel' group (1 RCT, n=137; MD=-6.48 [95% CI -14.49, 1.53]; very low quality); however there was uncertainty around the estimates. .

#### Paracervical block and intrauterine infusion versus paracervical block

RCT evidence showed there was no clinically important difference in overall satisfaction between the 'paracervical block and intrauterine infusion' group and the 'paracervical block' group (2 RCTs, n=157; MD=2.01 [95% CI -4.66, 8.68]; moderate quality)

***Patient satisfaction – would recommend to friend (100mm VAS)***

#### Paracervical block versus lidocaine gel

RCT evidence did not detect a clinically important difference in the rate of women who would recommend their anaesthesia method to a friend between the 'paracervical block' group and the 'lidocaine gel' group (1 RCT, n=137; MD=-3.00 [95% CI -9.30, 3.30]; very low quality); however there was uncertainty around the estimates.

***Termination of pregnancy completed with intended method of sedation/ anaesthesia***

No evidence was identified to inform this outcome.

***Pain – cervical dilation***

#### Paracervical block versus lidocaine gel

RCT evidence did not detect a clinically important difference in the rate of pain with cervical dilation measured on a 100mm visual analogue scale between the 'paracervical block' group and the 'lidocaine gel' group (1 RCT, n=137; MD=-4.00 [95% CI -11.58, 3.58]; very low quality); however there was uncertainty around the estimates.

#### Paracervical block versus intracervical block

RCT evidence showed there was no clinically important difference in the rate of pain with cervical dilation measured on a 10cm visual analogue scale between the 'paracervical block' group and the 'intracervical block' group (1 RCT, n=132; MD=-0.20 [95% CI -0.97, 0.57]; moderate quality).

#### Paracervical block and intrauterine infusion versus paracervical block

RCT evidence did not detect a clinically important difference in the rate of pain measured on a 100mm visual analogue scale between the 'paracervical block and intrauterine infusion' group and the 'paracervical block' group when a 10ml 1% lidocaine intrauterine infusion was used (1 RCT, n=79; MD=-3.00 [95% CI -14.72, 8.72]; low quality) but a lower clinically important difference when a 5ml 4% lidocaine intrauterine infusion was used (1 RCT, n=74;

MD=-20.00 [95% CI -32.86, -7.14]; low quality); however there was uncertainty around the estimates.

***Pain – aspiration/curettage***

**Paracervical block versus intracervical block**

RCT evidence did not detect a clinically important difference in the rate of pain with curettage measured on a 10cm visual analogue scale between the 'paracervical block' group and the 'intracervical block' group (1 RCT, n=132; MD=0.60 [95% CI -0.32, 1.52]; low quality); however there was uncertainty around the estimates.

**Paracervical block and intrauterine infusion versus paracervical block**

RCT evidence did not detect a clinically important difference in pain with aspiration measured on a 100mm visual analogue scale between the 'paracervical block and intrauterine infusion' group and the 'paracervical block' group when a 10ml 1% lidocaine intrauterine infusion was used (1 RCT, n=80; MD=-4.00 [95% CI -18.27, 10.27]; low quality); however there was uncertainty around the estimate but there was a lower clinically important difference when a 5ml 4% lidocaine intrauterine infusion was used (1 RCT, n=76; MD=-28.00 [95% CI -39.53, -16.47]; moderate quality).

***Pain – 30-45 minutes post operation (100mm VAS)***

**Paracervical block versus lidocaine gel**

RCT evidence showed there was no clinically important difference in the rate of pain 30-45 minutes post operation between the 'paracervical block' group and the 'lidocaine gel' group (1 RCT, n=137; MD=1.10 [95% CI -5.41, 7.61]; very low quality).

**Paracervical block and intrauterine infusion versus paracervical block**

RCT evidence did not detect a clinically important difference in the rate of pain 30 minutes post operation between the 'paracervical block and intrauterine infusion' group and the 'paracervical block' group when a 10ml 1% lidocaine intrauterine infusion was used (1 RCT, n=79; MD=7.00 [95% CI -2.26, 16.26]; low quality) or when a 5ml 4% lidocaine intrauterine infusion was used (1 RCT, n=75; MD=-5.00 [95% CI -14.51, 4.51]; low quality); however there was uncertainty around the estimates.

**Important outcomes**

***Haemorrhage requiring transfusion or > 500ml of blood loss***

No evidence was identified to inform this outcome.

***Nausea***

**Paracervical block versus intracervical block**

RCT evidence did not detect a clinically important difference in the rate of nausea between the 'paracervical block' group and the 'intracervical block' group (1 RCT, n=132; RR=0.33 [95% CI 0.01, 8.04]; very low quality); however there was uncertainty around the estimates.

### *Vomiting*

#### Paracervical block versus intracervical block

RCT evidence did not detect a clinically important difference in the rate of vomiting between the 'paracervical block' group and the 'intracervical block' group (1 RCT, n=132; RR=0.33 [95% CI 0.01, 8.04]; very low quality); however there was uncertainty around the estimates.

### *Length of admission*

No evidence was identified to inform this outcome.

## The committee's discussion of the evidence

### Interpreting the evidence

### *The outcomes that matter most*

The aim of sedation and anaesthesia during abortion is to reduce pain, distress and, if desired, awareness during the procedure; therefore, patient satisfaction and pain were selected as critical outcomes. Whether or not it was possible to complete the abortion with the intended method of sedation or anaesthesia was also selected as a critical outcome as it may be necessary to administer additional sedation or anaesthesia if the procedure is not tolerated using selected methods.

Haemorrhage requiring transfusion or greater than 500ml of blood loss was selected as an important outcome as some agents, particularly inhalational anaesthesia (sevoflurane, isoflurane and desflurane), cause uterine relaxation, which may in turn cause excessive bleeding during the abortion procedure. Similarly, nausea and vomiting were selected as important outcomes as these may be more common with the use of some agents, particularly inhalational anaesthesia and oral or intravenous opioids used in sedation or general anaesthetic regimes. Finally, length of admission was selected as an important outcome as this will be affected by: time needed for sedation or anaesthesia to take effect, including titrating dose to required level of sedation and administration of additional sedation or anaesthesia as needed; management of any immediate complications that arise, which may differ based on sedation or anaesthesia used; and time to recover from sedation or anaesthesia.

### *The quality of the evidence*

The evidence in the pairwise comparisons was assessed using the GRADE methodology. Evidence for patient satisfaction ranged from very low to high quality but the majority of evidence was of moderate to high quality; the main reasons evidence for this outcome was downgraded was imprecision due to wide confidence intervals and risk of bias due to a lack of blinding and the subjective nature of this outcome. There was limited evidence available for whether abortion was completed with intended method of sedation or anaesthesia; however, where this evidence was available, it was high quality. Evidence for pain ranged from very low to high quality; the main reasons evidence for this outcome was downgraded was imprecision due to wide confidence intervals and risk of bias due to a lack of blinding and the subjective nature of this outcome, but there was also some inconsistency in this outcome across included studies. Haemorrhage requiring transfusion or greater than 500ml of blood loss was only reported for one comparison (propofol general anaesthesia versus sevoflurane general anaesthesia); evidence was moderate quality and downgraded because of imprecision due to wide confidence intervals. Evidence for nausea and vomiting ranged

from very low to moderate quality and the main reason evidence was downgraded was imprecision due to wide confidence intervals. Finally, there was no evidence for length of admission.

There was no evidence comparing local anaesthesia with deep sedation or general anaesthesia, or conscious sedation with deep sedation or general anaesthesia.

***Benefits and harms***

There was evidence of greater overall patient satisfaction and satisfaction with anxiety control, and increased rate of women who would recommend the anaesthesia or sedation method they received to a friend, for women who received conscious sedation in addition to local anaesthesia compared with women who received local anaesthesia without sedation. However, the committee agreed that there were benefits of having local anaesthesia without sedation, such as a shorter admission time due to reduced time for anaesthesia to take effect and reduced recovery time, that may contribute to overall patient satisfaction that were not observable in the evidence due to differences between administering local anaesthesia only as part of a placebo-controlled randomised trial compared with normal clinical practice. Therefore, the committee did not think it was appropriate to conclude that conscious sedation and local anaesthesia would be superior to local anaesthesia without sedation for all women and recommended the use of both methods, depending on the preference of the woman.

There was evidence of reduced pain during the hospital stay in women who had deep sedation compared with general anaesthesia. However, this trial was confounded as women in the deep sedation arm also received local anaesthesia, which was not given in the general anaesthesia arm. As general anaesthesia is very short acting, pain would be expected after the abortion procedure if women have not received local anaesthesia. Therefore, the committee agreed there was insufficient evidence to conclude that either deep sedation or general anaesthesia is more effective than the other and recommended that both methods would be appropriate for women who desire a lack of full consciousness during the procedure.

There was good evidence of improved satisfaction with pain control, an increase in the rate of women who would choose the same method of sedation or anaesthesia again and reduced pain and nausea in women who had intravenous conscious sedation compared with those who had oral conscious sedation; therefore, the committee made a strong recommendation that, if using conscious sedation, intravenous conscious sedation is used rather than oral conscious sedation.

The available evidence showed no clinically meaningful differences between propofol general anaesthesia and sevoflurane general anaesthesia. However, haemorrhage requiring transfusion or greater than 500ml of blood loss is a rare event and evidence for this outcome was only available from 1, relatively small study which may have been underpowered to detect differences in this outcome. Further, 1 of the included trials (Nathan 1998) was stopped early due to twice as much bleeding occurring in the sevoflurane arm compared with the propofol arm. Therefore, the committee recommended that clinicians consider using propofol for general anaesthesia compared with inhalational anaesthesia. Propofol does not have any analgesic properties and all included studies also used a short-acting opioid, such as fentanyl. Therefore, the committee recommended a short-acting opioid was used in combination with propofol.

The recommendation was made for all inhalational anaesthesia (sevoflurane, isoflurane and desflurane), rather than just sevoflurane, as they are all known to cause uterine relaxation (Yoo 2006), which is the likely cause of increased blood loss in the sevoflurane arm. The committee agreed that further research comparing inhalational and intravenous anaesthesia

would be beneficial to inform future practice, so they decided to make a research recommendation (see Appendix L).

There was evidence of no clinically meaningful differences between different methods of administration of local anaesthesia, with the exception of reduced pain with cervical dilation and aspiration when a 5ml 4% lidocaine intrauterine infusion was added to a paracervical block; however, this difference was not observed when a 10ml 1% lidocaine intrauterine infusion was used. Therefore, the committee agreed that it was not possible to recommend a specific method of local anaesthesia. However, there was limited evidence comparing paracervical or intracervical methods of local anaesthesia with intrauterine methods, the evidence that was available was mainly low quality, and there were major confounders such as the use of fentanyl. Therefore, the committee agreed that further research on the efficacy of local anaesthesia methods, including the addition of intrauterine anaesthesia, would be beneficial to inform future research so made a research recommendation (see Appendix L).

The committee noted that the use of local anaesthesia and conscious sedation was not widespread among all sectors of the NHS, although interest was growing, and the use of conscious sedation is widespread in other areas like endoscopy and assisted conception. There was concern that a recommendation to offer these could mean that units introduced them without using best practice and as a result women could have a poor experience. Therefore, it is likely that training will be needed for staff administering it. Whilst different methods of local anaesthesia and conscious sedation were compared as part of this review, comparisons of optimal techniques within these methods were not considered as part of this review question. Therefore, the committee could not recommend specific protocols for local anaesthesia.

**Cost effectiveness and resource use**

A systematic review of the economic literature was conducted but no relevant studies were identified which were applicable to this review question.

The committee discussed the potential costs and savings of recommendations and agreed that there would not be a substantial increase in costs or resources. There is the potential for reduced resource use associated with using intravenous conscious sedation rather than oral conscious sedation as the former takes less time to take effect and has a shorter recovery time. Further, due to the greater effectiveness of intravenous compared with oral conscious sedation, increased use of intravenous sedation is likely to reduce the need for additional sedation or anaesthesia, or rebooking procedures due to inadequate sedation. However, absolute reductions in resource use are unclear as it is not currently known what proportion of procedures are undertaken using oral conscious sedation.

**Other consideration**

The committee acknowledged that some women, for example those who have previously given birth without any pain relief, may not want any sedation or anaesthesia for the abortion procedure and should have the option of declining this. However, no anaesthesia was not included as a comparison in this review question so the committee could not make recommendation in this area.

The committee were aware of guidelines on perioperative fasting from the European Society of Anaesthesiology (2011); however, fasting was not considered as part of this review question so the committee could not make recommendations in this area.

Whilst this question did not investigate the use of oral analgesics, the committee noted that most of the trials in the evidence base had used oral analgesia pre-treatment and so their

findings may not apply if this did not happen. Therefore, although they were not able to make any recommendations specifically about oral analgesics, the committee noted that they may be of benefit.

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# Appendices

## Appendix A – Review protocols

### Review protocol for review question: What is the optimal method of anaesthesia or sedation for surgical abortion?

| Field (based on PRISMA-P | Content |
|---|---|
| Review question in SCOPE | What is the optimal method of anaesthesia or sedation for surgical termination of pregnancy? |
| Review question in guideline | What is the optimal method of anaesthesia or sedation for surgical termination of pregnancy? |
| Type of review question | Intervention |
| Objective of the review | To determine the optimal method of anaesthesia or sedation for surgical termination of pregnancy |
| Eligibility criteria – population | Women who are having a uterine evacuation for surgical termination of pregnancy using electric or manual vacuum aspiration, or dilatation and evacuation.<br><br>Exclusions:<br>- Studies with indirect populations will not be considered |
| Eligibility criteria – intervention(s) | Local anaesthesia:<br>• Paracervical block<br>• Intracervical block<br>• Intrauterine installation<br>• Anaesthetic gel (e.g., lidocaine)<br>Conscious sedation:<br>• Oral or IV Benzodiazepines<br>• Zopiclone<br>• Nitrous oxide and oxygen mixture (Entonox or titrated nitrate)<br>Deep sedation:<br>• IV Benzodiazepines<br>• Propofol<br>• Ketamine<br>General anaesthesia:<br>• IV Benzodiazepines<br>• Propofol<br>• Sevoflurane<br>• Isoflurane<br>• Desflurane<br>• Ketamine<br>• Thiopentone<br>• Etomodate |

| Field (based on PRISMA-P | Content |
|---|---|
| Eligibility criteria – comparator(s)/control | Comparisons:<br>1. Local anaesthesia only versus conscious sedation (± local anaesthesia and/or IV or oral opioids)<br>2. Local anaesthesia only versus deep sedation<br>3. Local anaesthesia only versus general anaesthesia<br>4. Conscious sedation (± local anaesthesia and/or IV or oral opioids) versus deep sedation<br>5. Conscious sedation (± local anaesthesia and/or IV or oral opioids) versus general anaesthesia<br>6. Deep sedation versus general anaesthesia<br>7. Propofol (general anaesthesia) versus sevoflurane/ isoflurane/ desflurane (general anaesthesia)<br>8. Oral conscious sedation (± local anaesthesia and/or IV or oral opioids) versus IV conscious sedation (± local anaesthesia and/or IV or oral opioids)<br>9. Local anaesthesia method A versus local anaesthesia method B |
| Outcomes and prioritisation | **Critical outcomes:**<br>• Patient satisfaction<br>• Termination of pregnancy completed with intended method of sedation/ anaesthesia<br>• Pain<br><br>**Important outcomes:**<br>• Haemorrhage requiring transfusion or > 500ml of blood loss<br>• Nausea<br>• Vomiting<br>• Length of admission |
| Eligibility criteria – study design | - Systematic reviews of RCTs<br>- RCTs |
| Other inclusion exclusion criteria | Inclusion:<br>- English-language<br>- Studies conducted from 1990 (see below) |
| Proposed sensitivity/sub-group analysis, or meta-regression | Stratified analyses based on the following sub-groups of women, where possible:<br>Medical conditions:<br>- Complex pre-existing medical conditions<br>- No complex pre-existing medical conditions<br>Gestation: |

| Field (based on PRISMA-P | Content |
|---|---|
| | - <9 weeks<br>- ≥$9^{+0}$ to $13^{+6}$<br>- ≥14 weeks<br>Or if not possible,<br>- <14 weeks<br>- ≥14 weeks |
| Selection process – duplicate screening/selection/analysis | Dual weeding will not be performed for this question<br>Sifting, data extraction, appraisal of methodological quality and GRADE assessment will be performed by the systematic reviewer.<br>Quality control will be performed by the senior systematic reviewer.<br>Dual data extraction will not be performed for this question. |
| Data management (software) | Pairwise meta-analyses will be performed using Cochrane Review Manager (RevMan5).<br>'GRADEpro' will be used to assess the quality of evidence for each outcome.<br>NGA STAR software will be used for study sifting, data extraction, recording quality assessment using checklists and generating bibliographies/citations, |
| Information sources – databases and dates | Sources to be searched: Medline, Medline In-Process, CCTR, CDSR, DARE, HTA, Embase<br>Limits (e.g. date, study design):<br>Apply standard animal/non-English language exclusion<br>Limit to RCTs and systematic reviews<br>Dates: from 1990<br>Only studies conducted from 1990 will be considered for this review question, as propofol was licensed in the mid-1980's, using a cut off of 1990 gives time for anaesthetists to become experienced with the agent and not capture studies with a high complication rate due to inexperience |
| Identify if an update | Not an update |
| Author contacts | For details please see the guideline in development web site. |
| Highlight if amendment to previous protocol | For details please see Section 4.5 of Developing NICE guidelines: the manual |
| Search strategy – for one database | For details please see appendix B |
| Data collection process – forms/duplicate | A standardised evidence table format will be used, and published as appendix D (clinical evidence tables) or appendix H (economic evidence tables). |
| Data items – define all variables to be collected | For details please see evidence tables in appendix D (clinical evidence tables) or appendix H (economic evidence tables). |

