Menorrhagia

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ABSTRACT

INTRODUCTION: Menorrhagia (also known as heavy menstrual bleeding) limits normal activities, affects quality of life, and causes anaemia in two-thirds of women with objective menorrhagia (loss of 80 mL blood per cycle). Prostaglandin disorders may be associated with idiopathic menorrhagia and with heavy bleeding due to fibroids, adenomyosis, or use of intrauterine devices (IUDs). Fibroids have been found in 10% of women with menorrhagia overall and in 40% of women with severe menorrhagia; but half of women having a hysterectomy for menorrhagia are found to have a normal uterus. METHODS AND OUTCOMES: We conducted a systematic overview, aiming to answer the following clinical question: What are the effects of surgical treatments for menorrhagia? We searched: Medline, Embase, The Cochrane Library, and other important databases up to February 2014 (BMJ Clinical Evidence reviews are updated periodically; please check our website for the most up-to-date version of this review). RESULTS: At this update, searching of electronic databases retrieved 205 studies. After deduplication and removal of conference abstracts, 102 records were screened for inclusion in the overview. Appraisal of titles and abstracts led to the exclusion of 56 studies and the further review of 46 full publications. Of the 46 full articles evaluated, three systematic reviews and five RCTs were added at this update. We performed a GRADE evaluation for 30 PICO combinations. CONCLUSIONS: In this systematic overview, we categorised the efficacy for three surgical interventions based on information about the effectiveness and safety of dilatation and curettage, endometrial destruction (resection or ablation), and hysterectomy.

QUESTIONS

INTERVENTIONS

SURGERY

Beneficial

Likely to be beneficial

Unknown effectiveness

Covered elsewhere in Clinical Evidence

Fibroids (uterine myomatosis, leiomyomas)

Key points

- Menorrhagia (also known as heavy menstrual bleeding) limits normal activities, affects quality of life, and causes anaemia in two-thirds of women with objective menorrhagia (blood loss of 80 mL or more per cycle).

  Prostaglandin disorders may be associated with idiopathic menorrhagia and with heavy bleeding caused by fibroids, adenomyosis, or use of IUDs.

  Fibroids have been found in 10% of women with menorrhagia overall and in 40% of women with severe menorrhagia; but half of women having a hysterectomy for menorrhagia are found to have a normal uterus.

- Hysterectomy reduces blood loss and the need for further surgery compared with medical treatments or endometrial destruction, but can lead to complications in up to one third of women. Fewer women reported overall treatment dissatisfaction with hysterectomy compared with endometrial destruction.

- Endometrial destruction is more effective at reducing menorrhagia compared with medical treatment but complications can include infection, haemorrhage, and uterine perforation.

  We don't know whether any one type of endometrial destruction is superior, or whether dilatation and curettage has any effect on menstrual blood loss.

Clinical context

GENERAL BACKGROUND

Menorrhagia (also known as heavy menstrual bleeding) is defined as excessive menstrual blood loss that interferes with the woman's physical, emotional, social, and material quality of life, and that can occur alone or in combination with other symptoms. Idiopathic ovulatory menorrhagia is regular, heavy bleeding in the absence of recognisable pelvic pathology or a general bleeding disorder.

FOCUS OF THE REVIEW

Menorrhagia is common and affects many women's lives adversely. It is important to know which treatments are the most effective. This overview has concentrated on surgical treatments for menorrhagia, as little new evidence for first-line medical treatments is being generated. Previous overviews on medical interventions for menorrhagia are still available in the *BMJ Clinical Evidence* archive.

COMMENTS ON EVIDENCE

Many systematic reviews and RCTs exist that look at surgical interventions for menorrhagia; but when subject to GRADE evaluation, most of the evidence is of low to moderate strength only. We found no RCT evidence comparing surgical interventions with no treatment. For hysterectomy, none of the included systematic review or RCTs separated out whether ovaries were removed or conserved at the time of surgery, and this may have an effect on patient satisfaction and some of the postoperative emotional and functional outcomes.

SEARCH AND APPRAISAL SUMMARY

The update literature search for this overview was carried out from the date of the last search, June 2011, to February 2014. For more information on the electronic databases searched and criteria applied during assessment of studies for potential relevance to the overview, please see the Methods section. Searching of electronic databases retrieved 205 studies. After deduplication and removal of conference abstracts, 102 records were screened for inclusion in the overview. Appraisal of titles and abstracts led to the exclusion of 56 studies and the further review of 46 full publications. Of the 46 full articles evaluated, three systematic reviews and five RCTs were added at this update.

DEFINITION

Menorrhagia (also known as heavy menstrual bleeding) is defined as heavy, but regular, menstrual bleeding. **Idiopathic ovulatory menorrhagia** is regular heavy bleeding in the absence of recognisable pelvic pathology or a general bleeding disorder. **Objective menorrhagia** is taken to be a total menstrual blood loss of 80 mL or more in each menstruation. [1] It is difficult to incorporate objective measurement of menstrual blood loss into everyday practice. Subjectively, menorrhagia may be defined as a complaint of regular excessive menstrual blood loss that interferes with the woman's physical, emotional, social, and material quality of life, and that can occur alone or in combination with other symptoms. [2]

INCIDENCE/ PREVALENCE

In the UK, 5% of women aged 30 to 49 years consult their general practitioners each year with menorrhagia. [3] In New Zealand, 2% to 4% of primary-care consultations by premenopausal women are for menstrual problems. [4] It is a common cause of referral to secondary care. [5]

AETIOLOGY/ RISK FACTORS

Idiopathic ovulatory menorrhagia is thought to be caused by disordered prostaglandin production within the endometrium. [6] Prostaglandins may also be implicated in menorrhagia associated with uterine fibroids, adenomyosis, or the presence of an IUD. Fibroids have been reported in 10% of women with menorrhagia (80–100 mL/cycle) and in 40% of women with severe menorrhagia (at least 200 mL/cycle). [7]

PROGNOSIS

Menorrhagia limits normal activities, affects quality of life, and causes iron-deficiency anaemia in two-thirds of women shown to have objective menorrhagia. [1] [8] [9] [10] One in five women in the UK, and one in three in the US, have a hysterectomy before the age of 60 years; menorrhagia is the main presenting problem in at least half of these women. [11] [12] [13] About half of women who have a hysterectomy for menorrhagia are found to have an anatomically normal uterus, although this does not mean intervention was not warranted. [14] Data suggest that hysterectomy rates are falling, perhaps due to the widespread introduction of endometrial destruction procedures or intrauterine progestogens. [15]

AIMS OF INTERVENTION

To reduce menstrual bleeding; improve quality of life; and prevent or correct iron-deficiency anaemia with minimal adverse effects.