| Field (based on PRISMA-P | Content |
|---|---|
| Methods for assessing bias at outcome/study level | Appraisal of methodological quality:<br>The methodological quality of each study will be assessed using an appropriate checklist:<br>• RoBIS for systematic reviews<br>• Cochrane risk of bias tool for RCTs<br>The risk of bias across all available evidence will be evaluated for each outcome using an adaptation of the 'Grading of Recommendations Assessment, Development and Evaluation (GRADE) toolbox' developed by the international GRADE working group http://www.gradeworkinggroup.org/ |
| Criteria for quantitative synthesis (where suitable) | For details please see Section 6.4 of Developing NICE guidelines: the manual |
| Methods for analysis – combining studies and exploring (in)consistency | Synthesis of data:<br>Pairwise meta-analysis will be conducted where appropriate for all other outcomes.<br>When meta-analysing continuous data, change scores will be pooled in preference to final scores.<br>For details regarding inconsistency, please see the methods chapter<br>Minimally important differences:<br>Statistical significance will be used for 'haemorrhage requiring transfusion or > 500ml of blood loss'. For the remaining outcomes, default values will be used: 0.8 and 1.25 for dichotomous outcomes (relative risks); 0.5 times SD (for the control group) for continuous outcomes. |
| Meta-bias assessment – publication bias, selective reporting bias | For details please see Section 6.2 of Developing NICE guidelines: the manual.<br>If sufficient relevant RCT evidence is available, publication bias will be explored using RevMan software to examine funnel plots. |
| Assessment of confidence in cumulative evidence | For details please see Sections 6.4 and 9.1 of Developing NICE guidelines: the manual |
| Rationale/context – Current management | For details please see the introduction to the evidence review. |
| Describe contributions of authors and guarantor | A multidisciplinary committee developed the guideline. The committee was convened by The National Guideline Alliance and chaired by Profession Iain Cameron in line with section 3 of Developing NICE guidelines: the manual.<br>Staff from The National Guideline Alliance will undertake systematic literature searches, appraise the evidence, conduct meta-analysis and cost-effectiveness analysis where appropriate, and draft the guideline in collaboration with the |

| Field (based on PRISMA-P | Content |
|---|---|
| | committee. For details please see the methods chapter. |
| Sources of funding/support | The National Guideline Alliance is funded by NICE and hosted by the Royal College of Obstetricians and Gynaecologists |
| Name of sponsor | The National Guideline Alliance is funded by NICE and hosted by the Royal College of Obstetricians and Gynaecologists |
| Roles of sponsor | NICE funds The National Guideline Alliance to develop guidelines for those working in the NHS, public health, and social care in England |
| PROSPERO registration number | Not registered |

*GRADE: Grading of Recommendations Assessment, Development and Evaluation; IV: intravenous; N/A: not applicable; NHS: National Health Service; NICE: National Institute for Health and Care Excellence; NGA: National Guideline Alliance; RCT: randomised controlled trial; RoBIS: risk of bias in systematic reviews; SD: standard deviation*

# Appendix B – Literature search strategies

## Literature search strategy for review question: What is the optimal method of anaesthesia or sedation for surgical abortion?

The search for this topic was last run on 11th June 2018. It was decided not to undertake a re-run for this topic in November 2018 as this is not a fast moving evidence base and there were unlikely to be any new studies published which would affect the recommendations.

**Database: Medline & Embase (Multifile)**
Last searched on **Embase Classic+Embase** 1947 to 2018 June 08, **Ovid MEDLINE(R) Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE(R) Daily and Ovid MEDLINE(R)** 1946 to Present
Date of last search: 11th June 2018

| # | Searches |
|---|---|
| 1 | exp abortion/ use emczd |
| 2 | exp pregnancy termination/ use emczd |
| 3 | exp Abortion, Induced/ use ppez |
| 4 | Abortion Applicants/ use ppez |
| 5 | exp Abortion, Spontaneous/ use ppez |
| 6 | exp Abortion, Criminal/ use ppez |
| 7 | Aborted fetus/ use ppez |
| 8 | fetus death/ use emczd |
| 9 | abortion.mp. |
| 10 | (abort$ or postabort$ or preabort$).tw. |
| 11 | ((f?etal$ or f?etus$ or gestat$ or midtrimester$ or pregnan$ or prenatal$ or pre natal$ or trimester$) and terminat$).tw. |
| 12 | ((f?etal$ or f?etus$) adj loss$).tw. |
| 13 | ((gestat$ or midtrimester$ or pregnan$ or prenatal$ or pre natal$ or trimester$) adj3 loss$).tw. |
| 14 | (((elective$ or threaten$ or voluntar$) adj3 interrupt$) and pregnan$).tw. |
| 15 | 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 |
| 16 | Pain/dt, pc use ppez |
| 17 | pain/dt, pc use emczd |
| 18 | Pain, Postoperative/dt, pc use ppez |
| 19 | postoperative pain/dt, pc use emczd |
| 20 | (pain adj (control or management or treatment)).tw. |
| 21 | (Anesthesia, Local/ or Anesthetics, Local/) use ppez |
| 22 | (Anesthesia, Obstetrical/ or Analgesia, Obstetrical/) use ppez |
| 23 | Lidocaine/ use ppez |
| 24 | (local anesthesia/ or local anesthetic agent/) use emczd |
| 25 | (obstetric anesthesia/ or obstetric analgesia/) use emczd |
| 26 | paracervical block/ use emczd |
| 27 | lidocaine/ use emczd |
| 28 | (local adj3 (an?esthe$ or analges$)).tw. |

| # | Searches |
|---|---|
| 29 | ((paracervical or intracervical or intrauterine or para-cervical or intra-cervical or intra-uterine) adj3 (an?esthe$ or analges$ or block$)).tw. |
| 30 | ((an?esthe$ or analges$) adj3 (gel$ or topical or cream$ or ointment$ or spray$)).tw. |
| 31 | (lidocain$ or lignocain$ or xylocain$).tw. |
| 32 | Conscious Sedation/ use ppez |
| 33 | Deep Sedation/ use ppez |
| 34 | "Hypnotics and Sedatives"/ use ppez |
| 35 | exp sedation/ use emczd |
| 36 | sedative agent/ use emczd |
| 37 | (sedat$ or hypnot$ or tranquiliz$).tw. |
| 38 | exp Benzodiazepines/ use ppez |
| 39 | exp benzodiazepine derivative/ use emczd |
| 40 | ben?odia?epin$.tw. |
| 41 | zopiclone/ use emczd |
| 42 | (zopiclon$ or zimovan$ or imovan$).tw. |
| 43 | Nitrous Oxide/ use ppez |
| 44 | nitrous oxide/ use emczd |
| 45 | nitrous oxide plus oxygen/ use emczd |
| 46 | (nitrous adj oxide$).tw. |
| 47 | entonox$.tw. |
| 48 | (N2O adj inhal$).tw. |
| 49 | (propofol$ or diprivan$ or fresofol$ or pofol$ or recofol$).tw. |
| 50 | Ketamine/ use ppez |
| 51 | ketamine/ use emczd |
| 52 | (ketamin$ or ketalar$).tw. |
| 53 | (exp Anesthesia, General/ or exp Anesthetics, General/) use ppez |
| 54 | (exp general anesthesia/ or exp anesthetic agent/) use emczd |
| 55 | (general adj3 an?esthe$).tw. |
| 56 | exp Methyl Ethers/ use ppez |
| 57 | exp Thiobarbiturates/ use ppez |
| 58 | exp ether derivative/ use emczd |
| 59 | exp barbituric acid derivative/ use emczd |
| 60 | (sevoflurane$ or sevorane$ or ultane$ or isoflurane$ or forane$ or terrell$ or desflurane$ or suprane$ or thiopentone$ or thiopental$ or trapanal$ or etomidat$ or hypnomidate$ or amidate$).tw. |
| 61 | or/16-60 |
| 62 | 15 and 61 |
| 63 | ((surgical or suction or vacuum) adj6 (abortion or termination)).tw. |
| 64 | 61 and 63 |
| 65 | 62 or 64 |
| 66 | (controlled clinical trial or pragmatic clinical trial or randomized controlled trial).pt. or drug therapy.fs. or (groups or placebo or randomi#ed or randomly or trial).ab. |

| # | Searches |
|---|---|
| 67 | crossover procedure/ or double blind procedure/ or randomized controlled trial/ or single blind procedure/ or (assign* or allocat* or crossover* or cross over* or ((doubl* or singl*) adj blind*) or factorial* or placebo* or random* or volunteer*).ti,ab. |
| 68 | meta-analysis/ |
| 69 | meta-analysis as topic/ |
| 70 | systematic review/ |
| 71 | meta-analysis/ |
| 72 | (meta analy* or metanaly* or metaanaly*).ti,ab. |
| 73 | ((systematic or evidence) adj2 (review* or overview*)).ti,ab. |
| 74 | ((systematic* or evidence*) adj2 (review* or overview*)).ti,ab. |
| 75 | (reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab. |
| 76 | (search strategy or search criteria or systematic search or study selection or data extraction).ab. |
| 77 | (search* adj4 literature).ab. |
| 78 | (medline or pubmed or cochrane or embase or psychlit or psyclit or psychinfo or psycinfo or cinahl or science citation index or bids or cancerlit).ab. |
| 79 | cochrane.jw. |
| 80 | ((pool* or combined) adj2 (data or trials or studies or results)).ab. |
| 81 | letter/ |
| 82 | editorial/ |
| 83 | news/ |
| 84 | exp historical article/ |
| 85 | Anecdotes as Topic/ |
| 86 | comment/ |
| 87 | case report/ |
| 88 | (letter or comment*).ti. |
| 89 | 81 or 82 or 83 or 84 or 85 or 86 or 87 or 88 |
| 90 | randomized controlled trial/ or random*.ti,ab. |
| 91 | 89 not 90 |
| 92 | animals/ not humans/ |
| 93 | exp Animals, Laboratory/ |
| 94 | exp Animal Experimentation/ |
| 95 | exp Models, Animal/ |
| 96 | exp Rodentia/ |
| 97 | (rat or rats or mouse or mice).ti. |
| 98 | 91 or 92 or 93 or 94 or 95 or 96 or 97 |
| 99 | letter.pt. or letter/ |
| 100 | note.pt. |
| 101 | editorial.pt. |
| 102 | case report/ or case study/ |
| 103 | (letter or comment*).ti. |
| 104 | 99 or 100 or 101 or 102 or 103 |
| 105 | randomized controlled trial/ or random*.ti,ab. |
| 106 | 104 not 105 |

| # | Searches |
|---|---|
| 107 | animal/ not human/ |
| 108 | nonhuman/ |
| 109 | exp Animal Experiment/ |
| 110 | exp Experimental Animal/ |
| 111 | animal model/ |
| 112 | exp Rodent/ |
| 113 | (rat or rats or mouse or mice).ti. |
| 114 | 106 or 107 or 108 or 109 or 110 or 111 or 112 or 113 |
| 115 | 98 use ppez |
| 116 | 114 use emczd |
| 117 | 115 or 116 |
| 118 | 66 use ppez |
| 119 | 67 use emczd |
| 120 | 118 or 119 |
| 121 | (or/68-69,72,74-79) use ppez |
| 122 | (or/70-73,75-80) use emczd |
| 123 | 121 or 122 |
| 124 | 65 and 117 |
| 125 | 65 not 124 |
| 126 | 120 or 123 |
| 127 | 125 and 126 |
| 128 | remove duplicates from 127 |
| 129 | limit 128 to english language |
| 130 | limit 129 to yr="1990 -Current" |

**Database: Cochrane Library via Wiley Online**
Date of last search: 11th June 2018

| # | Searches |
|---|---|
| #1 | MeSH descriptor: [Abortion, Induced] explode all trees |
| #2 | MeSH descriptor: [Abortion Applicants] explode all trees |
| #3 | MeSH descriptor: [Abortion, Spontaneous] explode all trees |
| #4 | MeSH descriptor: [Abortion, Criminal] explode all trees |
| #5 | MeSH descriptor: [Aborted Fetus] explode all trees |
| #6 | "abortion":ti,ab,kw (Word variations have been searched) |
| #7 | (abort* or postabort* or preabort*):ti,ab,kw (Word variations have been searched) |
| #8 | ((fetal* or fetus* or foetal* or foetus* or gestat* or midtrimester* or pregnan* or prenatal* or pre natal* or trimester*) and terminat*):ti,ab,kw (Word variations have been searched) |
| #9 | ((fetal* or fetus* or foetal* or foetus*) next loss*):ti,ab,kw (Word variations have been searched) |
| #10 | ((gestat* or midtrimester* or pregnan* or prenatal* or pre natal* or trimester*) near/3 loss*):ti,ab,kw (Word variations have been searched) |
| #11 | (((elective* or threaten* or voluntar*) near/3 interrupt*) and pregnan*):ti,ab,kw (Word variations have been searched) |
| #12 | #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 |

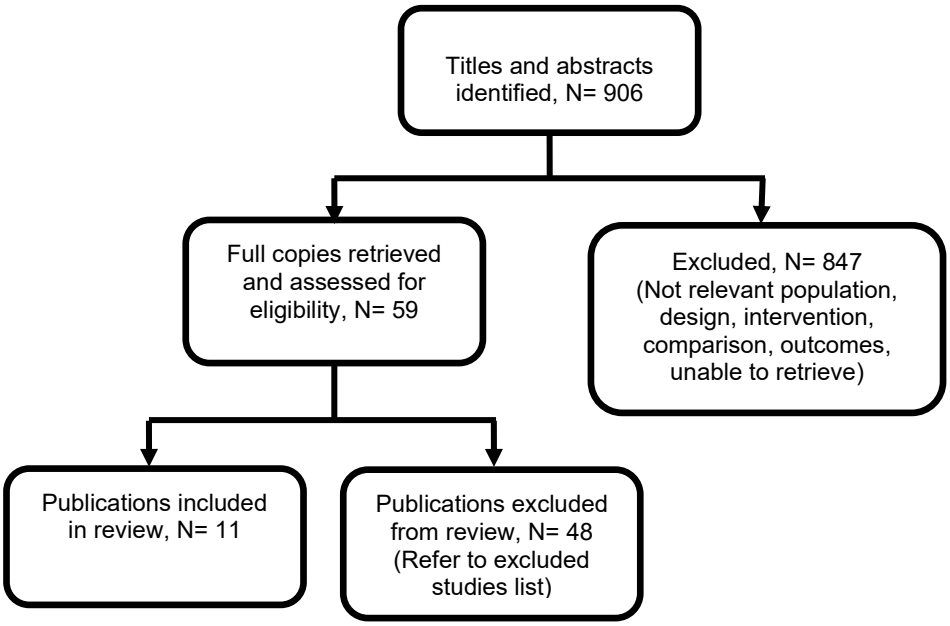
| # | Searches |
|---|---|
| #13 | MeSH descriptor: [Pain] this term only and with qualifier(s): [Drug therapy - DT, Prevention & control - PC] |
| #14 | MeSH descriptor: [Pain, Postoperative] this term only and with qualifier(s): [Drug therapy - DT, Prevention & control - PC] |
| #15 | (pain next (control or management or treatment)):ti,ab,kw (Word variations have been searched) |
| #16 | MeSH descriptor: [Anesthesia, Local] this term only |
| #17 | MeSH descriptor: [Anesthetics, Local] this term only |
| #18 | MeSH descriptor: [Anesthesia, Obstetrical] this term only |
| #19 | MeSH descriptor: [Analgesia, Obstetrical] this term only |
| #20 | MeSH descriptor: [Lidocaine] this term only |
| #21 | (local near/3 (anesthe* or anaesthe* or analges*)):ti,ab,kw (Word variations have been searched) |
| #22 | ((paracervical or intracervical or intrauterine or para-cervical or intra-cervical or intra-uterine) near/3 (anesthe* or anaesthe* or analges* or block*)):ti,ab,kw (Word variations have been searched) |
| #23 | ((anesthe* or anaesthe* or analges*) near/3 (gel* or topical or cream* or ointment* or spray*)):ti,ab,kw (Word variations have been searched) |
| #24 | (lidocain* or lignocain* or xylocain*):ti,ab,kw (Word variations have been searched) |
| #25 | MeSH descriptor: [Conscious Sedation] this term only |
| #26 | MeSH descriptor: [Deep Sedation] this term only |
| #27 | MeSH descriptor: [Hypnotics and Sedatives] this term only |
| #28 | (sedat* or hypnot* or tranquiliz*):ti,ab,kw (Word variations have been searched) |
| #29 | MeSH descriptor: [Benzodiazepines] explode all trees |
| #30 | ben?odia?epin*:ti,ab,kw (Word variations have been searched) |
| #31 | (zopiclon* or zimovan* or imovan*):ti,ab,kw (Word variations have been searched) |
| #32 | MeSH descriptor: [Nitrous Oxide] this term only |
| #33 | (nitrous next oxide*):ti,ab,kw (Word variations have been searched) |
| #34 | entonox*:ti,ab,kw (Word variations have been searched) |
| #35 | (N2O next inhal*):ti,ab,kw (Word variations have been searched) |
| #36 | (propofol* or diprivan* or fresofol* or pofol* or recofol*):ti,ab,kw (Word variations have been searched) |
| #37 | MeSH descriptor: [Ketamine] this term only |
| #38 | (ketamin* or ketalar*):ti,ab,kw (Word variations have been searched) |
| #39 | MeSH descriptor: [Anesthesia, General] explode all trees |
| #40 | MeSH descriptor: [Anesthetics, General] explode all trees |
| #41 | (general near/3 (anesthe* or anaesthe*)):ti,ab,kw (Word variations have been searched) |
| #42 | MeSH descriptor: [Methyl Ethers] explode all trees |
| #43 | MeSH descriptor: [Thiobarbiturates] explode all trees |
| #44 | (sevoflurane* or sevorane* or ultane* or isoflurane* or forane* or terrell* or desflurane* or suprane* or thiopentone* or thiopental* or trapanal* or etomidat* or hypnomidate* or amidate*):ti,ab,kw (Word variations have been searched) |
| #45 | #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29 or #30 or #31 or #32 or #33 or #34 or #35 or #36 or #37 or #38 or #39 or #40 or #41 or #42 or #43 or #44 |
| #46 | #12 and #45 |

| # | Searches |
|---|---|
| #47 | ((surgical or suction or vacuum) near/6 (abortion or termination)):ti,ab,kw (Word variations have been searched) |
| #48 | #45 and #47 |
| #49 | #46 or #48 |

# Appendix C – Clinical evidence study selection

## Clinical evidence study selection for review question: What is the optimal method of anaesthesia or sedation for surgical abortion?

**Figure 1: Study selection flow chart**



# Appendix D – Clinical evidence tables

## Clinical evidence tables for review question: What is the optimal method of anaesthesia or sedation for surgical abortion?

| Study details | Participants | Interventions | Outcomes and Results | Comments |
|---|---|---|---|---|
| **Full citation**<br>Allen, R. H., Fitzmaurice, G., Lifford, K. L., Lasic, M., Goldberg, A. B., Oral compared with intravenous sedation for first-trimester Surgical Abortion: A randomized controlled trial, Obstetrics and Gynecology, 113, 276-283, 2009<br><br>**Ref Id**<br>883805<br><br>**Country/ies where the study was carried out**<br>USA<br><br>**Study type**<br>Randomised controlled trial<br><br>**Aim of the study**<br>To test whether oral and intravenous conscious | **Sample size**<br>n=2,193 screened for eligibility (n=444 ineligible for sedation; n=387 underweight; n=156 gestational age; n=59 language; n=37 maternal age; n=21 allergy; n=8 narcotic or intravenous drug use; n=2 inability to give consent)<br>n=132 randomised (n=67 oral conscious sedation; n=65 IV conscious sedation)<br>n=130 analysed (n=67 oral conscious sedation [n=2 excluded due to protocol violation]; n=65 conscious sedation)<br><br>**Characteristics**<br>Age in years (mean; standard deviation in parentheses):<br>Oral conscious sedation: 23.9 (5.4)<br>IV conscious sedation: 26.1 (6.3) | All women received 800mg oral ibuprofen and additional oral medication according to treatment allocation. After 60 minutes, women received IV medication according to treatment allocation. All women received a paracervical block with 20ml of 1% buffered lidocaine; 2ml was administered into the anterior lip of the cervix before tenaculum placement and 8ml to the 4 and 8 o'clock positions of the cervix. The abortion was completed using Pratt dilators and electric or manual suction; oxygen was given throughout the procedure and 25 to 50µ fentanyl was given if requested. Pain was measured on a 100-point scale within 3 minutes of speculum removal; postoperative pain and side | **Outcome: Patient satisfaction**<br>Pain control: completely/mostly acceptable<br>Oral conscious sedation: 35/65<br>IV conscious sedation: 54/65<br>Pain control: somewhat acceptable<br>Oral conscious sedation: 27/65<br>IV conscious sedation: 8/65<br>Pain control: mostly or completely unacceptable<br>Oral conscious sedation: 3/65<br>IV conscious sedation: 3/65<br>Recommend to a friend: definitely/probably | **Limitations**<br><br>**Quality of study:**<br>Risk of bias assessed using Cochrane risk of bias tool<br>Random sequence generation: low risk, computer-generated blocks of four or six<br>Allocation concealment: low risk, sequentially numbered sealed opaque envelopes<br>Blinding of participants and personnel: low risk, double-blind<br>Blinding of outcome assessment: low risk, double-blind<br>Attrition: low risk for all outcomes; no missing data<br>Selective reporting: low risk, all outcomes reported in sufficient detail for analysis<br><br>**Other information**<br>Underpowered to detect a difference of 2.5 on the pain |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
|---|---|---|---|---|
| sedation are equivalent for management of pain during first trimester surgical abortion<br><br>**Study dates**<br>July 2006 to July 2007<br><br>**Source of funding**<br>Anonymous foundation | Gestational age in days (mean; standard deviation in parentheses):<br>Oral conscious sedation: 61.3 (13)<br>IV conscious sedation: 58.8 (11.2)<br>Ethnicity - Latina (number; percentage in parentheses):<br>Oral conscious sedation: 13 (20)<br>IV conscious sedation: 10 (15.4)<br>Ethnicity - African American (number; percentage in parentheses):<br>Oral conscious sedation: 26 (40)<br>IV conscious sedation: 22 (33.8)<br>Ethnicity - White (number; percentage in parentheses):<br>Oral conscious sedation: 22 (33.8)<br>IV conscious sedation: 24 (36.9)<br>Ethnicity - Asian (number; percentage in parentheses):<br>Oral conscious sedation: 0 (0)<br>IV conscious sedation: 3 (4.6)<br>Nulliparous (number; percentage in parentheses): | effects were measured approximately 30 minutes after arriving in recovery.<br><br>**Oral conscious sedation:**<br>Women received 2 oral 5mg oxycodone tablets and 1 sublingual 1mg lorazepam tablet; 60 minutes later, 2 2ml syringes of saline were administered.<br><br>**IV conscious sedation:**<br>Women received 2 oral placebo tablets and 1 sublingual placebo tablet (Vitamin C and Vitamin B12); 60 minutes later, 2ml IV fentanyl and 2ml IV midazolam were administered. | Oral conscious sedation: 52/65<br>IV conscious sedation: 60/65<br>Recommend to a friend: don't know<br>Oral conscious sedation: 5/65<br>IV conscious sedation: 1/65<br>Recommend to a friend: probably or definitely no<br>Oral conscious sedation: 8/65<br>IV conscious sedation: 4/65<br>Things about the pain control that could be better: strongly agree/agree<br>Oral conscious sedation: 30/65<br>IV conscious sedation: 18/65<br>Things about the pain control that could be better: not sure<br>Oral conscious sedation: 7/65 | scale; recruitment stopped at 50% of the way through planned sample size due to futility - assumed that further data collection would not yield evidence of equivalence |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
|---|---|---|---|---|
| | Oral conscious sedation: 31 (48)<br>IV conscious sedation: 28 (43)<br>Prior abortion (number; percentage in parentheses):<br>Oral conscious sedation: 41 (63)<br>IV conscious sedation: 39 (60)<br>Prior abortion (number; percentage in parentheses):<br>Oral conscious sedation: 41 (63)<br>IV conscious sedation: 39 (60)<br><br>**Inclusion criteria**<br>English- or Spanish-speaking women (or had translator available) at least 18 years old requesting surgical abortion between $5^{+0}$ and $12^{+6}$ weeks' gestation<br><br>**Exclusion criteria**<br>Contraindication to any of the study medication; chronic narcotic, benzodiazepine, or barbiturate use within the past year, IV drug use within the past year; weight <120lb | | IV conscious sedation: 5/65<br>Things about the pain control that could be better: strongly disagree/disagree<br>Oral conscious sedation: 28/65<br>IV conscious sedation: 42/65<br>Would choose same method again: definitely/probably<br>Oral conscious sedation: 47/65<br>IV conscious sedation: 61/65<br>Would choose same method again: don't know<br>Oral conscious sedation: 4/65<br>IV conscious sedation: 0/65<br>Would choose same method again: probably/ definitely not<br>Oral conscious sedation: 14/65 | |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
|---|---|---|---|---|
| | | | IV conscious sedation: 4/65<br><br>**Outcome: Termination of pregnancy completed with intended method of sedation/ anaesthesia**<br>Oral conscious sedation: 65/65<br>IV conscious sedation: 65/65<br><br>**Outcome: Pain (measured on 100-point scale)**<br><u>Intraoperative (continuous)</u><br>Oral conscious sedation: N=65, M=61.2; SD=25.2<br>IV conscious sedation: N=65, M=36.3, SD=26.5<br><u>Intraoperative - mild (<40)</u><br>Oral conscious sedation: 12/65<br>IV conscious sedation: 38/65 | |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
|---|---|---|---|---|
| | | | Intraoperative - moderate (≥40-<70)<br>Oral conscious sedation: 23/65<br>IV conscious sedation: 17/65<br>Intraoperative - severe (≥70-100)<br>Oral conscious sedation: 30/65<br>IV conscious sedation: 10/65<br>Postoperative<br>Oral conscious sedation: N=65, M=18.5, SD=18.8<br>IV conscious sedation: N=65, M=11.2, SD=17.8<br><br>**Outcome: Nausea (postoperative)**<br>Oral conscious sedation: 21/65<br>IV conscious sedation: 11/65<br><br>**Outcome: Vomiting (postoperative)** | |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
|---|---|---|---|---|
| | | | Oral conscious sedation: 10/65<br>IV conscious sedation: 4/65 | |
| **Full citation**<br>Bayer, L. L., Edelman, A. B., Fu, R., Lambert, W. E., Nichols, M. D., Bednarek, P. H., Miller, K., Jensen, J. T., An Evaluation of Oral Midazolam for Anxiety and Pain in First-Trimester Surgical Abortion: A Randomized Controlled Trial, Obstetrics and Gynecology, 126, 37-46, 2015<br><br>**Ref Id**<br>883693<br><br>**Country/ies where the study was carried out**<br>USA<br><br>**Study type**<br>Randomised controlled trial<br><br>**Aim of the study** | **Sample size**<br>n=870 screened for eligibility (n=416 did not meet inclusion criteria [n=273 gestational age; n=40 required IV sedation; n=19 younger than 18 years old; n=84 other reasons]; n=157 declined to participate; n=84 declined anxiolytic; n=70 daily enrolment limit had been reached; n=18 research assistant unavailable; n=1 study drug unavailable)<br>n=124 randomised (n=62 midazolam [conscious sedation + local anaesthesia]; n=62 placebo [local anaesthesia])<br>n=123 analysed for primary outcome (n=62 midazolam [conscious sedation + local anaesthesia]; n=61 placebo [local anaesthesia; n=1 changed decision to have abortion])<br><br>**Characteristics** | All women received 800mg oral ibuprofen at least 60 minutes before the procedure and study medication was given 30 to 60 minutes before the start of the procedure. All women were given a paracervical block of 20ml buffered 1% lidocaine and abortions were performed using vacuum aspiration; pain and anxiety were assessed at several time points throughout the procedure. Following the procedure, physicians reported difficulty of the procedure, adverse events, and maximum sedation of the women; women's satisfaction, pain and memory was assessed following the procedure and they were asked to complete a questionnaire between 1 and 3 days postoperatively. | **Outcome: Patient satisfaction**<br>Recommend to a friend (30 minutes postoperatively)<br>Midazolam (conscious sedation + local anaesthesia): 49/61<br>Placebo (local anaesthesia): 37/61<br>Satisfaction with anxiety control - 100mm VAS (30 minutes postoperatively)<br>Midazolam (conscious sedation + local anaesthesia): N=61, M=68.9, SD=24.7<br>Placebo (local anaesthesia): N=61, M=56.1, SD=29.6<br>Satisfaction with pain control - 100mm VAS (30 minutes postoperatively) | **Limitations**<br><br>**Quality of study:**<br>Risk of bias assessed using Cochrane risk of bias tool<br>Random sequence generation: low risk, computer generated blocks of four; prepared by research pharmacy<br>Allocation concealment: low risk, sequentially numbered sealed opaque envelopes; prepared by research pharmacy<br>Blinding of participants and personnel: low risk, double blind<br>Blinding of outcome assessment: low risk, double blind<br>Attrition: low risk for all outcomes; missing data on primary outcomes for 1 woman in midazolam arm because left the clinic before completing the post-operative questionnaire; rates of completion for 1-3 days |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
|---|---|---|---|---|
| To investigate the effect of midazolam on pain and anxiety for first-trimester surgical abortion<br><br>**Study dates**<br>May 2013 to December 2013<br><br>**Source of funding**<br>Society of Family Planning | Age in years (mean; standard deviation in parentheses):<br>Midazolam (conscious sedation + local anaesthesia): 25.5 (5.8)<br>Placebo (local anaesthesia): 25.8 (5.3)<br>Gestational age <8 weeks (number; percentage in parentheses):<br>Midazolam (conscious sedation + local anaesthesia): 39 (62.9)<br>Placebo (local anaesthesia): 29 (46.8)<br>Gestational age ≥8 weeks (number; percentage in parentheses):<br>Midazolam (conscious sedation + local anaesthesia): 23 (37.1)<br>Placebo (local anaesthesia): 33 (53.2)<br>Race - White (number; percentage in parentheses):<br>Midazolam (conscious sedation + local anaesthesia): 42 (67.7)<br>Placebo (local anaesthesia): 44 (71.0)<br>Race - African-American (number; percentage in parentheses): | **Midazolam (conscious sedation + local anaesthesia):**<br>5 mL oral cherry-flavoured 2 mg/mL midazolam syrup (total 10mg midazolam)<br><br>**Placebo (local anaesthesia):**<br>5ml oral cherry-flavoured placebo syrup | Midazolam (conscious sedation + local anaesthesia): N=61, M=50.0, SD=27.3<br>Placebo (local anaesthesia): N=61, M=43.2, SD=30.7<br>Overall satisfaction - 100mm VAS (30 minutes postoperatively)<br>Midazolam (conscious sedation + local anaesthesia): N=61, M=78.4, SD=20.1<br>Placebo (local anaesthesia): N=61, M=77.8, SD=18.3<br>Satisfaction with anxiety control - 100mm VAS (1-3 days postoperatively)<br>Midazolam (conscious sedation + local anaesthesia): N=44, M=64.7, SD=28.2<br>Placebo (local anaesthesia): N=41, M=50.2, SD=31.7<br>Satisfaction with pain control - 100mm VAS | postoperative questionnaire were similar between groups<br>Selective reporting: low risk, all outcomes reported in sufficient detail for analysis<br><br>**Other information**<br>None |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
|---|---|---|---|---|
| | Midazolam (conscious sedation + local anaesthesia): 6 (9.7)<br>Placebo (local anaesthesia): 3 (4.8)<br>Race - Asian (number; percentage in parentheses):<br>Midazolam (conscious sedation + local anaesthesia): 1 (1.6)<br>Placebo (local anaesthesia): 4 (6.5)<br>Ethnicity - Hispanic (number; percentage in parentheses):<br>Midazolam (conscious sedation + local anaesthesia): 8 (12.9)<br>Placebo (local anaesthesia): 9 (14.5)<br>Parity - nulliparous (number; percentage in parentheses):<br>Midazolam (conscious sedation + local anaesthesia): 32 (51.6)<br>Placebo (local anaesthesia): 38 (61.3)<br>Parity - parous (number; percentage in parentheses):<br>Midazolam (conscious sedation + local anaesthesia): 30 (48.4)<br>Placebo (local anaesthesia): 24 (38.7) | | (1-3 days postoperatively)<br>Midazolam (conscious sedation + local anaesthesia): N=44, M=48.2, SD=30.1<br>Placebo (local anaesthesia): N=41, M=36.6, SD=30.8<br>Overall satisfaction - 100mm VAS (1-3 days postoperatively)<br>Midazolam (conscious sedation + local anaesthesia): N=44, M=74.9, SD=25.5<br>Placebo (local anaesthesia): N=41, M=65.7, SD=26.4<br><br>**Outcome: Pain - measured on 100mm visual analogue scale (VAS)**<br>During aspiration:<br>Midazolam (conscious sedation + local anaesthesia): N=62, M=70.1, SD=22.1 | |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
|---|---|---|---|---|
| | Previous vaginal delivery (number; percentage in parentheses):<br>Midazolam (conscious sedation + local anaesthesia): 22 (35.5)<br>Placebo (local anaesthesia): 20 (32.2)<br>Previous surgical abortion (number; percentage in parentheses):<br>Placebo (local anaesthesia): 21 (33.9)<br><br>**Inclusion criteria**<br>English- or Spanish-speaking women aged at least 18 years old; good general health; requesting surgical abortion between $6^{+0}$ and $10^{+6}$ weeks' gestation<br><br>**Exclusion criteria**<br>Early pregnancy failure; required cervical priming; <100lb in weight; contraindications to study medications; used heroin or methadone in previous 3 months; requested narcotic or IV sedation; used alcohol, | | Placebo (local anaesthesia): N=61, M=74.3, SD=20.6<br><br>**Outcome: vomiting - 30 minutes postoperatively**<br>Midazolam (conscious sedation + local anaesthesia): 1/61<br>Placebo (local anaesthesia): 1/61 | |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
|---|---|---|---|---|
| | narcotics or benzodiazepines in previous 24 hours | | | |
| **Full citation**<br>Conti, J. A., Lerma, K., Shaw, K. A., Blumenthal, P. D., Self-Administered Lidocaine Gel for Pain Control With First-Trimester Surgical Abortion: A Randomized Controlled Trial.[Erratum appears in Obstet Gynecol. 2016 Dec;128(6):1450; PMID: 28092300], Obstetrics & GynecologyObstet Gynecol, 128, 297-303, 2016<br><br>**Ref Id**<br>771419<br><br>**Country/ies where the study was carried out**<br>USA<br><br>**Study type**<br>Randomised controlled trial<br><br>**Aim of the study**<br>To compare the efficacy of paracervical block and self-administered lidocaine gel for | **Sample size**<br>n=274 screened for eligibility (n=64 ineligible; n=57 declined participation; n=11 other reasons)<br>n=142 randomised (n=70 paracervical block; n=72 lidocaine gel)<br>n=147 received allocated intervention and included in analysis (n=68 paracervical block [n=1 declined abortion; n=1 declined IV sedation]; n=69 lidocaine gel [n=2 <18 years old; n=1 ineligible for IV sedation])<br><br>**Characteristics**<br>Age in years (mean; standard deviation in parentheses):<br>Paracervical block: 26.5 (5.9)<br>Lidocaine gel: 27 (6.6)<br>Gestational age ≤$7^{+6}$ weeks (number; percentage in parentheses):<br>Paracervical block: 25 (37)<br>Lidocaine gel: 40 (58) | All women received 100mg IV fentanyl and 1mg IV midazolam immediately prior to speculum insertion; additional doses of IV medication were permitted as needed. Pain was measured at several time points on a 100mm visual analogue scale (VAS) and satisfaction was measured on a 100mm VAS immediately prior to discharge. Procedure for abortion was not reported.<br><br>**Paracervical block:**<br>12ml of 1% lidocaine (total 120mg) was administered using a 22-guage spinal needle; 2ml was injected superficially into the cervix at the tenaculum and the remaining 10ml was injected into the cervicovaginal junction at the 4 and 8 o'clock positions continuously from superficial to deep (1 to 2cm); unclear if | **Outcome: patient satisfaction (measured on 100mm VAS)**<br><u>Overall experience</u><br>Paracervical block: N=68, M=48.02, SD=26.23<br>Lidocaine gel: N=69, M=54.5, SD=21.3<br><u>Recommend to friend</u><br>Paracervical block: N=68, M=80.5, SD=20.3<br>Lidocaine gel: N=69, M=83.5, SD=17.2<br><br>**Outcome: Pain (measured on 100mm VAS)**<br><u>Cervical dilation</u><br>Paracervical block: N=68, M=60.1, SD=24.2<br>Lidocaine gel: N=69, M=64.1, SD=20.9<br><u>30-45 minutes post-procedure</u> | Limitations<br><br>**Quality of study:**<br>Risk of bias assessed using Cochrane risk of bias tool<br>Random sequence generation: unclear risk, block randomisation, not-reported whether this was computer generated<br>Allocation concealment: low risk, sequentially numbered sealed opaque envelopes<br>Blinding of participants and personnel: no blinding; low risk for objective outcomes; high risk for subjective outcomes<br>Blinding of outcome assessment: no blinding; low risk for objective outcomes; high risk for subjective outcomes<br>Attrition: low risk for all outcomes; no missing data<br>Selective reporting: moderate risk, insufficient data reported for analysis for pain outcomes at some time points |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