OUTCOMES

Menstrual blood loss (assessed objectively [mL/cycle] or subjectively), including rates of amenorrhoea; **anaemia**, primarily measured by haemoglobin concentration; **patient satisfaction**; **quality of life**; **need for re-treatment**; **intraoperative and postoperative complications**; **postoperative recovery**; and **adverse effects**. Whether a particular percentage reduction in menstrual blood loss is considered clinically important will depend on pretreatment menstrual loss and on individual women's perceptions of acceptable menstrual loss. Women may regard amenorrhoea as a benefit or a harm of treatment, depending on their perspective.

METHODS

Search strategy *BMJ Clinical Evidence* search and appraisal February 2014. Databases used to identify studies for this systematic review include: Medline 1966 to February 2014, Embase 1980 to February 2014, The Cochrane Database of Systematic Reviews 2014, issue 1 (1966 to date of issue), the Database of Abstracts of Reviews of Effects (DARE), and the Health Technology As-

sessment (HTA) database. **Inclusion criteria** Study design criteria for inclusion in this review were systematic reviews and RCT published in English, at least single-blinded (where possible, because blinding is difficult when comparing different modalities, such as surgical versus medical, and therefore open studies were included in these scenarios), and studies containing 10 or more individuals in each treatment arm, of whom more than 80% were followed up. There was no minimum length of follow-up. *BMJ Clinical Evidence* does not necessarily report every study found (e.g., every systematic review). Rather, we report the most recent, relevant and comprehensive studies identified through an agreed process involving our evidence team, editorial team, and expert contributors. **Evidence evaluation** A systematic literature search was conducted by our evidence team, who then assessed titles and abstracts, and finally selected articles for full text appraisal against inclusion and exclusion criteria agreed a priori with our expert contributors. In consultation with the expert contributors, studies were selected for inclusion and all data relevant to this overview extracted into the benefits and harms section of the overview. In addition, information that did not meet our predefined criteria for inclusion in the benefits and harms section, may have been reported in the 'Further information on studies' or 'Comment' section. **Adverse effects** All serious adverse effects, or those adverse effects reported as statistically significant, were included in the harms section of the overview. Pre-specified adverse effects identified as being clinically important were also reported, even if the results were not statistically significant. Although *BMJ Clinical Evidence* presents data on selected adverse effects reported in included studies, it is not meant to be, and cannot be, a comprehensive list of all adverse effects, contraindications, or interactions of included drugs or interventions. A reliable national or local drug database must be consulted for this information. **Comment and Clinical guide sections** In the Comment section of each intervention, our expert contributors may have provided additional comment and analysis of the evidence, which may include additional studies (over and above those identified via our systematic search) by way of background data or supporting information. As *BMJ Clinical Evidence* does not systematically search for studies reported in the Comment section, we cannot guarantee the completeness of the studies listed there or the robustness of methods. Our expert contributors add clinical context and interpretation to the Clinical guide sections where appropriate. **Data and quality** To aid readability of the numerical data in our reviews, we round many percentages to the nearest whole number. Readers should be aware of this when relating percentages to summary statistics such as relative risks (RRs) and odds ratios (ORs). *BMJ Clinical Evidence* does not report all methodological details of included studies. Rather, it reports by exception any methodological issue or more general issue that may affect the weight a reader may put on an individual study, or the generalisability of the result. These issues may be reflected in the overall GRADE analysis. We have performed a GRADE evaluation of the quality of evidence for interventions included in this review (see table, p 47). The categorisation of the quality of the evidence (high, moderate, low, or very low) reflects the quality of evidence available for our chosen outcomes in our defined populations of interest. These categorisations are not necessarily a reflection of the overall methodological quality of any individual study, because the Clinical Evidence population and outcome of choice may represent only a small subset of the total outcomes reported, and population included, in any individual trial. For further details of how we perform the GRADE evaluation and the scoring system we use, please see our website (www.clinicalevidence.com).

QUESTION What are the effects of surgical treatments for menorrhagia?

OPTION DILATATION AND CURETTAGE

- For GRADE evaluation of interventions for Menorrhagia, see table, p 47 .
- We don't know whether dilatation and curettage has any effect on menstrual blood loss.

Benefits and harms

Dilatation and curettage versus no treatment:

We found no systematic review or RCTs.

Dilatation and curettage versus oral medical treatments (non-steriodal anti-inflammatory drugs, tranexamic acid, combined oral contraceptives, or oral progestogens):

We found no systematic review or RCTs.

Dilatation and curettage versus intrauterine progestogen:

We found no systematic review or RCTs.

Dilatation and curettage versus hysterectomy:

We found no systematic review or RCTs.

Dilatation and curettage versus endometrial destruction (resection or ablation):

We found no systematic review or RCTs.

Comment: Observational evidence suggests that dilatation and curettage may cause adverse effects, including uterine perforation and cervical laceration, as well as the usual risks of general anaesthesia. [16]

Clinical guide

Dilatation and curettage still plays a role in the investigation of menorrhagia as endometrium can be obtained for histological examination if outpatient sampling has failed. We found one uncontrolled cohort study (50 women) that measured blood loss before and after dilatation and curettage. [17] It found a reduction in menstrual blood loss in the first menstrual period after the procedure, but losses returned to previous levels or higher by the second menstrual period.

OPTION HYSTERECTOMY

- For GRADE evaluation of interventions for Menorrhagia, see table, p 47 .
- We found no direct evidence from RCTs comparing hysterectomy with no treatment, oral medical treatments, or dilatation and curettage.
- Hysterectomy may reduce anaemia and blood loss at 2 years compared with intrauterine progestogens, but this is based on weak evidence.
- Hysterectomy reduces blood loss and the need for further surgery compared with endometrial destruction, but it may lead to more complications.
- Fewer women reported overall treatment dissatisfaction with hysterectomy compared with endometrial destruction.