|---|---|---|---|---|
| pain management during first trimester surgical abortion<br><br>**Study dates**<br>April 2015 to October 2015<br><br>**Source of funding**<br>Society of Family Planning Research Fund | Gestational age ≥8$^{+0}$ weeks [within first trimester; boundary not reported] (number; percentage in parentheses):<br>Paracervical block: 40 (59)<br>Lidocaine gel: 27 (39)<br>Note. percentages for gestational age do not add up as there was a small number of women included for reaspiration or failed medical abortion<br>Nulliparous (number; percentage in parentheses):<br>Paracervical block: 40 (59)<br>Lidocaine gel: 44 (64)<br>Previous vaginal delivery (number; percentage in parentheses);<br>Paracervical block: 23 (34)<br>Lidocaine gel: 22 (32)<br>Previous abortion (number; percentage in parentheses):<br>Paracervical block: 28 (41)<br>Lidocaine gel: 26 (38)<br>Race - White (number; percentage in parentheses):<br>Paracervical block: 40 (59)<br>Lidocaine gel: 41 (59) | this was before or after IV medication.<br><br>**Lidocaine gel:**<br>20ml of 2% lidocaine gel (total 400mg) was self-administered vaginally, using a 20ml sterile, Luer-lock syringe, 20 to 30 minutes before the abortion procedure. | Paracervical block: N=68, M=18.2, SD=19.3<br>Lidocaine gel: N=69, M=17.1, SD=19.6 | **Other information**<br>None |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
|---|---|---|---|---|
| | Race - Black/African American (number; percentage in parentheses):<br>Paracervical block: 7 (10)<br>Lidocaine gel: 6 (9)<br>Race - Asian (number; percentage in parentheses):<br>Paracervical block: 6 (9)<br>Lidocaine gel: 4 (6)<br>Race - Native Hawaiian or Pacific Islander (number; percentage in parentheses):<br>Paracervical block: 3 (4)<br>Lidocaine gel: 1 (1)<br>Ethnicity - Hispanic/Latina (number; percentage in parentheses):<br>Paracervical block: 37 (54)<br>Lidocaine gel: 35 (51)<br><br>**Inclusion criteria**<br>English- or Spanish-speaking women aged at least 18 years old; undergoing first trimester surgical abortion; had chosen IV sedation<br><br>**Exclusion criteria** | | | |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
|---|---|---|---|---|
| | Preoperative use of misoprostol (normally given from 12 weeks at the included clinics); allergy to study medications; uterine anomaly; prior cervical surgery | | | |
| **Full citation**<br>Edelman, A., Nichols, M. D., Leclair, C., Astley, S., Shy, K., Jensen, J. T., Intrauterine lidocaine infusion for pain management in first-trimester abortions, Obstetrics & GynecologyObstet Gynecol, 103, 1267-72, 2004<br><br>**Ref Id**<br>771422<br><br>**Country/ies where the study was carried out**<br>USA<br><br>**Study type**<br>Randomised controlled trial<br><br>**Aim of the study**<br>To investigate the efficacy of intrauterine lidocaine infusion, in addition to paracervical block, for pain management | **Sample size**<br>n=571 screened for eligibility (n=10 <18 years old; n=94 ≥11 weeks' gestation; n=73 requested narcotics; n=20 non-English speaking<br>n=80 randomised (n=40 paracervical block + intrauterine infusion; n=40 paracervical block; exact number of eligible women who declined participation is not known)<br><br>**Characteristics**<br>Age in years (mean; standard deviation in parentheses):<br>Paracervical block + intrauterine infusion: 26 (6.0)<br>Paracervical block: 24 (4.8)<br>Gestational age in weeks (mean; standard deviation in parentheses):<br>Paracervical block + intrauterine infusion: 7.0 (1.9)<br>Paracervical block: 7.5 (1.9) | All women were given 800mg of ibuprofen and if requested 5mg of Valium 20 to 30 minutes before the procedure. At the start of the procedure, a speculum was placed and all women received a paracervical block of 1ml of 1% nonbuffered lidocaine on the anterior and posterior lip of the cervix and then 4.5ml of 1% lidocaine at 4 and 8 o'clock positions. Following this, a 3mm Novak curette was passed into the uterine cavity and intrauterine infusion was administered according to treatment allocation; the curette was held in place for 3 minutes. The cervix was dilated to 1mm less than the gestational age in weeks and abortions were performed with an electric vacuum pump device using rigid curved cannulas. Women | **Outcome: Patient satisfaction (measured on 100mm VAS)**<br>Paracervical block + intrauterine infusion: N=40, M=82, SD=23<br>Paracervical block: N=40, M=83, SD=20<br><br>**Outcome: Pain (measured on 100mm VAS)**<br><u>Cervical dilation</u><br>Paracervical block + intrauterine infusion: N=39, M=33, SD=28<br>Paracervical block: N=40, M=36, SD=25<br><u>Aspiration</u><br>Paracervical block + intrauterine infusion: N=40, M=47, SD=38<br>Paracervical block: N=40, M=51, SD=26 | **Limitations**<br><br>**Quality of study:**<br>Risk of bias assessed using Cochrane risk of bias tool<br>Random sequence generation: low risk, computer generated blocks of 20<br>Allocation concealment: unclear risk, sequentially numbered data sheets and syringes but not clear if these were in sealed opaque envelopes<br>Blinding of participants and personnel: low risk, double blind<br>Blinding of outcome assessment: low risk, double blind<br>Attrition: low risk for all outcomes; some missing data from 1 woman in intervention arm<br>Selective reporting: low risk, all outcomes reported in sufficient detail for analysis |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
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| during first trimester surgical abortion<br><br>**Study dates**<br>July 2002 to February 2003<br><br>**Source of funding**<br>The Oregon Health & Science Family Planning Fellowship Fund | Ethnicity - White (number; percentage in parentheses):<br>Paracervical block + intrauterine infusion: 32 (80)<br>Paracervical block: 35 (88)<br>Nulligravid (number; percentage in parentheses):<br>Paracervical block + intrauterine infusion: 11 (28)<br>Paracervical block: 15 (38)<br>Multigravid (number; percentage in parentheses):<br>Paracervical block + intrauterine infusion: 29 (73)<br>Paracervical block: 25 (63)<br>Previous vaginal deliveries (mean; standard deviation in parentheses):<br>Paracervical block + intrauterine infusion: 0.85 (0.95)<br>Paracervical block: 0.53 (0.83)<br>Previous abortions (mean; standard deviation in parentheses):<br>Paracervical block + intrauterine infusion: 0.60 (0.90)<br>Paracervical block: 0.65 (0.89)<br><br>**Inclusion criteria** | were asked to rate their pain on a 100mm visual analogue scale (VAS) at several time points throughout the procedure and prior to discharge.<br><br>**Paracervical block + intrauterine infusion:**<br>10ml 1% lidocaine intrauterine infusion<br><br>**Paracervical block:**<br>10ml sterile saline intrauterine infusion | <u>30 minutes after procedure</u><br>Paracervical block + intrauterine infusion: N=39, M=28, SD=21<br>Paracervical block: N=40, M=21, SD=21 | **Other information**<br>None |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
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| | English-speaking women in good general health, aged more than 18 years old requesting abortion at <11 weeks' gestation; weight >100lbs<br><br>**Exclusion criteria**<br>Refusal or inability to receive ibuprofen and/or paracervical blocks; requesting intravenous narcotics | | | |
| **Full citation**<br>Edelman,A., Nichols,M.D., Leclair,C., Jensen,J.T., Four percent intrauterine lidocaine infusion for pain management in first-trimester abortions, Obstetrics and Gynecology, 107, 269-275, 2006<br><br>**Ref Id**<br>131670<br><br>**Country/ies where the study was carried out**<br>USA<br><br>**Study type**<br>Randomised controlled trial | **Sample size**<br>n=2200 screened for eligibility (n=40 <18 years old; n=335 gestational age ≥11 weeks; n=88 requested narcotics; n=62 non-English speaking)<br>n=80 randomised (n=40 paracervical block + intrauterine infusion; n=40 paracervical block; exact number of eligible women who were offered the study and declined is not known)<br>n=77 received allocated treatment (n=38 paracervical block + intrauterine infusion [n=2 withdrew before receiving study medication]; n=39 paracervical block [n=1 | All women were given 800mg of ibuprofen and if requested 5mg of diazepam 20 to 30 minutes before the procedure. At the start of the procedure, a speculum was placed and all women received a paracervical block of 1ml of 1% nonbuffered lidocaine on the anterior and posterior lip of the cervix and then 4.5ml of 1% lidocaine at 4 and 8 o'clock positions to a depth of approximately 1.5 inches. Following this, a 3mm Novak curette was passed into the uterine cavity and intrauterine infusion was rapidly administered according to | **Outcome: Patient satisfaction (measured on 100mm VAS)**<br>Paracervical block + intrauterine infusion: N=38, M=85, SD=19<br>Paracervical block: N=39, M=80, SD=23<br><br>**Outcome: Pain (measured on 100mm VAS)**<br><u>Cervical dilation</u><br>Paracervical block + intrauterine infusion: N=35, M=35, SD=30<br>Paracervical block: N=39, M=55, SD=26 | **Limitations**<br><br>**Quality of study:**<br>Risk of bias assessed using Cochrane risk of bias tool<br>Random sequence generation: low risk, computer generated blocks of 20<br>Allocation concealment: unclear risk, sequentially numbered data sheets and syringes but not clear if these were in sealed opaque envelopes<br>Blinding of participants and personnel: low risk, double blind<br>Blinding of outcome assessment: low risk, double blind |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
|---|---|---|---|---|
| **Aim of the study**<br>To investigate the efficacy of intrauterine lidocaine infusion, in addition to paracervical block, for management of pain in first trimester surgical abortions<br><br>**Study dates**<br>November 2003 to December 2004 (recruitment suspended March 2004 to June 2004)<br><br>**Source of funding**<br>The Oregon Health & Science Family Planning Fellowship Fund | withdrew before receiving study medication])<br><br>**Characteristics**<br>Age in years (mean; standard deviation in parentheses):<br>Paracervical block + intrauterine infusion: 26 (5.7)<br>Paracervical block: 26 (6.7)<br>Gestational age in weeks (mean; standard deviation in parentheses):<br>Paracervical block + intrauterine infusion: 8 (1.6)<br>Paracervical block: 8 (1.6)<br>Ethnicity - White (number; percentage in parentheses):<br>Paracervical block + intrauterine infusion: 37 (95)<br>Paracervical block: 33 (83)<br>Nulligravid (number; percentage in parentheses):<br>Paracervical block + intrauterine infusion: 16 (41)<br>Paracervical block: 18 (46)<br>Multigravid (number; percentage in parentheses):<br>Paracervical block + intrauterine infusion: 23 (59) | treatment allocation; the curette was held in place for 3 minutes (changed to slow infusion over the 3 minutes after half of the procedures due to concern regarding lidocaine toxicity). The cervix was dilated to 1mm less than the gestational age in weeks and abortions were performed with an electric vacuum pump device using rigid curved cannulas. Women were asked to rate their pain on a 100mm visual analogue scale (VAS) at several time points throughout the procedure and prior to discharge.<br><br>**Paracervical block + intrauterine infusion:**<br>5ml 4% lidocaine intrauterine infusion<br><br>**Paracervical block:**<br>5ml sterile saline intrauterine infusion | <u>Aspiration</u><br>Paracervical block + intrauterine infusion: N=37, M=43, SD=30<br>Paracervical block: N=39, M=71, SD=20<br><u>30 minutes after procedure</u><br>Paracervical block + intrauterine infusion: N=37, M=20, SD=20<br>Paracervical block: N=38, M=25, SD=22 | Attrition: low risk for all outcomes; 2 women in the intervention arm and 1 woman in the control arm withdrew before taking study medication; some missing data for pain scores but rate of missing data is small and similar between arms<br>Selective reporting: low risk, all outcomes reported in sufficient detail for analysis<br><br>**Other information**<br>None |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
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| | Paracervical block: 26 21 (54)<br>Previous vaginal delivery (mean; standard deviation in parentheses):<br>Paracervical block + intrauterine infusion: 0.67 (1.15)<br>Paracervical block: 0.64 (0.90)<br>Previous abortion (mean; standard deviation in parentheses):<br>Paracervical block + intrauterine infusion: 0.51 (0.68)<br>Paracervical block: 0.52 (0.82)<br><br>**Inclusion criteria**<br>English-speaking women aged >18 years old in good general health; <11 weeks' gestation requesting abortion; >100lbs<br><br>**Exclusion criteria**<br>Refusal or inability to receive ibuprofen and/or paracervical blocks; request for intravenous narcotics | | | |
| **Full citation**<br>Mankowski, J. L., Kingston, J., Moran, T., Nager, C. W., Lukacz, E. S., Paracervical compared with intracervical | **Sample size**<br>n=153 screened for eligibility (n=2 declined participation; n=12 ineligible; n=3 withdrew consent; n=3 missed by | All women received 800mg oral ibuprofen, 1mg IV midazolam and 100micrograms (mcg) IV fentanyl before the | **Outcome: Pain (10cm VAS)**<br>Cervical dilation | **Limitations**<br><br>**Quality of study:** |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
|---|---|---|---|---|
| lidocaine for suction curettage: a randomized controlled trial, Obstetrics & GynecologyObstet Gynecol, 113, 1052-7, 2009<br><br>**Ref Id**<br>771433<br><br>**Country/ies where the study was carried out**<br>USA<br><br>**Study type**<br>Randomised controlled trial<br><br>**Aim of the study**<br>To compare the efficacy of paracervical and intracervical local anaesthesia for first trimester abortion<br><br>**Study dates**<br>December 2007 to February 2008<br><br>**Source of funding**<br>No sources reported | provider; n=1 no pregnancy found)<br>n=132 randomised (n=66 paracervical block; n=66 intracervical block)<br><br>**Characteristics**<br>Age in years (mean; standard deviation in parentheses):<br>Paracervical: 26 (6)<br>Intracervical: 26 (6)<br>Gestational age in days (mean; standard deviation in parentheses):<br>Paracervical: 60 (13)<br>Intracervical: 61 (12)<br>Race - White (number; percentage in parentheses):<br>Paracervical: 19 (29)<br>Intracervical: 23 (35)<br>Ethnicity - Hispanic (number; percentage in parentheses):<br>Paracervical: 33 (50)<br>Intracervical: 26 (39)<br>Race - African American (number; percentage in parentheses):<br>Paracervical: 10 (15)<br>Intracervical: 6 (9) | procedure and local anaesthesia was administered according to treatment allocation. Cervical dilation was performed by the surgeon using Denniston dilators and the abortion was conducted using electric vacuum aspiration. Pain was measured at baseline, at completion of dilation and at completion of curettage on a 10cm visual analogue scale (VAS).<br><br>**Paracervical:**<br>20ml local anaesthetic (5ml 1% lidocaine, 5 units vasopressin, 5ml 8% sodium bicarbonate) administered using a 5/8-inch, 25-guage needle; a small amount was injected at the tenaculum and the remainder was injected at the cervicovaginal junction at the 3, 5, 7 and 9 o'clock positions.<br><br>**Intracervical:**<br>20ml local anaesthetic (5ml 1% lidocaine, 5 units | Paracervical: N=66, M=2.6, SD=2.3<br>Intracervical: N=66, M=2.8, SD=2.2<br><u>Curettage</u><br>Paracervical: N=66, M=3.9, SD=2.9<br>Intracervical: N=66, M=3.3, SD=2.5<br><br>**Outcome: Nausea**<br>Paracervical: 0/66<br>Intracervical: 1/66<br><br>**Outcome: Vomiting**<br>Paracervical: 0/66<br>Intracervical: 1/66 | Risk of bias assessed using Cochrane risk of bias tool<br>Random sequence generation: unclear risk, randomised in blocks of 10 using a random-numbers table (unclear if computer generated)<br>Allocation concealment: low risk, sequentially numbered sealed opaque envelopes<br>Blinding of participants and personnel: low risk, double blind<br>Blinding of outcome assessment: low risk, double blind<br>Attrition: low risk for all outcomes; small amount of missing data for primary outcome (pain) - intention to treat analysis<br>Selective reporting: low risk, all outcomes reported in sufficient detail for analysis<br><br>**Other information**<br>None |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
|---|---|---|---|---|
| | Race - Asian or Pacific Islander (number; percentage in parentheses):<br>Paracervical: 4 (6)<br>Intracervical: 9 (14)<br>Gravidity (median; range in parentheses):<br>Paracervical: 2 (7)<br>Intracervical: 3 (7)<br>Parity - vaginal (median; range in parentheses):<br>Paracervical: 0 (5)<br>Intracervical: 21 (5)<br>Parity - caesarean (median; range in parentheses):<br>Paracervical: 0 (2)<br>Intracervical: 0 (2)<br>Abortions - spontaneous (median; range in parentheses):<br>Paracervical: 0 (1)<br>Intracervical: 0 (3)<br>Abortions - medical (median; range in parentheses):<br>Paracervical: 0 (1)<br>Intracervical: 0 (1)<br>Abortions - surgical (median; range in parentheses):<br>Paracervical: 0 (3)<br>Intracervical: 1 (6) | vasopressin, 5ml 8% sodium bicarbonate) administered using a 1-inch, 20-guage needle; a small amount was injected at the tenaculum and the remainder was injected into the cervical stroma at the 12, 3, 6 and 9 o'clock positions. | | |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
|---|---|---|---|---|
| | Prior D&C (median; range in parentheses):<br>Paracervical: 0 (4)<br>Intracervical: 0 (6)<br><br>**Inclusion criteria**<br>Not reported<br><br>**Exclusion criteria**<br>Gestation >12 weeks; weight <98lb; known allergy to lidocaine; non-viable pregnancy | | | |
| **Full citation**<br>Micks, E., Edelman, A., Botha, R., Bednarek, P., Nichols, M., Jensen, J. T., The effect of sevoflurane on interventions for blood loss during dilation and evacuation procedures at 18-24 weeks of gestation: A randomized controlled trial, Contraception, 91, 488-494, 2015<br><br>**Ref Id**<br>802192<br><br>**Country/ies where the study was carried out** | **Sample size**<br>n=160 randomised (n=80 sevoflurane; n=80 control)<br><br>**Characteristics**<br>Age in years (mean; standard deviation in parentheses):<br>Sevoflurane: 25.9 (6.2)<br>Control: 25.9 (5.9)<br>Gestational age in weeks (mean; standard deviation in parentheses):<br>Sevoflurane: 20.8 (1.9)<br>Control: 20.8 (1.8)<br>Ethnicity - White (number; percentage in parentheses): | All women received cervical priming with overnight laminaria and 400mcg misoprostol given bucally roughly 90 minutes before the procedure and preoperative doxycycline; women over 22 weeks at 1 of the 2 sites (accounting for 97% of procedures) received intraamniotic or intrafetal digoxin injection. Inhaled agents were administered according to treatment allocation on arrival to the operating room. All women received IV propofol, IV midazolam, IV fentanyl, IV | **Patient satisfaction measured on 10cm VAS**<br>Satisfaction with anaesthesia<br>Sevoflurane: N=80, M=9.4, SD=1.1<br>Control: N=80, M=9.3, SD=1.4<br>Recommend to others<br>Sevoflurane: N=80, M=9.3, SD=1.4<br>Control: N=80, M=9.2, SD=1.0<br><br>**Outcome: Termination of pregnancy** | **Limitations**<br><br>**Quality of study:**<br>Risk of bias assessed using Cochrane risk of bias tool<br>Random sequence generation: low risk, computer generated; prepared by study staff not involved in enrolment<br>Allocation concealment: low risk, sequentially numbered sealed opaque envelopes; prepared by study staff not involved in enrolment<br>Blinding of participants and personnel: women and surgeons blinded, anaesthetists |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
|---|---|---|---|---|
| USA<br><br>**Study type**<br>Randomised controlled trial<br><br>**Aim of the study**<br>To investigate if the use of sevoflurane for anaesthesia during dilatation and evacuation increases the need for interventions for bleeding<br><br>**Study dates**<br>Not reported<br><br>**Source of funding**<br>Anonymous donor to the Oregon Health & Science University Family Planning | Sevoflurane: 55 (68.8)<br>Control: 45 (56.3)<br>Ethnicity - Black (number; percentage in parentheses):<br>Sevoflurane: 6 (7.5)<br>Control: 10 (12.5)<br>Ethnicity - Latina (number; percentage in parentheses):<br>Sevoflurane: 3 (3.8)<br>Control: 6 (7.5)<br>Nulliparous (number; percentage in parentheses):<br>Sevoflurane: 50 (62.5)<br>Control: 44 (55)<br>Prior caesarean section (number; percentage in parentheses):<br>Sevoflurane: 12 (15)<br>Control: 8 (10)<br><br>**Inclusion criteria**<br>Women aged at least 16 years old undergoing voluntary surgical abortion between 18 and 24 weeks' gestation.<br><br>**Exclusion criteria**<br>Severe maternal respiratory disease, upper respiratory tract | oxytocin and inhaled nitrous oxide (doses not reported). Pain was recorded using visual analogue scales (VAS) after waking from anaesthesia and before discharge and women were asked about side effects.<br><br>**Sevoflurane:**<br>Sevoflurane and oxygen mixture (concentration not reported) delivered through face mask<br><br>**Control:**<br>Oxygen only delivered through face mask | **completed with intended method of sedation/anaesthesia**<br>Sevoflurane: 78/80 (surgeon asked inhaled agents to be stropped due to severe haemorrhage)<br>Control: 80/80<br><br>**Outcome: Pain measured on 10cm VAS**<br><u>Upon waking from anaesthesia</u><br>Sevoflurane: N=80, M=2.6, SD=2.3<br>Control: N=80, M=2.8, SD=2.2<br><u>Upon discharge</u><br>Sevoflurane: N=80, M=2.2, SD=2.5<br>Control: N=80, M=2.0, SD=1.9<br><br>**Outcome: Haemorrhage requiring transfusion or > 500ml of blood loss** | unblinded; low risk for objective outcomes; high risk for subjective outcomes reported by women<br>Blinding of outcome assessment: women and surgeons blinded, anaesthetists unblinded; low risk for objective outcomes; high risk for subjective outcomes reported by women<br>Attrition: low risk for all outcomes; no missing data<br>Selective reporting: low risk, all outcomes reported in sufficient detail for analysis<br><br>**Other information**<br>None |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
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| | infection or sinus blockage; currently anticoagulated; known multiple pregnancy fetal demise; known allergy/sensitivity to sevoflurane or other inhaled anaesthetic agents | | Sevoflurane: 2/80<br>Control: 0/80<br><br>**Outcome: Nausea**<br>Sevoflurane: 13/80<br>Control: 11/80<br><br>**Outcome: Vomiting**<br>Sevoflurane: 4/80<br>Control: 3/80 | |
| **Full citation**<br>Nathan, N., Peyclit, A., Lahrimi, A., Feiss, P., Comparison of sevoflurane and propofol for ambulatory anaesthesia in gynaecological surgery, Canadian Journal of Anaesthesia, 45, 1148-50, 1998<br><br>**Ref Id**<br>883587<br><br>**Country/ies where the study was carried out**<br>France<br><br>**Study type** | **Sample size**<br>n=52 randomised (n=26 sevoflurane; n= 26 propofol)<br><br>**Characteristics**<br>Not reported; demographic details, gestational age and duration of surgery were not different between groups<br><br>**Inclusion criteria**<br>Women aged >18 years old undergoing abortion by aspiration and were grade I on the American Society of Anesthesiologists physical status classification<br><br>**Exclusion criteria** | All women received 1mg oral lorazepam and 800mg oral cimetidine 2 hours before surgery; 0.5 to 0.75mg alfentanil was given immediately prior to induction anaesthesia. A questionnaire was completed at discharge and 24 hours after surgery.<br><br>**Sevoflurane:**<br>Anaesthesia was induced using the single breath vital capacity technique with 8% sevoflurane in 6 1min-1 oxygen and maintained with 2-3% sevoflurane in 2 1min-1 fresh gas flow including nitrous oxide. | **Outcome: Pain**<br>During recovery:<br>Sevoflurane: 0/26<br>Propofol: 2/26<br>24 hours after surgery:<br>Sevoflurane: 6/22<br>Propofol: 8/23<br><br>**Outcome: Nausea (24 hours after surgery)**<br>Sevoflurane: 13/22<br>Propofol: 4/23<br><br>**Outcome: Vomiting (24 hours after surgery)**<br>Sevoflurane: 5/22<br>Propofol: 2/23 | **Limitations**<br><br>**Quality of study:**<br>Risk of bias assessed using Cochrane risk of bias tool<br>Random sequence generation: unclear risk, insufficient information reported<br>Allocation concealment: low risk, sealed envelopes<br>Blinding of participants and personnel: no blinding; low risk for objective outcomes; high risk for subjective outcomes<br>Blinding of outcome assessment: no blinding; low risk for objective outcomes; high risk for subjective outcomes |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
|---|---|---|---|---|
| Randomised controlled trial<br><br>**Aim of the study**<br>To investigate the cost-effectiveness of propofol or sevoflurane anaesthesia for abortion<br><br>**Study dates**<br>Not reported<br><br>Source of funding<br>No sources reported | Obesity; symptomatic regurgitation; unable to understand the vital capacity procedure | **Propofol:**<br>Anaesthesia was induced with propofol (dose not reported) and maintained with 60% nitrous oxide; additional boluses of 20mg propofol were given if the anaesthesia was too light | | Attrition: low risk for all outcomes; missing data from questionnaire 24 hours after surgery was small and similar between arms<br>Selective reporting: low risk, all outcomes reported in sufficient detail for analysis<br><br>**Other information**<br>The study was stopped early due to increased bleeding in the sevoflurane group (twice as much as propofol group) |
| **Full citation**<br>Raeder, J. C., Propofol anaesthesia versus paracervical blockade with alfentanil and midazolam sedation for outpatient abortion, Acta Anaesthesiologica Scandinavica, 36, 31-37, 1992<br><br>**Ref Id**<br>883860<br><br>**Country/ies where the study was carried out** | **Sample size**<br>n=88 screened for eligibility (n=21 declined to participate; n=8 did not meet inclusion criteria)<br>n=59 randomised (n=28 general anaesthesia; n=31 regional anaesthesia [deep sedation])<br><br>**Characteristics**<br>Age in years (mean; standard deviation in parentheses):<br>Regional anaesthesia (deep sedation): 24 (6.3)<br>General anaesthesia: 23 (4.8) | All women were seen by the anaesthesiologist a week before the procedure and were asked about previous health issues, anaesthetic experience, smoking, coffee and alcohol habits, and anxiety before the procedure. Women fasted (for at least 9 hours) before the operation. Anaesthesia was performed according to treatment assignment; discomfort and side effects were noted. Women were discharged after 3 hours of postoperative observations; | **Outcome: Patient satisfaction - would have same anaesthesia again**<br>Regional anaesthesia (deep sedation): 26/31<br>General anaesthesia: 22/28<br><br>**Outcome: Pain**<br><u>During hospital stay</u><br>Regional anaesthesia (deep sedation): 7/31<br>General anaesthesia: 19/28<br><u>During travel home</u> | **Limitations**<br><br>**Quality of study:**<br>Risk of bias assessed using Cochrane risk of bias tool<br>Random sequence generation: unclear risk, insufficient information reported<br>Allocation concealment: unclear risk, insufficient information reported<br>Blinding of participants and personnel: no blinding; low risk for objective outcomes; high risk for subjective outcomes |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
|---|---|---|---|---|
| Norway<br><br>**Study type**<br>Randomised controlled trial<br><br>**Aim of the study**<br>To compare the effectiveness of, and recovery from, rapid elimination sedatives (e.g., alfentanil and midazolam) compared with propofol for surgical abortion<br><br>**Study dates**<br>Not reported<br><br>**Source of funding**<br>Astra-Pharma; ICI-Pharma; Janssen-Pharma; Roche Norway | ASA grade I (number; percentage in parentheses):<br>Regional anaesthesia (deep sedation): 29 (94)<br>General anaesthesia: 25 (89)<br>ASA grade II (number; percentage in parentheses):<br>Regional anaesthesia (deep sedation): 2 (6)<br>General anaesthesia: 3 (11)<br><br>**Inclusion criteria**<br>Women having a first trimester surgical abortion; 50 to 80kg; American Society of Anesthesiologists physical status classification grade I or II<br><br>**Exclusion criteria**<br>No additional criteria reported | 5 days after the operation they were sent a questionnaire about discomfort and side effects during the hospital stay, while travelling home and over the following night and day.<br><br>**Regional anaesthesia (deep sedation):**<br>Women were given 0.1mg/kg IV midazolam and 0.01mg/kg IV alfentanil before a paracervical block with 2 10ml of 20mg/ml mepivacaine and 0.005mg/ml adrenaline; air was breathed as normal but women were assisted with an oxygen mask if oxygen saturation dropped below 85%<br><br>**General anaesthesia:**<br>Women were given 0.01mg/kg IV alfentanil 1 minute before 2mg/kg bolus injection propofol; women breathed 75% nitrous oxide in oxygen by mask and were | Regional anaesthesia (deep sedation): 1/31<br>General anaesthesia: 5/28<br><u>At home (over following night and day)</u><br>Regional anaesthesia (deep sedation): 8/31<br>General anaesthesia: 8/28<br>On a scale of 1-11<br>Regional anaesthesia (deep sedation): N=31, M=1.4, SD=1.1<br>General anaesthesia: N=28, M=2.4, SD=1.8 | Blinding of outcome assessment: investigators of postoperative function were blinded to treatment allocation, women weren't; low risk for objective outcomes and investigator reported subjective outcomes; high risk for patient-reported subjective outcomes<br>Attrition: low risk for all outcomes; no missing data<br>Selective reporting: low risk, all outcomes reported in sufficient detail for analysis<br><br>**Other information**<br>None |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
|---|---|---|---|---|
| | | assisted if arterial oxygen saturation dropped below 85% | | |
| **Full citation**<br>Wong, C. Y. G., Ng, E. H. Y., Ngai, S. W., Ho, P. C., A randomized, double blind, placebo-controlled study to investigate the use of conscious sedation in conjunction with paracervical block for reducing pain in termination of first trimester pregnancy by suction evacuation, Human Reproduction, 17, 1222-1225, 2002<br><br>**Ref Id**<br>772996<br><br>**Country/ies where the study was carried out**<br>China<br><br>**Study type**<br>Randomised controlled trial<br><br>**Aim of the study** | **Sample size**<br>n=100 randomised (n=50 conscious sedation [+ local anaesthesia]; n=50 placebo [local anaesthesia])<br><br>**Characteristics**<br>Age in years (median; range in parentheses):<br>Conscious sedation (+ local anaesthesia): 26 (16-42)<br>Placebo (local anaesthesia): 29 (16-43)<br>Gestational age in years (median; range in parentheses):<br>Conscious sedation (+ local anaesthesia): 10 (8-12)<br>Placebo (local anaesthesia): 10 (8-12)<br>Previous deliveries (number; percentage in parentheses):<br>Conscious sedation (+ local anaesthesia): 21 (42)<br>Placebo (local anaesthesia): 35 (70)<br>Previous abortion (number; percentage in parentheses): | Women received IV medication according to treatment assignment followed by a paracervical block of 10ml 1% lignocaine at the 4 and 8 o'clock positions of the cervix. The cervix was dilated if needed (using Hegar dilator 8 to 10) and the abortion was performed using suction with Karmen catheters 8 to 10. The surgeon graded the maximum level of sedation achieved and the need for additional analgesia (pethidine) was recorded. Women were asked to rate their pain (on a scale of 1 to 10) during insertion of IV catheter, during suction evacuation, 5 minutes after evacuation and 1 hour after evacuation. Post-operative side effects and satisfaction were recorded prior to discharge (normally after 4 hours). | **Outcome: Patient satisfaction**<br><u>Excellent</u><br>Conscious sedation (+local anaesthesia): 10/50<br>Placebo (local anaesthesia: 1/50<br><u>Satisfactory</u><br>Conscious sedation (+local anaesthesia): 15/50<br>Placebo (local anaesthesia: 9/50<br><u>Fair</u><br>Conscious sedation (+local anaesthesia): 18/50<br>Placebo (local anaesthesia: 30/50<br><u>Unsatisfactory</u><br>Conscious sedation (+local anaesthesia): 7/50<br>Placebo (local anaesthesia: 10/50 | **Limitations**<br><br>**Quality of study:**<br>Risk of bias assessed using Cochrane risk of bias tool<br>Random sequence generation: low risk, computer-generated blocks of 10<br>Allocation concealment: low risk, sealed opaque envelopes<br>Blinding of participants and personnel: low risk, double blind<br>Blinding of outcome assessment: low risk, double blind<br>Attrition: low risk for all outcomes; no missing data<br>Selective reporting: moderate risk; pain outcomes not reported in sufficient detail for analysis<br><br>**Other information**<br>None |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
|---|---|---|---|---|
| To investigate the effect of conscious sedation for pain relief during first trimester surgical abortion under local anaesthesia<br><br>**Study dates**<br>September 1999 to December 1999<br><br>**Source of funding**<br>No sources reported | Conscious sedation (+ local anaesthesia): 18 (36)<br>Placebo (local anaesthesia): 25 (50)<br><br>**Inclusion criteria**<br>Women aged >16 years with normal general and gynaecological examination; <12 weeks' gestation on the day of recruitment<br><br>**Exclusion criteria**<br>History of severe and recurrent liver disease; myasthenia gravis; psychiatric condition requiring medication; contraindications to prostaglandins | **Conscious sedation (+local anaesthesia):**<br>2mg IV midazolam and 25mcg IV fentanyl were given 2 minutes prior to the paracervical block<br><br>**Placebo (local anaesthesia):**<br>2ml IV saline given 2 minutes prior to the paracervical block | | |
| **Full citation**<br>Xu, G. H., Liu, X. S., Yu, F. Q., Gu, E. W., Zhang, J., Wang, K., Dreaming during sevoflurane or propofol short-term sedation: A randomised controlled trial, Anaesthesia and Intensive Care, 40, 505-510, 2012<br><br>**Ref Id** | **Sample size**<br>n=220 screened for eligibility (n=4 declined participation; n=8 insufficient oral bowel preparation; n=6 had altered anaesthetic plan; n=2 serious cardiac morbidity (American Society of Anesthesiologists grade III) | Intravenous access was initiated and oxygen administration started at arrival to the operating room. All women received 4 1/minute oxygen through a face mask for denitrogenation and were given 1 bolus 1mcg/kg IV fentanyl. Anaesthesia was induced according to study medication and the | **Outcome: Patient satisfaction - satisfied with care**<br>Sevoflurane: 92/100<br>Propofol: 91/100 | **Limitations**<br><br>**Quality of study:**<br>Risk of bias assessed using Cochrane risk of bias tool<br>Random sequence generation: low risk, computer generated<br>Allocation concealment: low risk, sealed opaque envelopes<br>Blinding of participants and personnel: no blinding; low risk |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
|---|---|---|---|---|
| 883630<br><br>**Country/ies where the study was carried out**<br>China<br><br>**Study type**<br>Randomised controlled trial<br><br>**Aim of the study**<br>To investigate dreaming occurring under short-term sedation with sevoflurane or propofol and whether dreaming is affected by recover time (main aim, and therefore primary outcomes, are outside the scope of the protocol for this review question but patient satisfaction, which is an outcome of interest, is reported and therefore the study had has been included to extract this information)<br><br>**Study dates**<br>No reported<br><br>**Source of funding** | n=200 randomised (n=100 sevoflurane; n=100 propofol)<br><br>**Characteristics**<br>Age in years (mean; standard deviation in parentheses): 30 (6.46)<br>Not reported separately based on treatment allocation but authors report that characteristics were similar between groups<br><br>**Inclusion criteria**<br>Women undergoing abortion by electric suction aspiration at <10 weeks' gestation<br><br>**Exclusion criteria**<br>Inadequate understanding of Chinese language; psychotic disorder | procedure began when the eyelash reflex was lost. Anaesthetists were instructed to target the level of sedation to an Observer's Assessment of Alertness/Sedation (OAA/S) score of 1; sevoflurane and propofol were stopped at this point. All women were interviewed immediately after waking up from sedation.<br><br>**Sevoflurane:**<br>8% sevoflurane with oxygen through spontaneous breathing with a face mask<br><br>**Propofol:**<br>1.5 to 2.5mg/kg IV propofol | | for objective outcomes; high risk for subjective outcomes<br>Blinding of outcome assessment: no blinding; low risk for objective outcomes; high risk for subjective outcomes<br>Attrition: low risk, no missing data<br>Selective reporting: low risk, all outcomes reported in sufficient detail for analysis<br><br>**Other information**<br>None |