Benefits and harms

Hysterectomy versus no treatment:

We found no systematic review or RCTs.

Hysterectomy versus oral medical treatments (non-steriodal anti-inflammatory drugs, tranexamic acid, combined oral contraceptive, oral progestogens):

We found no systematic review or RCTs.

Hysterectomy versus dilatation and curettage:

We found no systematic review or RCTs.

Hysterectomy versus intrauterine progestogens:

We found three systematic reviews (search dates 2005; [18] 2009; [19] and 2010 [20]). All three reviews identified the same RCT comparing hysterectomy with a progestogen-releasing IUD. We found one further follow-up report of this RCT (see Comment, p 4), [21] and we found one subsequent RCT. [22]

Menstrual blood loss

Hysterectomy compared with intrauterine progestogens Progesterone-releasing IUD may be more effective than hysterectomy at reducing menstrual blood loss (measured by Pictorial Blood Loss Assessment Chart [PBAC]) at 3 months, but may be less effective than hysterectomy at 6 and 24 months. However, the clinical importance of differences at some time points is unclear (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Menstrual blood loss					
[22] RCT	72 women with heavy menstrual bleeding unresponsive to medical treatment	**Mean Pictorial Blood Loss Assessment Chart (PBAC) score (0 = amenorrhea, 0–50 = spotting, 50–100 = normal, and >100 = heavy) , 3 months** 37.0 with progestogen-releasing IUD 52.9 with laparoscopic supracervical hysterectomy	P = 0.004	○○○	progestogen-releasing IUD
[22] RCT	72 women with heavy menstrual bleeding unresponsive to medical treatment	**Mean PBAC score , 6 months** 50.4 with progestogen-releasing IUD 19.7 with laparoscopic supracervical hysterectomy	Reported as P = 0.000	○○○	hysterectomy
[22] RCT	72 women with heavy menstrual bleeding unresponsive to medical treatment	**Mean PBAC score , 12 months** 3.5 with progestogen-releasing IUD 3.7 with laparoscopic supracervical hysterectomy	Reported as not significant P value not provided	⟷	Not significant
[22] RCT	72 women with heavy menstrual bleeding unresponsive to medical treatment	**Mean PBAC score , 24 months** 56.4 with progestogen-releasing IUD 3.74 with laparoscopic supracervical hysterectomy	Reported as P = 0.000	○○○	hysterectomy

No data from the following reference on this outcome. [18] [19] [20] [21]

Anaemia

Hysterectomy compared with intrauterine progestogens Hysterectomy may be more effective than progestogen-releasing IUDs at increasing haemoglobin levels at up to 2 years, although we don't know whether it is more effective at 5 and 10 years follow-up (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Anaemia					
[18] Systematic review	228 women with menorrhagia, total number of women randomised not reported Data from 1 RCT	**Haemoglobin levels , 12 months** with progestogen-releasing IUD (levonorgestrel) with hysterectomy Absolute results not reported	MD 3 units 95% CI 0.1 units to 5.9 units Review reported that it was unclear whether this difference was clinically significant At 12 months, the levonorgestrel IUD was in place in 68% of the	○○○	hysterectomy

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
			women, and 20% had undergone hysterectomy		
[21] RCT	236 women	**Haemoglobin levels (g/mL) , 5-year follow-up** 137.9 with levonorgestrel IUD 134.5 with hysterectomy 221 women in analysis	Reported as 'no difference' between study groups P value not reported At 10 years, the levonorgestrel IUD was in place in 37% of women, and 46% had undergone hysterectomy		
[21] RCT	236 women	**Haemoglobin levels (g/mL) , 10-year follow-up** 140.4 with levonorgestrel IUD 137.8 with hysterectomy 221 women in analysis	Reported as 'no difference' between study groups P value not reported At 10 years, the levonorgestrel IUD was in place in 37% of women, and 46% had undergone hysterectomy		
[22] RCT	72 women with heavy menstrual bleeding unresponsive to medical treatment	**Haemoglobin levels (g/dL) , 24 months** 14.1 with progestogen-releasing IUD 14.9 with laparoscopic supracervical hysterectomy	Reported as significant difference between groups P value not provided The RCT also found a significant difference between groups in favour of hysterectomy at 3, 6, and 12 months	○○○	hysterectomy

No data from the following reference on this outcome. [19] [20]

Patient satisfaction

Hysterectomy compared with intrauterine progestogens Progestogen-releasing IUDs and hysterectomy seem to be equally effective at improving patient satisfaction (moderate-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Patient satisfaction					
[18] Systematic review	Women with menorrhagia, total number of women randomised not reported Data from 1 RCT	**Proportion of women expressing satisfaction** 110/117 (94%) with progestogen-releasing IUD (levonorgestrel) 107/115 (93%) with hysterectomy 232 women in this analysis Patient satisfaction was reported as high in both groups At 12 months, the levonorgestrel IUD was in place in 68% of the women, and 20% had undergone hysterectomy	OR 1.17 95% CI 0.41 to 3.34	⟷	Not significant

No data from the following reference on this outcome. [19] [20] [21] [22]

Quality of life

Hysterectomy compared with intrauterine progestogens We don't know whether progestogen-releasing IUDs and hysterectomy differ in effectiveness at improving quality-of-life scores (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Quality of life					
[18] Systematic review	Women with menorrhagia, total number of women randomised not reported Data from 1 RCT	**Health-related quality-of-life scores , 1 year** with progestogen-releasing IUD (levonorgestrel) with hysterectomy Absolute results not reported The review reported that health-related quality of life had improved in both groups, and that there were no significant differences in outcome measures between the groups at 12 months, except for pain, which was significantly higher in the levonorgestrel IUD group (P = 0.01); no further data reported At 12 months, the levonorgestrel IUD was in place in 68% of the women, and 20% had undergone hysterectomy	Reported as not significant	⟷	Not significant
[21] RCT	236 women	**Change from baseline to 10-year follow-up in EQ-5D** –1.10 with levonorgestrel IUD –0.01 with hysterectomy 221 women in this analysis At 10 years, the levonorgestrel IUD was in place in 37% of women, and 46% had undergone hysterectomy	P = 0.94	⟷	Not significant
[21] RCT	236 women	**Change from baseline to 10-year follow-up in RAND-36 General health** –2.3 with levonorgestrel IUD –4.5 with hysterectomy 221 women in analysis At 10 years, the levonorgestrel IUD was in place in 37% of women, and 46% had undergone hysterectomy	P = 0.39 The RCT also tested 7 other individual items of the RAND-36 scale and there was no significant difference between groups	⟷	Not significant
[21] RCT	236 women	**Change from baseline to 10-year follow-up in general health (visual analogue scale [VAS] 0–100)** –4.4 with levonorgestrel IUD –7.4 with hysterectomy At 10 years, the levonorgestrel IUD was in place in 37% of women, and 46% had undergone hysterectomy	P = 0.32	⟷	Not significant
[22] RCT	72 women with heavy menstrual bleeding unresponsive to medical treatment	**SF-36 General health , 24 months** 87.4 with progestogen-releasing IUD 88.2 with laparoscopic supracervical hysterectomy	P = 0.115	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
[22] RCT	72 women with heavy menstrual bleeding unresponsive to medical treatment	**SF-36 Physical functioning , 24 months** 85.3 with progestogen-releasing IUD 90.3 with laparoscopic supracervical hysterectomy	P = 0.350	⟷	Not significant
[22] RCT	72 women with heavy menstrual bleeding unresponsive to medical treatment	**SF-36 Role function emotional , 24 months** 83.5 with progestogen-releasing IUD 67.4 with laparoscopic supracervical hysterectomy	Reported as P = 0.000	○○○	progestogen-releasing IUD
[22] RCT	72 women with heavy menstrual bleeding unresponsive to medical treatment	**SF-36 Mental health , 24 months** 85.3 with progestogen-releasing IUD 48.5 with laparoscopic supracervical hysterectomy	Reported as P = 0.000	○○○	progestogen-releasing IUD
[22] RCT	72 women with heavy menstrual bleeding unresponsive to medical treatment	**SF-36 Social functioning , 24 months** 89.4 with progestogen-releasing IUD 87.6 with laparoscopic supracervical hysterectomy	P = 0.125	⟷	Not significant
[22] RCT	72 women with heavy menstrual bleeding unresponsive to medical treatment	**SF-36 Vitality , 24 months** 78.8 with progestogen-releasing IUD 73.2 with laparoscopic supracervical hysterectomy	P = 0.570	⟷	Not significant

No data from the following reference on this outcome. [19] [20]

Need for re-treatment

No data from the following reference on this outcome. [18] [19] [20] [21] [22]

Intraoperative and postoperative complications

No data from the following reference on this outcome. [18] [19] [20] [21] [22]

Postoperative recovery

No data from the following reference on this outcome. [18] [19] [20] [21] [22]

Adverse effects

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Adverse effects					
[18] Systematic review	Women with menorrhagia, total number of women randomised not reported Data from 1 RCT	**Adverse effects** with progestogen-releasing IUD (levonorgestrel) with hysterectomy Absolute results not reported Adverse effects with progestogen-releasing IUD included: failure of insertion, intermenstrual bleeding, hormonal symptoms, and expulsion Adverse effects with hysterectomy included: bladder and bowel perforation, vesicovaginal fistula, urinary retention, intestinal obstruction, postoperative bleeding, severe postoperative pain, peritonitis, fever, wound infection, wound rupture, and infected pelvic haematoma			
[18] Systematic review	Women with menorrhagia, total number of women randomised not reported Data from 1 RCT	**Proportion of women developing ovarian cysts , 6 months** 17/97 (18%) with progestogen-releasing IUD (levonorgestrel) 3/101 (3%) with hysterectomy 198 women in this analysis	OR 4.93 95% CI 1.96 to 12.39 P = 0.0007	●●○	hysterectomy
[18] Systematic review	Women with menorrhagia, total number of women randomised not reported Data from 1 RCT	**Proportion of women developing ovarian cysts , 12 months** 17/79 (22%) with progestogen-releasing IUD (levonorgestrel) 8/101 (8%) with hysterectomy 180 women in this analysis	OR 3.10 95% CI 1.33 to 7.24 P = 0.009	●●○	hysterectomy

No data from the following reference on this outcome. [19] [20] [21] [22]

Hysterectomy versus endometrial destruction (resection or ablation):

We found two systematic reviews. [23] [24] The first review (search date 2013, 1260 women) [23] included eight RCTs. The second review (search date 2010, 1127 women) [24] included seven RCTs, all of which were included in the first review. The second review performed a meta-analysis with independent patient data from six RCTs. [24] The first review included women of reproductive years with both heavy regular periods (menorrhagia) and heavy irregular periods (metrorrhagia), and compared endometrial resection and ablation (including first- and second-generation techniques) with hysterectomy (by abdominal, vaginal, and laparoscopic or laparoscopic-assisted routes). [23] It reported that participants were eligible for (i.e., had shown no response to medical treatment) or were awaiting hysterectomy.

Menstrual blood loss

Hysterectomy compared with endometrial destruction Hysterectomy seems more effective than endometrial resection/ablation at improving the proportion of women with improvement in bleeding symptoms and objective menstrual bleeding (as measured by PBAC scores) at 1 to 4 years in women with menorrhagia (moderate-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Menstrual blood loss					
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 4 RCTs in this analysis	**Proportion with improvement in bleeding symptoms (women's perception) , up to 1 year** 285/327 (87%) with endometrial resection/ablation 323/326 (98%) with hysterectomy	RR 0.89 95% CI 0.85 to 0.93 P <0.00001	●○○	hysterectomy
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 2 RCTs in this analysis	**Proportion with improvement in bleeding symptoms (women's perception) , 2 years** 124/141 (88%) with endometrial resection/ablation 145/151 (96%) with hysterectomy	RR 0.92 95% CI 0.86 to 0.99 P = 0.017	●○○	hysterectomy
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 2 RCTs in this analysis	**Proportion with improvement in bleeding symptoms (women's perception) , 4 years** 111/120 (93%) with endometrial resection/ablation 116/117 (99%) with hysterectomy	RR 0.93 95% CI 0.88 to 0.99 P = 0.014 Significant heterogeneity: I^2 = 79%, P = 0.03 See Further information on studies	●○○	hysterectomy
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding Data from 1 RCT	**Mean Pictorial Blood Loss Assessment Chart (PBAC) score (0 = amenorrhea, 0–50 = spotting, 50–100 = normal, and >100 = heavy) , 1 year** 54.0 with endometrial resection/ablation 29.6 with hysterectomy 64 women in analysis	Mean difference 24.40 95% CI 16.01 to 32.79 P <0.00001	○○○	hysterectomy
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding Data from 1 RCT	**Mean PBAC score , 2 years** 73.5 with endometrial resection/ablation 29.5 with hysterectomy 64 women in analysis	Mean difference 44.00 95% CI 36.09 to 51.91 P <0.00001	○○○	hysterectomy