| Study details | Participants | Interventions | Outcomes and Results | Comments |
|---|---|---|---|---|
| Youth Culture Program of First Affiliated Hospital, Anhui Medical University, China; National Nature Science Foundation of China | | | | |

*IV: intravenous; mcg: micrograms; VAS: visual analogue scale*

# Appendix E – Forest plots

## Forest plots for review question: What is the optimal method of anaesthesia or sedation for surgical abortion?

### Comparison 6. Propofol (general anaesthesia) versus sevoflurane (general anaesthesia)

**Figure 2: Nausea**

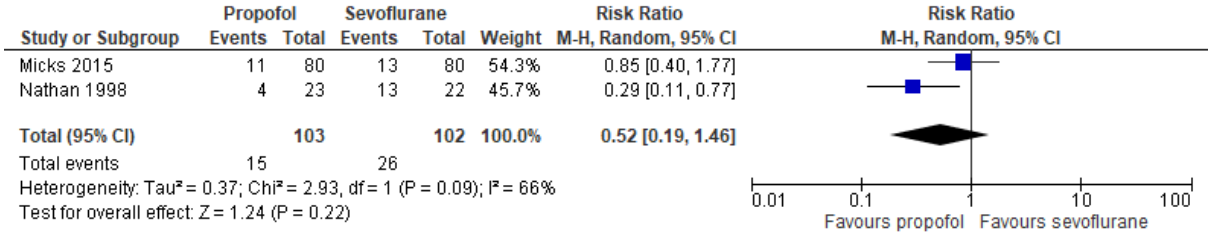
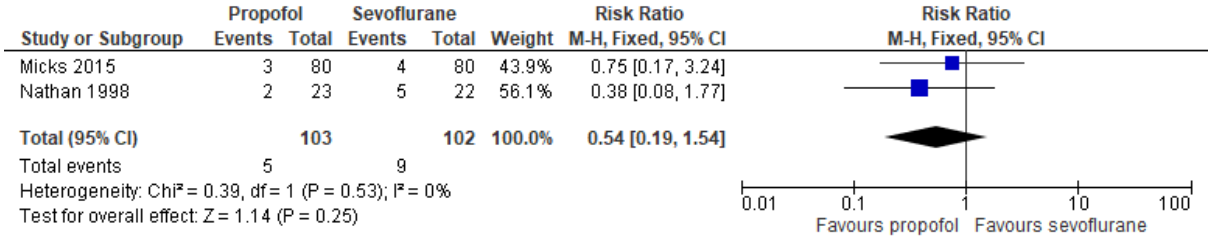
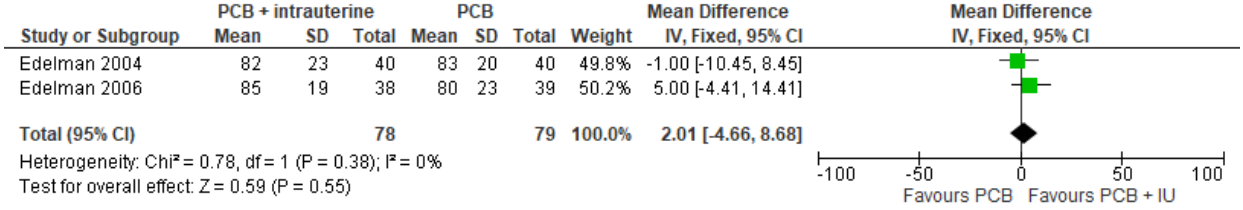



**Figure 3: Vomiting**




### Comparison 7. Local anaesthesia method A versus local anaesthesia method B

**Figure 4: Patient satisfaction measured on 100mm visual analogue scale (VAS)**



# Appendix F – GRADE tables

## GRADE tables for review question: What is the optimal method of anaesthesia or sedation for surgical abortion?

### Table 3: Clinical evidence profile: Comparison 1. Local anaesthesia versus conscious sedation (and local anaesthesia)

| Quality assessment | | | | | | | No of patients | | Effect | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **No of studies** | **Design** | **Risk of bias** | **Inconsistency** | **Indirectness** | **Imprecision** | **Other considerations** | **Local anaesthesia** | **Conscious sedation (+ local anaesthesia)** | **Relative (95% CI)** | **Absolute** | **Quality** | **Importance** |
| **Patient satisfaction: would recommend to friend** | | | | | | | | | | | | |
| 1 (Bayer 2015) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | Serious[1] | None | 37/61 (60.7%) | 49/61 (80.3%) | RR 0.76 (0.6 to 0.96) | 193 fewer per 1000 (from 32 fewer to 321 fewer) | MODERATE | CRITICAL |
| **Patient satisfaction: overall satisfaction - Excellent** | | | | | | | | | | | | |
| 1 (Wong 2002) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | No serious imprecision | None | 1/50 (2%) | 10/50 (20%) | RR 0.1 (0.01 to 0.75) | 180 fewer per 1000 (from 50 fewer to 198 fewer) | HIGH | CRITICAL |
| **Patient satisfaction: overall satisfaction - Satisfactory** | | | | | | | | | | | | |
| 1 (Wong 2002) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | Very serious[2] | None | 9/50 (18%) | 15/50 (30%) | RR 0.6 (0.29 to 1.24) | 120 fewer per 1000 (from 213 fewer to 72 more) | LOW | CRITICAL |
| **Patient satisfaction: overall satisfaction - Fair** | | | | | | | | | | | | |
| 1 (Wong 2002) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | Serious[1] | None | 30/50 (60%) | 18/50 (36%) | RR 1.67 (1.08 to 2.57) | 241 more per 1000 (from 29 | MODERATE | CRITICAL |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | more to 565 more) | | |
| **Patient satisfaction: overall satisfaction - Unsatisfactory** | | | | | | | | | | | | |
| 1 (Wong 2002) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | Very serious[2] | None | 10/50 (20%) | 7/50 (14%) | RR 1.43 (0.59 to 3.45) | 60 more per 1000 (from 57 fewer to 343 more) | LOW | CRITICAL |
| **Patient satisfaction: anxiety control (100mm VAS) - 30 minutes post-op** | | | | | | | | | | | | |
| 1 (Bayer 2015) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | Serious[1] | None | 61 | 61 | Not relevant | MD 12.8 lower (22.47 to 3.13 lower) | MODERATE | CRITICAL |
| **Patient satisfaction: anxiety control (100mm VAS) - 3 days post-op** | | | | | | | | | | | | |
| 1 (Bayer 2015) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | Serious[1] | None | 41 | 44 | Not relevant | MD 14.5 lower (27.29 to 1.71 lower) | MODERATE | CRITICAL |
| **Patient satisfaction: pain control (100mm VAS) - 30 minutes post-op** | | | | | | | | | | | | |
| 1 (Bayer 2015) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | Serious[1] | None | 61 | 61 | Not relevant | MD 6.8 lower (17.11 lower to 3.51 higher) | MODERATE | CRITICAL |
| **Patient satisfaction: pain control (100mm VAS) - 3 days post-op** | | | | | | | | | | | | |
| 1 (Bayer 2015) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | Serious[1] | None | 41 | 44 | Not relevant | MD 11.6 lower (24.56 lower to 1.36 higher) | MODERATE | CRITICAL |
| **Patient satisfaction: overall satisfaction (100mm VAS) - 30 minutes post-op** | | | | | | | | | | | | |
| 1 (Bayer 2015) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | No serious imprecision | None | 61 | 61 | Not relevant | MD 0.6 lower (7.42 lower to 6.22 higher) | HIGH | CRITICAL |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Patient satisfaction: overall satisfaction (100mm VAS) - 3 days post-op** | | | | | | | | | | | | |
| 1 (Bayer 2015) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | Serious[1] | None | 41 | 44 | Not relevant | MD 9.2 lower (20.25 lower to 1.85 higher) | MODERATE | CRITICAL |
| **Pain: during aspiration (100mm VAS)** | | | | | | | | | | | | |
| 1 (Bayer 2015) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | Serious[1] | None | 61 | 62 | Not relevant | MD 4.2 higher (3.35 lower to 11.75 higher) | MODERATE | CRITICAL |
| **Vomiting: 30 minutes post-op** | | | | | | | | | | | | |
| 1 (Bayer 2015) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | Very serious[2] | None | 1/61 (1.6%) | 1/61 (1.6%) | RR 1 (0.06 to 15.63) | 0 fewer per 1000 (from 15 fewer to 240 more) | LOW | IMPORTANT |

*CI: confidence interval; MD: mean difference; MID: minimally important difference; RR: relative risk; VAS: visual analogue scale*
*[1] The quality of evidence was downgraded by 1 as the 95% confidence interval crossed 1 MID*
*[2] The quality of evidence was downgraded by 2 as the 95% confidence interval crossed 2 MIDs*

## Table 4: Clinical evidence profile: Comparison 2. Deep sedation (and local anaesthesia) versus general anaesthesia

| **Quality assessment** | | | | | | | **No of patients** | | **Effect** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **No of studies** | **Design** | **Risk of bias** | **Inconsistency** | **Indirectness** | **Imprecision** | **Other considerations** | **Deep sedation (+ local anaesthesia)** | **General anaesthesia** | **Relative (95% CI)** | **Absolute** | **Quality** | **Importance** |
| **Patient satisfaction: would have same anaesthesia again** | | | | | | | | | | | | |
| 1 (Raeder 1992) | Randomised trials | Serious[1] | No serious inconsistency | No serious indirectness | Serious[2] | None | 26/31 (83.9%) | 22/28 (78.6%) | RR 1.07 (0.83 to 1.37) | 55 more per 1000 (from 134 fewer to 291 more) | LOW | CRITICAL |
| **Pain - During hospital stay** | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 (Raeder 1992) | Randomised trials | Serious[1] | No serious inconsistency | No serious indirectness | No serious imprecision | None | 7/31 (22.6%) | 19/28 (67.9%) | RR 0.33 (0.17 to 0.67) | 455 fewer per 1000 (from 224 fewer to 563 fewer) | MODERATE | CRITICAL |
| **Pain - During travel home** | | | | | | | | | | | | |
| 1 (Raeder 1992) | Randomised trials | Serious[1] | No serious inconsistency | No serious indirectness | Very serious[3] | None | 1/31 (3.2%) | 5/28 (17.9%) | RR 0.18 (0.02 to 1.45) | 146 fewer per 1000 (from 175 fewer to 80 more) | VERY LOW | CRITICAL |
| **Pain - At home (following night and day)** | | | | | | | | | | | | |
| 1 (Raeder 1992) | Randomised trials | Serious[1] | No serious inconsistency | No serious indirectness | Very serious[3] | None | 8/31 (25.8%) | 8/28 (28.6%) | RR 0.9 (0.39 to 2.08) | 29 fewer per 1000 (from 174 fewer to 309 more) | VERY LOW | CRITICAL |
| **Pain (11-point scale)** | | | | | | | | | | | | |
| 1 (Raeder 1992) | Randomised trials | Serious[1] | No serious inconsistency | No serious indirectness | Serious[2] | None | 31 | 28 | Not relevant | MD 1 lower (1.77 to 0.23 lower) | LOW | CRITICAL |

*CI: confidence interval; MD: mean difference; MID: minimally important difference; RR: relative risk*
*[1] The quality of evidence was downgraded 1 level as this is a subjective patient reported outcome and women were not blind to treatment allocation*
*[2] The quality of evidence was downgraded by 1 as the 95% confidence interval crossed 1 MID*
*[3] The quality of evidence was downgraded by 2 as the 95% confidence interval crossed 2 MIDs*

## Table 5: Clinical evidence profile: Comparison 3. Propofol (general anaesthesia) versus sevoflurane (general anaesthesia)

| **Quality assessment** | | | | | | | **No of patients** | | **Effect** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **No of studies** | **Design** | **Risk of bias** | **Inconsistency** | **Indirectness** | **Imprecision** | **Other considerations** | **Propofol (general anaesthesia)** | **Sevoflurane (general anaesthesia)** | **Relative (95% CI)** | **Absolute** | **Quality** | **Importance** |
| **Patient satisfaction: overall satisfaction** | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 (Xu 2012) | Randomised trials | Serious[1] | No serious inconsistency | No serious indirectness | No serious imprecision | None | 91/100 (91%) | 92/100 (92%) | RR 0.99 (0.91 to 1.08) | 9 fewer per 1000 (from 83 fewer to 74 more) | MODERATE | CRITICAL |
| **Patient satisfaction: satisfaction with anaesthesia (10cm VAS)** | | | | | | | | | | | | |
| 1 (Micks 2015) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | No serious imprecision | None | 80 | 80 | Not relevant | MD 0.1 lower (0.49 lower to 0.29 higher) | HIGH | CRITICAL |
| **Patient satisfaction: would recommend to friend (10cm VAS)** | | | | | | | | | | | | |
| 1 (Micks 2015) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | No serious imprecision | None | 80 | 80 | Not relevant | MD 0.1 lower (0.48 lower to 0.28 higher) | HIGH | CRITICAL |
| **Termination completed with intended method of sedation/anaesthesia** | | | | | | | | | | | | |
| 1 Micks 2015) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | No serious imprecision | None | 80/80 (100%) | 78/80 (97.5%) | RR 1.03 (0.98 to 1.07) | 29 more per 1000 (from 19 fewer to 68 more) | HIGH | CRITICAL |
| **Pain - During recovery** | | | | | | | | | | | | |
| 1 (Nathan 1998) | Randomised trials | Very serious[2] | No serious inconsistency | No serious indirectness | Very serious[3] | None | 2/26 (7.7%) | 0/26 (0%) | RR 5 (0.25 to 99.34) | Not estimable | VERY LOW | CRITICAL |
| **Pain - 24 hours post-op** | | | | | | | | | | | | |
| 1 (Nathan 1998) | Randomised trials | Very serious[2] | No serious inconsistency | No serious indirectness | Very serious[3] | None | 8/23 (34.8%) | 6/22 (27.3%) | RR 1.28 (0.53 to 3.08) | 76 more per 1000 (from 128 fewer to 567 more) | VERY LOW | CRITICAL |
| **Pain (10cm VAS) - Upon waking from anaesthesia** | | | | | | | | | | | | |
| 1 Micks 2015) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | No serious imprecision | None | 80 | 80 | Not relevant | MD 0.2 higher (0.5 lower to 0.9 higher) | HIGH | CRITICAL |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Pain (10cm VAS) - Upon discharge** | | | | | | | | | | | | |
| 1 (Micks 2015) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | No serious imprecision | None | 80 | 80 | Not relevant | MD 0.2 lower (0.89 lower to 0.49 higher) | HIGH | CRITICAL |
| **Haemorrhage requiring transfusion or >500ml blood loss** | | | | | | | | | | | | |
| 1 Micks 2015) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | Serious[4] | None | 0/80 (0%) | 2/80 (2.5%) | RR 0.2 (0.01 to 4.1) | 20 fewer per 1000 (from 25 fewer to 78 more) | MODERATE | IMPORTANT |
| **Nausea** | | | | | | | | | | | | |
| 2 (Micks 2015; Nathan 1998) | Randomised trials | Serious[5] | Serious[6] | No serious indirectness | Very serious[3] | None | 15/103 (14.6%) | 26/102 (25.5%) | RR 0.52 (0.19 to 1.46) | 122 fewer per 1000 (from 206 fewer to 117 more) | VERY LOW | IMPORTANT |
| **Vomiting** | | | | | | | | | | | | |
| 2 (Micks 2015; Nathan 1998) | Randomised trials | Serious[7] | No serious inconsistency | No serious indirectness | Very serious[3] | None | 5/103 (4.9%) | 9/102 (8.8%) | RR 0.54 (0.19 to 1.54) | 41 fewer per 1000 (from 71 fewer to 48 more) | VERY LOW | IMPORTANT |