No data from the following reference on this outcome. [24]

Anaemia

No data from the following reference on this outcome. [23] [24]

Patient satisfaction

Hysterectomy compared with endometrial destruction Hysterectomy seems more effective than endometrial resection/ablation at improving satisfaction with treatment in women with menorrhagia, although results were inconsistent, and absolute levels of satisfaction were relatively high in both groups (moderate-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Patient satisfaction					
[24] Systematic review	Premenopausal women 5 RCTs in this analysis	**Proportion of women expressing overall dissatisfaction with treatment** 21/382 (5%) with hysterectomy 57/454 (13%) with endometrial ablation	OR 2.46 95% CI 1.54 to 3.9 P <0.001	●●○	hysterectomy
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 4 RCTs in this analysis	**Proportion very or moderately satisfied , 1-year follow-up** 319/406 (79%) with endometrial resection/ablation 273/333 (82%) with hysterectomy	RR 0.94 95% CI 0.88 to 1.00 P = 0.062	⟷	Not significant
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 4 RCTs in this analysis	**Proportion very or moderately satisfied , 2-year follow-up** 222/311 (71%) with endometrial resection/ablation 201/256 (79%) with hysterectomy	RR 0.87 95% CI 0.80 to 0.95 P = 0.0024	●○○	hysterectomy
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 2 RCTs in this analysis	**Proportion very or moderately satisfied , 4-year follow-up** 84/123 (68%) with endometrial resection/ablation 93/123 (76%) with hysterectomy	RR 0.89 95% CI 0.77 to 1.03 P = 0.12	⟷	Not significant

Quality of life

Hysterectomy compared with endometrial destruction We don't know whether hysterectomy and endometrial resection/ablation differ in effectiveness at improving quality-of-life scores in women with menorrhagia (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Quality of life					
[24] Systematic review	213 women Data from 1 RCT	**Change in EQ-5D** with hysterectomy with endometrial ablation Absolute results not reported	P = 0.6	⟷	Not significant
[24] Systematic review	181 women Data from 1 RCT	**Change in Short Form-36 (SF-36) General health , from baseline** with laparoscopic supracervical hysterectomy with endometrial resection Absolute results not reported	No direct comparison between groups P <0.01 for difference from baseline with either intervention		
[24] Systematic review	181 women Data from 1 RCT	**Change in SF-36 Social functioning , from baseline** with laparoscopic supracervical hysterectomy with endometrial destruction Absolute results not reported	No direct comparison between groups P <0.01 for difference from baseline with either intervention		
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding	**SF-36 Mental health , 1 year** with endometrial resection/ablation	Mean difference –1.53 95% CI –5.06 to+ 2.01 P = 0.40	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
	2 RCTs in this analysis	with hysterectomy Absolute results not reported 385 women in this analysis			
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 2 RCTs in this analysis	**SF-36 Energy , 1 year** with endometrial resection/ablation with hysterectomy Absolute results not reported 211 women in this analysis	Mean difference –10.99 95% CI –14.45 to –7.53 P <0.00001	○○○	hysterectomy
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 2 RCTs in this analysis	**SF-36 Pain , 1 year** with endometrial resection/ablation with hysterectomy Absolute results not reported 391 women in this analysis	Mean difference –1.91 95% CI –5.67 to +1.86 P = 0.32	⟷	Not significant
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 2 RCTs in this analysis	**SF-36 General health perception , 1 year** with endometrial resection/ablation with hysterectomy Absolute results not reported 385 women in this analysis	Mean difference –7.27 95% CI –10.72 to –3.81 P = 0.000037	○○○	hysterectomy
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 3 RCTs in this analysis	**SF-36 Role limitation (physical) , 2 years** with endometrial resection/ablation with hysterectomy Absolute results not reported 300 women in this analysis	Mean difference –3.09 95% CI –7.94 to +1.76 P = 0.21	⟷	Not significant
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding	**SF-36 Role limitation (emotional) , 2 years** with endometrial resection/ablation with hysterectomy Absolute results not reported 300 women in this analysis	Mean difference 10.22 95% CI 5.48 to 14.96 P = 0.000024	○○○	endometrial resection/ablation
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 3 RCTs in this analysis	**SF-36 Social functioning , 2 years** with endometrial resection/ablation with hysterectomy Absolute results not reported 300 women in this analysis	Mean difference –10.06 95% CI –13.55 to –6.58 P <0.00001	○○○	hysterectomy
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 4 RCTs in this analysis	**SF-36 Mental health , 2 years** with endometrial resection/ablation with hysterectomy Absolute results not reported 509 women in this analysis	Mean difference +2.39 95% CI –0.61 to +5.40 P = 0.12	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 4 RCTs in this analysis	**SF-36 Energy , 2 years** with endometrial resection/ablation with hysterectomy Absolute results not reported 513 women in this analysis	Mean difference –2.01 95% CI –5.41 to +1.40 P = 0.25	⟷	Not significant
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 4 RCTs in this analysis	**SF-36 Pain , 2 years** with endometrial resection/ablation with hysterectomy Absolute results not reported 513 women in this analysis	Mean difference –9.50 95% CI –12.80 to –6.21 P <0.00001	○○○	hysterectomy
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 4 RCTs in this analysis	**SF-36 General health perception , 2 years** with endometrial resection/ablation with hysterectomy Absolute results not reported 509 women in this analysis	Mean difference –7.42 95% CI –10.64 to –4.20 P <0.00001	○○○	hysterectomy
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 3 RCTs in this analysis	**SF-36 Physical functioning , 2 years** with endometrial resection/ablation with hysterectomy Absolute results not reported 300 women in this analysis	Mean difference –9.29 95% CI –12.80 to –5.78 P <0.00001	○○○	hysterectomy
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 2 RCTs in this analysis	**EQ-5D score , within 1 year after surgery** with endometrial resection/ablation with hysterectomy Absolute results not reported 347 women in this analysis	Mean difference –3.24 95% CI –8.35 to +1.88 P = 0.21	⟷	Not significant
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 2 RCTs in this analysis	**EQ-5D score , 2 years after surgery** with endometrial resection/ablation with hysterectomy Absolute results not reported 368 women in this analysis	Mean difference –1.96 95% CI –5.60 to +1.67 P = 0.29	⟷	Not significant
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 2 RCTs in this analysis	**Anxiety, Hospital Anxiety and Depression (HAD) scores , 2 and 4 years after surgery** with endometrial resection/ablation with hysterectomy Absolute results not reported 259 women in this analysis	Mean difference –0.67 95% CI –1.64 to +0.30 P = 0.18	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 2 RCTs in this analysis	**Depression, HAD scores , 2 and 4 years after surgery** with endometrial resection/ablation with hysterectomy Absolute results not reported 259 women in this analysis	Mean difference 0.00 95% CI –0.10 to +0.09 P = 0.97	⟷	Not significant
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding Data from 1 RCT	**Proportion with improvement in general health , 1 year after surgery** 78/96 (81%) with endometrial resection/ablation 85/89 (96%) with hysterectomy	RR 4.17 95% CI 1.47 to 11.85 P = 0.0073	●●○	hysterectomy
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding Data from 1 RCT	**Proportion with improvement in general health , 4 years after surgery** 64/76 (84%) with endometrial resection/ablation 66/70 (94%) with hysterectomy	RR 2.76 95% CI 0.93 to 8.17 P = 0.066	⟷	Not significant

Need for re-treatment

Hysterectomy compared with endometrial destruction Hysterectomy is more effective than endometrial resection/ablation at reducing the need for further surgery at up to 4 years in women with menorrhagia (high-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Need for further surgery					
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 6 RCTs in this analysis	**Requirement for further surgery , within first year** 59/475 (12%) with endometrial resection/ablation 1/412 (<1%) with hysterectomy	RR 14.9 95% CI 5.2 to 42.6 P <0.00001	●●●	hysterectomy
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 6 RCTs in this analysis	**Requirement for further surgery , 2 years** 93/489 (19%) with endometrial resection/ablation 2/441 (<1%) with hysterectomy	RR 23.4 95% CI 8.3 to 65.8 P <0.00001	●●●	hysterectomy
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding Data from 1 RCT	**Requirement for further surgery , 3 years** 23/116 (20%) with endometrial resection/ablation 1/56 (2%) with hysterectomy	RR 11.1 95% CI 1.54 to 80.14 P = 0.02	●●●	hysterectomy
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding Data from 1 RCT	**Requirement for further surgery , 4 years** 39/102 (38%) with endometrial resection/ablation 1/95 (1%) with hysterectomy	RR 36.32 95% CI 5.09 to 259.21 P = 0.0003	●●●	hysterectomy

No data from the following reference on this outcome. [24]

Intraoperative and postoperative complications

Hysterectomy compared with endometrial destruction Hysterectomy seems to be associated with a higher risk of sepsis, blood transfusion, pyrexia, vault and wound haematoma, and pain when compared with endometrial resection/ablation in women with menorrhagia, but also seems to be associated with a lower risk of fluid overload (moderate-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Complications of surgery – adverse events short-term (intraoperative and immediate postoperative)					
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 4 RCTs in this analysis	**Sepsis** 18/345 (5%) with endometrial resection/ablation 88/276 (32%) with hysterectomy	RR 0.19 95% CI 0.12 to 0.31 P <0.00001	●●●	endometrial resection/ablation
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 3 RCTs in this analysis	**Haemorrhage** 10/310 (3%) with endometrial resection/ablation 13/245 (5%) with hysterectomy	RR 0.69 95% CI 0.32 to 1.46 P = 0.33	⟷	Not significant
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 4 RCTs in this analysis	**Blood transfusion** 3/409 (1%) with endometrial resection/ablation 16/342 (5%) with hysterectomy	RR 0.20 95% CI 0.07 to 0.59 P = 0.0032	●●●	endometrial resection/ablation
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 3 RCTs in this analysis	**Pyrexia** 9/298 (3%) with endometrial resection/ablation 53/307 (17%) with hysterectomy	RR 0.17 95% CI 0.09 to 0.35 P <0.00001	●●●	endometrial resection/ablation
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 5 RCTs in this analysis	**Vault haematoma** 2/428 (1%) with endometrial resection/ablation 29/430 (7%) with hysterectomy	RR 0.11 95% CI 0.04 to 0.34 P = 0.000099	●●●	endometrial resection/ablation
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding Data from 1 RCT	**Wound haematoma** 0/105 (0%) with endometrial resection/ablation 14/97 (14%) with hysterectomy	RR 0.03 95% CI 0.00 to 0.53 P = 0.016	●●●	endometrial resection/ablation
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding Data from 1 RCT	**Anaesthetic (not further defined)** 0/105 (0%) with endometrial resection/ablation 2/97 (2%) with hysterectomy	RR 0.18 95% CI 0.01 to 3.80 P = 0.27	⟷	Not significant
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 3 RCTs in this analysis	**Fluid overload** 18/304 (6%) with endometrial resection/ablation 1/307 (1%) with hysterectomy	RR 9.27 95% CI 2.17 to 39.64 P = 0.0027	●●●	hysterectomy
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding	**Perforation** 4/215 (2%) with endometrial resection/ablation 0/215 (0%) with hysterectomy	RR 5.05 95% CI 0.61 to 42.16 P = 0.13	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
	2 RCTs in this analysis				
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding Data from 1 RCT	**Gastrointestinal obstruction/ileus** 1/105 (1%) with endometrial resection/ablation 2/97 (2%) with hysterectomy	RR 0.46 95% CI 0.04 to 5.01 P = 0.53	⟷	Not significant
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 2 RCTs in this analysis	**Laparotomy** 2/194 (1%) with endometrial resection/ablation 5/189 (3%) with hysterectomy	RR 0.39 95% CI 0.08 to 1.97 P = 0.25	⟷	Not significant
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding Data from 1 RCT	**Cystotomy** 0/110 (0%) with endometrial resection/ablation 2/118 (2%) with hysterectomy	RR 0.21 95% CI 0.01 to 4.42 P = 0.32	⟷	Not significant
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 2 RCTs in this analysis	**Cervical laceration** 2/199 (1%) with endometrial resection/ablation 0/210 (0%) with hysterectomy	RR 3.16 95% CI 0.33 to 30.10 P = 0.32	⟷	Not significant
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding Data from 1 RCT	**Cardiorespiratory event** 0/110 (0%) with endometrial resection/ablation 3/118 (3%) with hysterectomy	RR 0.15 95% CI 0.01 to 2.93 P = 0.21	⟷	Not significant
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding Data from 1 RCT	**Thromboembolic event** 0/110 (0%) with endometrial resection/ablation 2/118 (2%) with hysterectomy	RR 0.21 95% CI 0.01 to 4.42 P = 0.32	⟷	Not significant
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding Data from 1 RCT	**Re-admission/return to surgery** 0/110 (0%) with endometrial resection/ablation 3/118 (3%) with hysterectomy	RR 0.15 95% CI 0.01 to 2.93 P = 0.21	⟷	Not significant
Pain					
[24] Systematic review	Premenopausal women 2 RCTs in this analysis	**Surgery pain score** with hysterectomy with endometrial ablation Absolute results not reported 367 women included in this analysis	MD 2.5 95% CI 2.2 to 2.9 P <0.0001	○○○	endometrial ablation