*CI: confidence interval; MD: mean difference; MID: minimally important difference; RR: relative risk; VAS: visual analogue scale*

*[1] The quality of evidence was downgraded 1 level as this is a subjective, patient reported outcome and there was no blinding*

*[2] The quality of evidence was downgraded 2 levels as insufficient information was provided regarding random sequence generation and this is a subjective patient reported outcome and women were not blind to treatment allocation*

*[3] The quality of evidence was downgraded by 2 as the 95% confidence interval crossed 2 MIDs*

*[4] The quality of evidence was downgraded 1 level based on optimal information size as there was <300 events*

*[5] The quality of evidence was downgraded 1 level as there was insufficient information provided regarding randomisation method in 1 of the included trials; further this a subjective, patient reported outcome and there was no blinding in 1 of the included trials*

*[6] The quality of evidence was downgraded 1 level as there were high rates of unexplained heterogeneity (66%)*

*[7] The quality of evidence was downgraded 1 level as there was insufficient information provided regarding randomisation method in 1 of the included trials*

**Table 6: Clinical evidence profile: Comparison 4. Oral conscious sedation versus intravenous conscious sedation**

| Quality assessment | | | | | | | No of patients | | Effect | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **No of studies** | **Design** | **Risk of bias** | **Inconsistency** | **Indirectness** | **Imprecision** | **Other considerations** | **Oral conscious sedation** | **IV conscious sedation** | **Relative (95% CI)** | **Absolute** | Quality | Importance |
| **Patient satisfaction: pain control - Completely/mostly acceptable** | | | | | | | | | | | | |
| 1 (Allen 2009) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | Serious[1] | None | 35/65 (53.8%) | 54/65 (83.1%) | RR 0.65 (0.5 to 0.83) | 291 fewer per 1000 (from 141 fewer to 415 fewer) | MODERATE | CRITICAL |
| **Patient satisfaction: pain control - Somewhat acceptable** | | | | | | | | | | | | |
| 1 (Allen 2009) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | No serious imprecision | None | 27/65 (41.5%) | 8/65 (12.3%) | RR 3.38 (1.66 to 6.87) | 293 more per 1000 (from 81 more to 722 more) | HIGH | CRITICAL |
| **Patient satisfaction: pain control - Mostly/completely unacceptable** | | | | | | | | | | | | |
| 1 (Allen 2009) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | Very serious[2] | None | 3/65 (4.6%) | 3/65 (4.6%) | RR 1 (0.21 to 4.77) | 0 fewer per 1000 (from 36 fewer to 174 more) | LOW | CRITICAL |
| **Patient satisfaction: recommend to friend - Definitely/probably** | | | | | | | | | | | | |
| 1 (Allen 2009) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | Serious[1] | None | 52/65 (80%) | 60/65 (92.3%) | RR 0.87 (0.75 to 1) | 120 fewer per 1000 (from 231 fewer to 0 more) | MODERATE | CRITICAL |
| **Patient satisfaction: recommend to friend - Don't know** | | | | | | | | | | | | |
| 1 (Allen 2009) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | Very serious[2] | None | 5/65 (7.7%) | 1/65 (1.5%) | RR 5 (0.6 to 41.63) | 62 more per 1000 (from 6 fewer to 625 more) | LOW | CRITICAL |
| **Patient satisfaction: recommend to friend - Probably/definitely not** | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 (Allen 2009) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | Very serious[2] | None | 8/65 (12.3%) | 4/65 (6.2%) | RR 2 (0.63 to 6.32) | 62 more per 1000 (from 23 fewer to 327 more) | LOW | CRITICAL |
| **Patient satisfaction: would choose same method again - Definitely/probably** | | | | | | | | | | | | |
| 1 (Allen 2009) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | Serious[1] | None | 47/65 (72.3%) | 61/65 (93.8%) | RR 0.77 (0.65 to 0.91) | 216 fewer per 1000 (from 84 fewer to 328 fewer) | MODERATE | CRITICAL |
| **Patient satisfaction: would choose same method again - Don't know** | | | | | | | | | | | | |
| 1 (Allen 2009) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | Very serious[2] | None | 4/65 (6.2%) | 0/65 (0%) | RR 9 (0.49 to 163.85) | Not estimable | LOW | CRITICAL |
| **Patient satisfaction: would choose same method again - Probably/definitely not** | | | | | | | | | | | | |
| 1 (Allen 2009) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | Serious[1] | None | 14/65 (21.5%) | 4/65 (6.2%) | RR 3.5 (1.22 to 10.07) | 154 more per 1000 (from 14 more to 558 more) | MODERATE | CRITICAL |
| **Termination completed with intended method of sedation/anaesthesia** | | | | | | | | | | | | |
| 1 (Allen 2009) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | No serious imprecision | None | 65/65 (100%) | 65/65 (100%) | RR 1 (0.97 to 1.03) | 0 fewer per 1000 (from 30 fewer to 30 more) | HIGH | CRITICAL |
| **Pain (100-point scale) - Intraoperative** | | | | | | | | | | | | |
| 1 (Allen 2009) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | No serious imprecision | None | 65 | 65 | Not relevant | MD 24.9 higher (16.01 to 33.79 higher) | HIGH | CRITICAL |
| **Pain (100-point scale) - Postoperative** | | | | | | | | | | | | |
| 1 (Allen 2009) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | Serious[1] | None | 65 | 65 | Not relevant | MD 7.3 higher (1.01 to | MODERATE | CRITICAL |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 13.59 higher) | | |
| **Intraoperative pain - Mild (<40)** | | | | | | | | | | | | |
| 1 (Allen 2009) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | No serious imprecision | None | 12/65 (18.5%) | 38/65 (58.5%) | RR 0.32 (0.18 to 0.55) | 398 fewer per 1000 (from 263 fewer to 479 fewer) | HIGH | CRITICAL |
| **Intraoperative pain - Moderate (40-69)** | | | | | | | | | | | | |
| 1 (Allen 2009) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | Serious[1] | None | 23/65 (35.4%) | 17/65 (26.2%) | RR 1.35 (0.8 to 2.29) | 92 more per 1000 (from 52 fewer to 337 more) | MODERATE | CRITICAL |
| **Intraoperative pain - Severe (70-100)** | | | | | | | | | | | | |
| 1 (Allen 2009) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | No serious imprecision | None | 30/65 (46.2%) | 10/65 (15.4%) | RR 3 (1.6 to 5.62) | 308 more per 1000 (from 92 more to 711 more) | HIGH | CRITICAL |
| **Nausea (postoperative)** | | | | | | | | | | | | |
| 1 (Allen 2009) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | Serious[1] | None | 21/65 (32.3%) | 11/65 (16.9%) | RR 1.91 (1 to 3.63) | 154 more per 1000 (from 0 more to 445 more) | MODERATE | IMPORTANT |
| **Vomiting (postoperative)** | | | | | | | | | | | | |
| 1 (Allen 2009) | Randomised trials | No serious risk of bias | No serious inconsistency | No serious indirectness | Serious[1] | None | 10/65 (15.4%) | 4/65 (6.2%) | RR 2.5 (0.83 to 7.57) | 92 more per 1000 (from 10 fewer to 404 more) | MODERATE | IMPORTANT |

*CI: confidence interval; IV: intravenous; MD: mean difference; MID: minimally important difference; RR: relative risk*
*[1] The quality of evidence was downgraded by 1 as the 95% confidence interval crossed 1 MID*
*[2] The quality of evidence was downgraded by 2 as the 95% confidence interval crossed 2 MIDs*

**Table 7: Clinical evidence profile: Comparison 5. Local anaesthesia method A versus local anaesthesia method B**

| Quality assessment | | | | | | | No of patients | | Effect | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **No of studies** | **Design** | **Risk of bias** | **Inconsistency** | **Indirectness** | **Imprecision** | **Other considerations** | **Local anaesthesia method A** | **Local anaesthesia method B** | **Relative (95% CI)** | **Absolute** | Quality | Importance |
| **Patient satisfaction (100mm VAS) - paracervical block (PCB) versus lidocaine gel - Overall experience** | | | | | | | | | | | | |
| 1 (Conti 2016) | Randomised trials | Very serious[1] | No serious inconsistency | No serious indirectness | Serious[2] | None | 68 | 69 | Not relevant | MD 6.48 lower (14.49 lower to 1.53 higher) | VERY LOW | CRITICAL |
| **Patient satisfaction (100mm VAS) - paracervical block versus lidocaine gel - Would recommend to friend** | | | | | | | | | | | | |
| 1 (Conti 2016) | Randomised trials | Very serious[1] | No serious inconsistency | No serious indirectness | Serious[2] | None | 68 | 69 | Not relevant | MD 3 lower (9.3 lower to 3.3 higher) | VERY LOW | CRITICAL |
| **Patient satisfaction (100mm VAS) - PCB + intrauterine infusion versus PCB** | | | | | | | | | | | | |
| 2 (Edelman 2004; Edelman 2006) | Randomised trials | Serious[3] | No serious inconsistency | No serious indirectness | No serious imprecision | None | 78 | 79 | Not relevant | MD 2.01 higher (4.66 lower to 8.68 higher) | MODERATE | CRITICAL |
| **Pain (100mm VAS) - paracervical block versus lidocaine gel - Cervical dilation** | | | | | | | | | | | | |
| 1 (Conti 2016) | Randomised trials | Very serious[1] | No serious inconsistency | No serious indirectness | Serious[2] | None | 68 | 69 | Not relevant | MD 4 lower (11.58 lower to 3.58 higher) | VERY LOW | CRITICAL |
| **Pain (100mm VAS) - paracervical block versus lidocaine gel - 30-45 minutes postop** | | | | | | | | | | | | |
| 1 (Conti 2016) | Randomised trials | Very serious[1] | No serious inconsistency | No serious indirectness | No serious imprecision | None | 68 | 69 | Not relevant | MD 1.1 higher (5.41 lower to 7.61 higher) | LOW | CRITICAL |
| **Pain (10cm VAS) - paracervical block versus intracervical block - Cervical dilation** | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 (Mankowski 2009) | Randomised trials | Serious[4] | No serious inconsistency | No serious indirectness | No serious imprecision | None | 66 | 66 | Not relevant | MD 0.2 lower (0.97 lower to 0.57 higher) | MODERATE | CRITICAL |
| **Pain (10cm VAS) - paracervical block versus intracervical block - Curettage** | | | | | | | | | | | | |
| 1 (Mankowski 2009) | Randomised trials | Serious[4] | No serious inconsistency | No serious indirectness | Serious[2] | None | 66 | 66 | Not relevant | MD 0.6 higher (0.32 lower to 1.52 higher) | LOW | CRITICAL |
| **Pain (100mm VAS) - PCB + intrauterine infusion versus PCB - Cervical dilation - 10ml 1% lidocaine IUI** | | | | | | | | | | | | |
| 1 (Edelman 2004) | Randomised trials | Serious[5] | No serious inconsistency[6] | No serious indirectness | Serious[2] | None | 39 | 40 | Not relevant | MD 3 lower (14.72 lower to 8.72 higher) | LOW | CRITICAL |
| **Pain (100mm VAS) - PCB + intrauterine infusion versus PCB - Cervical dilation - 5ml 4% lidocaine IUI** | | | | | | | | | | | | |
| 1 (Edelman 2006) | Randomised trials | Serious[5] | No serious inconsistency[6] | No serious indirectness | Serious[2] | None | 35 | 39 | Not relevant | MD 20 lower (32.86 to 7.14 lower) | LOW | CRITICAL |
| **Pain (100mm VAS) - PCB + intrauterine infusion versus PCB - Aspiration - 10ml 1% lidocaine IUI** | | | | | | | | | | | | |
| 1 (Edelman 2004) | Randomised trials | Serious[5] | No serious inconsistency[7] | No serious indirectness | Serious[2] | None | 40 | 40 | Not relevant | MD 4 lower (18.27 lower to 10.27 higher) | LOW | CRITICAL |
| **Pain (100mm VAS) - PCB + intrauterine infusion versus PCB - Aspiration - 5ml 4% lidocaine IUI** | | | | | | | | | | | | |
| 1 (Edelman 2006) | Randomised trials | Serious[4] | No serious inconsistency[7] | No serious indirectness | No serious imprecision | None | 37 | 39 | Not relevant | MD 28 lower (39.53 to 16.47 lower) | MODERATE | CRITICAL |
| **Pain (100mm VAS) - PCB + intrauterine infusion versus PCB - 30 minutes postop - 10ml 1% lidocaine IUI** | | | | | | | | | | | | |
| 1 (Edelman 2004) | Randomised trials | Serious[5] | Serious[8] | No serious indirectness | Serious[2] | None | 39 | 40 | Not relevant | MD 7 higher (2.26 lower | LOW | CRITICAL |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | to 16.26 higher) | | |
| **Pain (100mm VAS) - PCB + intrauterine infusion versus PCB - 30 minutes postop - 5ml 4% lidocaine IUI** | | | | | | | | | | | | |
| 1 (Edelman 2006) | Randomised trials | Serious[5] | No serious inconsistency[8] | No serious indirectness | Serious[2] | None | 37 | 38 | Not relevant | MD 5 lower (14.51 lower to 4.51 higher) | LOW | CRITICAL |
| **Nausea - paracervical block versus intracervical block** | | | | | | | | | | | | |
| 1 (Mankowski 2009) | Randomised trials | Serious[3] | No serious inconsistency | No serious indirectness | Very serious[8] | None | 0/66 (0%) | 1/66 (1.5%) | RR 0.33 (0.01 to 8.04) | 10 fewer per 1000 (from 15 fewer to 107 more) | VERY LOW | IMPORTANT |
| **Vomiting - paracervical block versus intracervical block** | | | | | | | | | | | | |
| 1 (Mankowski 2009) | Randomised trials | Serious[3] | No serious inconsistency | No serious indirectness | Very serious[8] | None | 0/66 (0%) | 1/66 (1.5%) | RR 0.33 (0.01 to 8.04) | 10 fewer per 1000 (from 15 fewer to 107 more) | VERY LOW | IMPORTANT |

*CI: confidence interval; MD: mean difference; MID: minimally important difference; PCB: paracervical block; RR: relative risk; VAS: visual analogue scale*
*[1] The quality of evidence was downgraded 2 levels as insufficient information was reported regarding random sequence generation and this is a subjective patient reported outcome and women were not blind to treatment allocation*
*[2] The quality of the evidence was downgraded by 1 as the 95% confidence interval crossed 1 MID*
*[3] The quality of evidence was downgraded 1 level as there was insufficient information reported about allocation concealment in both trials*
*[4] The quality of evidence was downgraded 1 level as there was insufficient information reported regarding random sequence generation*
*[5] The quality of evidence was downgraded 1 level as there was insufficient information reported about allocation concealment*
*[6] Results are presented separately based on intrauterine infusion volume and concentration to explore significant heterogeneity that was present when analysed together (73%)*
*[7] Results are presented separately based on intrauterine infusion volume and concentration to explore significant heterogeneity that was present when analysed together (85%)*
*[8] Results are presented separately based on intrauterine infusion volume and concentration to explore significant heterogeneity that was present when analysed together (68%)*

[9] The quality of evidence was downgraded by 2 as the 95% confidence interval crossed 2 MIDs

# Appendix G – Economic evidence study selection

### Economic evidence for review question: What is the optimal method of anaesthesia or sedation for surgical abortion?

No economic evidence was identified which was applicable to this review question.

# Appendix H – Economic evidence tables

### Economic evidence tables for review question: What is the optimal method of anaesthesia or sedation for surgical abortion?

No economic evidence was identified which was applicable to this review question.

# Appendix I – Economic evidence profiles

### Economic evidence profiles for review question: What is the optimal method of anaesthesia or sedation for surgical abortion?

No economic evidence was identified which was applicable to this review question.

# Appendix J – Economic analysis

### Economic analysis for review question: What is the optimal method of anaesthesia or sedation for surgical abortion?

No economic analysis was conducted for this review question.