Postoperative recovery

Hysterectomy compared with endometrial destruction Endometrial ablation/resection may be more effective than hysterectomy at reducing the duration of hospital stay, the time to return to normal activity, and the time to return to work in women with menorrhagia (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Duration of hospital stay					
[24] Systematic review	Premenopausal women 7 RCTs in this analysis	**Duration of hospital stay (days)** with hysterectomy with endometrial destruction Absolute results not reported 1066 women included in this analysis	MD 3 days 95% CI 2.9 days to 3.1 days P <0.0001	○○○	endometrial destruction
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 7 RCTs in this analysis	**Duration of hospital stay (days)** with hysterectomy with endometrial resection/ablation Absolute results not reported 1115 women included in this analysis	The review noted that duration of hospital stay was significantly shorter with endometrial resection/ablation compared with hysterectomy in 7 out of 7 RCTs, but did not combine data due to heterogeneity (see Further information on studies)		
Return to work/normal activity					
[24] Systematic review	Premenopausal women 6 RCTs in this analysis	**Return to work (days)** with hysterectomy with endometrial destruction Absolute results not reported 725 women included in this analysis	MD 14 days 95% CI 13 days to 16 days P <0.0001	○○○	endometrial destruction
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 4 RCTs in this analysis	**Time to return to normal activity** with hysterectomy with endometrial resection/ablation Absolute results not reported 632 women included in this analysis	The review noted that time to return to normal activity was significantly shorter with endometrial resection/ablation compared with hysterectomy in 4 out of 4 RCTs, but did not combine data due to heterogeneity (see Further information on studies)		
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 5 RCTs in this analysis	**Time to return to work** with hysterectomy with endometrial resection/ablation Absolute results not reported 683 women included in this analysis	The review noted that time to return to work was significantly shorter with endometrial resection/ablation compared with hysterectomy in 4 out of 5 RCTs, but did not combine data due to heterogeneity (see Further information on studies)		

Adverse effects

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Adverse effects after hospital discharge					
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding Data from 1 RCT	**Sepsis** 9/116 (8%) with endometrial resection/ablation 16/56 (29%) with hysterectomy	RR 0.27 95% CI 0.13 to 0.58 P = 0.00068	●●○	endometrial resection/ ablation

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding 2 RCTs in this analysis	**Haematoma** 4/215 (2%) with endometrial resection/ablation 4/153 (3%) with hysterectomy	RR 0.59 95% CI 0.15 to 2.37 P = 0.46	⟷	Not significant
[23] Systematic review	Women of reproductive years with heavy menstrual bleeding Data from 1 RCT	**Haemorrhage** 1/99 (1%) with endometrial resection/ablation 0/97 (0%) with hysterectomy	RR 2.94 95% CI 0.12 to 71.30 P = 0.51	⟷	Not significant

No data from the following reference on this outcome. [24]

Further information on studies

[23] The review noted that in five RCTs women had menorrhagia, while in two RCTs participants had a diagnosis of dysfunctional uterine bleeding. Exclusion criteria included large fibroids, and three RCTs also excluded participants with submucosal fibroids. The available data mostly compared first-generation techniques (predominantly transcervical resection of the endometrium [TCRE]) with total hysterectomy, although a wide variety of procedures were used. The review performed a sensitivity analysis of results when statistical heterogeneity occurred. Of the eight included RCTs, three RCTs did not describe how randomisation was undertaken, five RCTs did not seem to have any blinding of participants, investigators, or assessors, and two RCTs did not provide details of allocation concealment.

[23] The review noted that a high level of heterogeneity was present for some outcomes, such as time to return to work (I^2 = 100%) and time to return to normal activities (I^2 = 100%). It noted that this may be explained, in part, by differences in operative interventions. Two RCTs included abdominal hysterectomies only, one RCT included vaginal hysterectomy only, and two RCTs included laparoscopic hysterectomy only — the remaining RCTs were mixed. It performed a sensitivity analysis. Compared with TCRE/ablation, mean differences (MD) in hospital stay were significantly longer for abdominal and vaginal hysterectomy (MD 4.9 days, 95% CI 3.2 days to 6.5 days; and MD 4.3 days, 95% CI 4.1 days to 4.4 days, respectively), and only just significant for laparoscopic hysterectomy (MD 0.3 days, 95% CI 0.7 days to 0.1 days). Similarly, in time to return to normal activities, when compared with TCRE/ablation, the greatest difference was with abdominal hysterectomy (MD 21 days, 95% CI 17.2 days to 24.8 days), and less so with vaginal hysterectomy (MD 5 days, 95% CI 2.7 days to 7.3 days) and laparoscopic hysterectomy (MD 1.5 days, 95% CI 0.1 days to 3.1 days). It noted that the mode of hysterectomy did not change the estimates of comparisons for bleeding outcomes, but it did affect some aspects of the surgical safety/adverse effects outcomes.