# Appendix K – Excluded studies

## Excluded studies for review question: What is the optimal method of anaesthesia or sedation for surgical abortion?

### Clinical studies

| Study | Reason for Exclusion |
|---|---|
| Acmaz, G., Aksoy, H., Ozoglu, N., Aksoy, U., Albayrak, E., Effect of paracetamol, dexketoprofen trometamol, lidocaine spray, and paracervical block application for pain relief during suction termination of first-trimester pregnancy, BioMed Research International, 2013 (no pagination), 2013 | Comparison not included in protocol: lidocaine spray |
| Agostini, A., Provansal, M., Collette, E., Capelle, M., Estrade, J. P., Cravello, L., Gamerre, M., Comparison of ropivacaine and lidocaine for paracervical block during surgical abortion, Contraception, 77, 382-385, 2008 | Comparison not included in protocol: ropivacaine versus lidocaine local anaesthesia - both administered by paracervical block |
| Aho, M., Erkola, O., Kallio, A., Scheinin, H., Korttila, K., Comparison of dexmedetomidine and midazolam sedation and antagonism of dexmedetomidine with atipamezole, Journal of Clinical Anesthesia, 5, 194-203, 1993 | Comparison not included in protocol: Dexmedetomidine versus midazolam - (dexmedetomidine not of interest to committee) |
| Aksoy, H., Aksoy, U., Ozyurt, S., Ozoglu, N., Acmaz, G., Aydin, T., Idem Karadag, O., Tayyar, A. T., Comparison of lidocaine spray and paracervical block application for pain relief during first-trimester surgical abortion: A randomised, double-blind, placebo-controlled trial, Journal of Obstetrics and Gynaecology, 36, 649-653, 2016 | Comparison not included in protocol (lidocaine spray) |
| Allen, R. H., Kumar, D., Fitzmaurice, G., Lifford, K. L., Goldberg, A. B., Pain management of first-trimester surgical abortion: effects of selection of local anesthesia with and without lorazepam or intravenous sedation, Contraception, 74, 407-13, 2006 | Non-randomised study design |
| Arellano, R. J., Pole, M. L., Rafuse, S. E., Fletcher, M., Saad, Y. G., Friedlander, M., Norris, A., Chung, F. F. T., Omission of nitrous oxide from a propofol-based anesthetic does not affect the recovery of women undergoing outpatient gynecologic surgery, Anesthesiology, 93, 332-339, 2000 | Comparison not included in protocol: propofol only versus propofol and nitrous oxide |
| Hall, G., Ekblom, A., Persson, E., Irestedt, L., Effects of prostaglandin treatment and paracervical blockade on postoperative pain in patients undergoing first trimester abortion in general anesthesia, Acta obstetricia ET gynecologica scandinavica, 76, 868-72, 1997 | Comparison not included in protocol: general anaesthesia and paracervical block versus general anaesthesia only |
| Hall,J.E., Ng,W.S., Smith,S., Blood loss during first trimester termination of pregnancy: comparison of two anaesthetic techniques, British Journal of Anaesthesia, 78, 172-174, 1997 | Outcomes reported are not included in protocol |
| Hamar, O., Garamvolgyi, G., Fentanyl-midazolam-flumazenil anaesthesia during induced abortion, Acta Chirurgica HungaricaActa Chir Hung, 31, 63-8, 1990 | Comparison not included in protocol: comparison of different non-inhaled agents for general anaesthesia |

| Study | Reason for Exclusion |
|---|---|
| Ireland, L. D., Allen, R. H., Pain Management for Gynecologic Procedures in the Office, Obstetrical & Gynecological SurveyObstet Gynecol Surv, 71, 89-98, 2016 | Includes populations outside scope of guideline |
| Jakobbson, J., Andreen, M., Westgren, M., Thomasson, K., Discomfort after outpatient abortion using paracervical block: A comparison between two opioids and one non-opioid drug for premedication, Gynecologic and Obstetric Investigation, 30, 71-74, 1990 | Comparison not included in protocol: morphine and scopolamine versus pethidine versus midazolam administered under paracervical block |
| Kan, A. S. Y., Ng, E. H. Y., Ho, P. C., The role and comparison of two techniques of paracervical block for pain relief during suction evacuation for first-trimester pregnancy termination, Contraception, 70, 159-163, 2004 | Comparison not in protocol: different techniques for paracervical block |
| Kapp, N., Whyte, P., Tang, J., Jackson, E., Brahmi, D., A review of evidence for safe abortion care, Contraception, 88, 350-63, 2013 | Contains comparisons no included in protocol: facets of abortion care beyond anaesthesia and analgesia |
| Karasahin,K.E., Alanbay,I., Ercan,C.M., Mesten,Z., Simsek,C., Baser,I., Lidocaine spray in addition to paracervical block reduces pain during first-trimester surgical abortion: a placebo-controlled clinical trial, Contraception, 83, 362-366, 2011 | Comparison not included in protocol: lidocaine spray |
| Kumarasinghe,N., Harpin,R., Stewart,A.W., Blood loss during suction termination of pregnancy with two different anaesthetic techniques, Anaesthesia and intensive care, 25, 48-50, 1997 | Outcomes reported are not included in protocol |
| Lazenby, G. B., Fogelson, N. S., Aeby, T., Impact of paracervical block on postabortion pain in patients undergoing abortion under general anesthesia, Contraception, 80, 578-82, 2009 | Comparison not included in protocol: deep sedation/general anaesthesia ad paracervical block versus deep sedation/general anaesthesia only |
| Li, Mf, Effect of drugs on artificial abortion of parous and primiparous women in randomized triple blind method, Zhonghua hu li za zhi [Chinese journal of nursing], 25, 73-74, 1990 | Non-English language |
| Li, Mf, The dilatation effect of local anesthetics on the cervix during surgical termination of early pregnancy, Zhonghua fu chan ke za zhi, 26, 37-9, 62, 1991 | Non-English language |
| Mercier, R. J., Zerden, M. L., Intrauterine anesthesia for gynecologic procedures: a systematic review, Obstetrics & GynecologyObstet Gynecol, 120, 669-77, 2012 | Contains comparisons outside scope: women undergoing gynaecological procedures other than abortion |
| Moayedi, G., Tschann, M., Pain Management for First-Trimester Uterine Aspiration, Obstetrical and Gynecological Survey, 73, 174-181, 2018 | Includes non-pharmacological methods of pain management |
| Nct,, Trial Comparing Intravenous and Oral Moderate Sedation for First Trimester Surgical Abortions, Https://clinicaltrials.gov/show/nct01011634, 2009 | Protocol only |
| Nct,, Refining Paracervical Block Techniques for Pain Control in First Trimester Surgical Abortion, Https://clinicaltrials.gov/show/nct01466491, 2011 | Protocol only |
| Nct,, Sevoflurane as an Anesthetic During Dilation and Evacuation Procedures, Https://clinicaltrials.gov/show/nct01048658, 2010 | Protocol only |

| Study | Reason for Exclusion |
|---|---|
| Nct,, Lidocaine-Prilocaine Cream in Conjunction With Paracervical Block for Pain With Abortion, Https://clinicaltrials.gov/show/nct03508804, 2016 | Protocol only |
| Nct,, 4% Intrauterine Lidocaine Infusion for Pain Management in First Trimester Abortions, Https://clinicaltrials.gov/show/nct00121329, 2005 | Protocol only |
| Nct,, Evaluation of a Prefixed 50% N2O- 50%O2 Mixture in Legal Abortion Under Local Analgesia, Https://clinicaltrials.gov/show/nct00769912, 2008 | Protocol only |
| Nct,, Lidocaine and Pain Management in First Trimester Abortions, Https://clinicaltrials.gov/show/nct00613821, 2008 | Protocol only |
| Nct,, Comparison of Lidocaine Spray and Paracervical Block Application for Pain Relief During First-trimester Surgical Abortion: a Randomized, Double-blind, Placebo-controlled Trial, Https://clinicaltrials.gov/show/nct02007408, 2013 | Protocol only |
| Nct,, Nitrous Oxide Versus Intravenous Sedation for Anesthesia, Https://clinicaltrials.gov/show/nct02755090, 2016 | Protocol only |
| Nct,, The Feasibility of Different Doses of Etomidate Admixed With Propofol in Induced Abortion: a Randomized, Double Blind Controlled Trial, Https://clinicaltrials.gov/show/nct02208596, 2014 | Protocol only |
| Nct,, Intravenous Sedation Versus General Anesthesia in Patients Undergoing Minor Gynecologic Surgery, Https://clinicaltrials.gov/show/nct01890707, 2012 | Protocol only |
| Owolabi, O. T., Moodley, J., A randomized trial of pain relief in termination of pregnancy in South Africa, Tropical Doctor, 35, 136-139, 2005 | Comparison not include in protocol: different techniques for paracervical block |
| Peng, Zy, Chen, Xm, Zeng, Bx, Liu, Jj, Propofol and midazolam used in artificial abortion section, Chinese journal of anesthesiology, 14, 369-371, 1994 | Non-English language |
| Renner, R. M., Edelman, A. B., Nichols, M. D., Jensen, J. T., Lim, J. Y., Bednarek, P. H., Refining paracervical block techniques for pain control in first trimester surgical abortion: a randomized controlled noninferiority trial, Contraception, 94, 461-466, 2016 | Comparison not included in protocol: difference paracervical block techniques |
| Renner, R. M., Jensen, J. T., Nichols, M. D., Edelman, A. B., Pain control in first-trimester surgical abortion: a systematic review of randomized controlled trials, Contraception, 81, 372-388, 2010 | Includes non-pharmacological methods of pain management |
| Renner, R. M., Nichols, M. D., Jensen, J. T., Li, H., Edelman, A. B., Paracervical block for pain control in first-trimester surgical abortion: A randomized controlled trial, Obstetrics and gynecology, 119, 1030-1037, 2012 | Comparison not included in protocol: conscious sedation and paracervical block versus conscious sedation only |
| Renner, Regina-Maria, Jensen, Jeffrey T J, Nichols, Mark D N, Edelman, Alison, Pain control in first trimester surgical abortion, Cochrane Database of Systematic Reviews, 2009 | Includes non-pharmacological methods of pain management |
| Rossi, Ae, Lo, Sapio D, Oliva, O, Vitale, O, Ebano, A, Hospital day-surgery: comparative evaluation of 3 general anesthesia techniques, Minerva Anestesiologica, 61, 265-269, 1995 | Non-English language |
| Singh, R. H., Montoya, M., Espey, E., Leeman, L., Nitrous oxide versus oral sedation for pain management of first-trimester surgical abortion - a randomized study, Contraception, 96, 118-123, 2017 | Comparison not included in protocol: oral conscious sedation versus inhaled conscious sedation |

| Study | Reason for Exclusion |
|---|---|
| Singh, R. H., Montoya, M., Espey, E., Leeman, L., Nitrous Oxide Versus Oral Sedation for Pain Management of First-Trimester Surgical Abortion-A Randomized Study, Obstetrical and Gynecological Survey, 72, 646-648, 2017 | Abstract and editorial review for Singh 2017 |
| Suliman, S., Ericksen, T., Labuschgne, P., de Wit, R., Stein, D. J., Seedat, S., Comparison of pain, cortisol levels, and psychological distress in women undergoing surgical termination of pregnancy under local anaesthesia versus intravenous sedation, BMC Psychiatry, 7, 24, 2007 | Non-randomised study |
| Tablov, V, Tsafarov, M, Tablov, B, Popov, I, Partenov, P, Diprivan versus midazolam in combined anaesthesia with ketamin for minor gynecological surgery, Akusherstvo i ginekologiia, 46, 41-43, 2007 | Non-English language |
| Tangsiriwatthana, Thumwadee, Sangkomkamhang, Ussanee S, Lumbiganon, Pisake, Laopaiboon, Malinee, Paracervical local anaesthesia for cervical dilatation and uterine intervention, Cochrane Database of Systematic Reviews, 2013 | Contains comparisons and populations not included in protocol |
| Wiebe, E. R., Comparison of the efficacy of different local anesthetics and techniques of local anesthesia in therapeutic abortions, American Journal of Obstetrics and Gynecology, 167, 131-134, 1992 | Comparison not included in protocol: different techniques for paracervical block |
| Wiebe, E. R., Pain control in abortion, International Journal of Gynecology and Obstetrics, 50, 41-46, 1995 | Comparison not included in protocol: different techniques for paracervical block |
| Wiebe, E. R., Trouton, K. J., Savoy, E., Intra-cervical versus i.v. fentanyl for abortion, Human Reproduction, 20, 2025-2028, 2005 | Comparison not included in protocol: IV fentanyl not of interest to committee |
| Wu, J., Yao, S., Wu, Z., Chu, S., Xia, G., Deng, F., A comparison of anesthetic regimens using etomidate and propofol in patients undergoing first-trimester abortions: Double-blind, randomized clinical trial of safety and efficacy, Contraception, 87, 55-62, 2013 | Comparison not included in protocol: different methods of general anaesthesia excluding anaesthetic gases |
| Zhou, J, The effect of nitrous oxide analgesia on artificial abortion, Chinese journal of anesthesiology, 14, 152, 1994 | Non-English language |

### Economic studies

No economic evidence was identified for this review. See supplementary material 2 for further information.

# Appendix L – Research recommendations

## Research recommendations for review question: What is the optimal method of anaesthesia or sedation for surgical abortion?

What local anaesthetic techniques are most effective for women having surgical abortion?

### Why this is important?

Surgical abortion under local anaesthesia is an established technique that is acceptable to women and has advantages in enabling quick, same day procedures, short admission times, no need for fasting and no need for care by a competent adult in the recovery phase and immediate provision of effective long acting reversible contraception. However the only RCTs conducted are on small numbers. Modest improvements in techniques could make a considerable difference to the experience of a large number of women.

**Table 8: Research recommendation rationale**

| Research question | What local anaesthetic techniques are most effective for women having surgical abortion? |
|---|---|
| Importance to 'patients' or the population | Abortion is a common procedure. For those women opting for a surgical procedure, the use of local anaesthesia can offer advantages. Any technique that reduces pain or distress could potentially benefit a large number of women and result in more having the confidence to choose local anaesthesia. Women can also have effective long acting reversible contraception fitted at the same. |
| Relevance to NICE guidance | Very little evidence was found in the comparison of "local anaesthesia method A versus local anaesthesia method B" and so no recommendation could be made. |
| Relevance to the NHS | Surgical abortion is a common procedure conducted in NHS. The ability to conduct more procedures using local anaesthesia would enable services to offer surgical treatments out of theatre environments which are far more cost effective and less intrusive for the woman. The procedure can be delivered in community settings, freeing resource in acute hospitals. |
| National priorities | Access to safe abortion is a public health priority. Identifying treatments that are cost effective and which enable a transfer of care from theatre to clinic, and from acute hospitals to community settings, are NHS priorities. |
| Current evidence base | Limited to trials involving very low numbers of women |
| Equality | N / A |

*N/A: not applicable; NHS: National Health Service; NICE: National Institute for Health and Care Excellence*

**Table 9: Research recommendation modified PICO table**

| Criterion | Explanation |
|---|---|
| Population | Women who are having a surgical abortion under local anaesthesia (also known as "manual vacuum aspiration") |
| Intervention | Standard technique using paracervical block (8 to 12mls local anaesthesia, wait of <3 minutes, use of unbuffered acidic local anaesthetic, no adjuvant intrauterine anaesthetic) |
| Comparator | Four arms to compare 1 of:<br>1. high volume technique (up to 40mls) |

| Criterion | Explanation |
|---|---|
| | 2. delay of 5 & 10 minutes between anaesthetic and start of procedure<br>3. use of bicarbonate to create a neutral pH of local<br>4. addition of intrauterine anaesthetic (e.g. 4% lignocaine gel left in-situ for 1 or 5 minutes) |
| Outcome | • Patient satisfaction (including whether would choose same technique in future)<br>• Pain score (maximal and at 5 and 15 minutes)<br>• Proportion reporting severe or minimal pain<br>• Proportion reporting pain less than or equivalent to that of normal menstruation<br>• Admission time<br>• Need for additional analgesia |
| Study design | RCT |
| Timeframe | 12 months |
| Additional information | Trial could also recruit from other populations such as miscarriage |

*RCT: randomised controlled trial*

## Research recommendations for review question: What is the optimal regimen for general anaesthesia for women having surgical abortion?

What is the optimal regimen for general anaesthesia for women having surgical abortion?

### Why this is important?

There is little research on the optimal method of general anaesthesia for a surgical abortion. However there is some weak evidence that the inhalational agents may result in more bleeding than intravenous drugs, as a result of their relaxant effect on the uterus.

**Table 10: Research recommendation rationale**

| **Research question** | What is the optimal regimen for general anaesthesia for women having surgical abortion? |
|---|---|
| Importance to 'patients' or the population | Although an increasing proportion of surgical abortions are expected to be conducted under local anaesthesia in the future, use of general anaesthesia remains commonplace and there are women who have a strong preference for general anaesthesia. |
| Relevance to NICE guidance | Uncertainty remains as to whether inhalational agents or intravenous anaesthetic drugs are better for inducing general anaesthesia in women undergoing a surgical abortion |
| Relevance to the NHS | Surgical abortion under general anaesthesia is a common procedure conducted in NHS |
| National priorities | Optimising the regimen of general anaesthesia for surgical abortion may improve the experience for women and enable abortion services to function more efficiently. |
| Current evidence base | Limited |
| Equality | N/A |

*N/A: not applicable; NHS: National Health Service; NICE: National Institute for Health and Care Excellence*

**Table 11: Research recommendation modified PICO table**

| **Criterion** | **Explanation** |
|---|---|
| Population | Women who are having a surgical abortion under general anaesthesia |
| Intervention | intravenous anaesthetic drug |
| Comparator | inhalational anaesthetic agent |
| Outcome | Blood loss, surgeon assessed uterine contractility, nausea, vomiting, patient acceptability |
| Study design | RCT |
| Timeframe | 12 months |
| Additional information | None |

*RCT: randomised controlled trial*