[22] This RCT assessed supracervical hysterectomy (i.e., it leaves the cervix behind), which is known to be associated with some menstrual bleeding. This finding cannot be extrapolated to total hysterectomies (whether vaginal, abdominal, or laparoscopic), where there should be no bleeding once the stitch line at the top of the vagina has healed.

Comment: One large population-based analysis stratified by age found that mortality after hysterectomy for non-malignant conditions is about 1/2000 in women aged younger than 50 years. [25]

Clinical guide
None of the included systematic review or RCTs separate out whether ovaries were removed or conserved at the time of hysterectomy, and this may have an effect on patient satisfaction and some of the postoperative emotional and functional outcomes.

OPTION ENDOMETRIAL DESTRUCTION (RESECTION OR ABLATION)

- For GRADE evaluation of interventions for Menorrhagia, see table, p 47 .

- Endometrial destruction is more effective at reducing menorrhagia compared with oral medical treatment, but complications can include infection, haemorrhage, and uterine perforation.
- We don't know whether endometrial destruction is more effective than intrauterine progestogens.
- Bipolar radiofrequency ablation seems to be effective at reducing blood loss and need for future surgery, and increasing patient satisfaction compared with hydrothermal ablation (both second-generation techniques), but we don't know whether any one other type of endometrial destruction technique is superior to another.

Benefits and harms

Endometrial destruction (resection or ablation) versus no treatment:

We found no systematic review or RCTs.

Endometrial destruction (resection or ablation) versus dilatation and curettage:

We found no systematic review or RCTs.

Endometrial destruction (resection or ablation) versus intrauterine progestogens:

We found three systematic reviews (search dates 2005; [18] 2009; [19] and 2010 [20]). The first systematic review identified five RCTs comparing transcervical endometrial resection (2 RCTs) or thermal balloon ablation (3 RCTs) with a progestogen-releasing IUD. [18] The second review included the same five RCTs but also identified a further study, published in 2006, which compared endometrial resection with a progestogen-releasing IUD. [19] The third systematic review identified nine RCTs comparing transcervical endometrial resection (3 RCTs) or thermal balloon ablation (6 RCTs) with a progestogen-releasing IUD, and included all the RCTs that were included in the two earlier systematic reviews. [20] However, as all the reviews used slightly different outcomes, we have reported them all here. We also found one 5-year follow-up report of an RCT included in the reviews, which reported on hysterectomy rates, [26] and we found one subsequent RCT that compared transcervical endometrial resection with a levonorgestrel IUD. [27]

Menstrual blood loss

Endometrial destruction (resection or ablation) compared with intrauterine progestogens We don't know how intrauterine progestogens and endometrial destruction compare at reducing menstrual blood loss (as measured by Pictorial Blood Loss Assessment and blood flow, or amenorrhoea) (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Pictorial Blood Loss Assessment Chart (PBAC)					
[18] Systematic review	Women with menorrhagia 3 RCTs in this analysis	**Proportion of people with Pictorial Blood Loss Assessment (PBAC) score <75 , 12 months** 79/106 (75%) with progestogen-releasing IUD 96/104 (92%) with endometrial ablation	OR 0.28 95% CI 0.14 to 0.58	●●○	endometrial ablation
[20] Systematic review	Women with menorrhagia 5 RCTs in this analysis	**PBAC score <75 , 12 months** with progestogen-releasing IUD with endometrial destruction Absolute results not reported 281 women included in this analysis	RR 1.19 95% CI 1.07 to 1.32 NNT = 7 95% CI 5 to 19	●○○	endometrial destruction
[20] Systematic review	Women with menorrhagia 2 RCTs in this analysis	**Mean PBAC score , 12 months** with progestogen-releasing IUD with endometrial destruction Absolute results not reported	Mean difference 44.07 95% CI 33.01 to 55.12	○○○	endometrial destruction

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
		127 women included in this analysis			
[19] Systematic review	Women with menorrhagia 5 RCTs in this analysis	**Mean PBAC score , 12 months** with progestogen-releasing IUD with endometrial ablation Absolute results not reported	MD +7.45 95% CI –12.37 to +27.26	⟷	Not significant
[27] RCT	104 women with menorrhagia	**PBAC score , 6 months** 70.65 with transcervical resection of the endometrium 60.38 with progestogen-releasing IUD (levonorgestrel)	Reported as "statistically similar" P value not reported Baseline differences between groups (see Further information on studies)	⟷	Not significant
[27] RCT	104 women with menorrhagia	**Difference in bleeding score (not further defined) , 1 year** 560.2 with transcervical resection of the endometrium 526.8 with progestogen-releasing IUD (levonorgestrel) 92 women in this analysis	P = 0.335 Baseline differences between groups (see Further information on studies)	⟷	Not significant
Amenorrhoea					
[18] Systematic review	Women with menorrhagia 4 RCTs in this analysis	**Amenorrhoea , up to 12 months** 15/109 (14%) with progestogen-releasing IUD 20/114 (18%) with endometrial ablation	OR 0.75 95% CI 0.36 to 1.54 P = 0.43 Significant heterogeneity: I^2 = 69%, P = 0.02 See Further information on studies	⟷	Not significant
[20] Systematic review	Women with menorrhagia 4 RCTs in this analysis	**Amenorrhoea , 12 months** with progestogen-releasing IUD with endometrial ablation Absolute results not reported 209 women included in this analysis	RR 1.27 95% CI 0.82 to 1.95	⟷	Not significant
[18] Systematic review	Women with menorrhagia 3 RCTs in this analysis	**Amenorrhoea , 24 months** with progestogen-releasing IUD with endometrial ablation Absolute results not reported 210 women included in this analysis	OR 1.3 95% CI 0.48 to 3.53	⟷	Not significant
[18] Systematic review	Women with menorrhagia 3 RCTs in this analysis	**Amenorrhoea , 36 months** with progestogen-releasing IUD with endometrial ablation Absolute results not reported 210 women included in this analysis	OR 0.6 95% CI 0.14 to 2.57	⟷	Not significant
[27] RCT	104 women with menorrhagia	**Amenorrhoea , 12 months** 21/47 (45%) with transcervical resection of the endometrium 5/45 (11%) with progestogen-releasing IUD (levonorgestrel)	P <0.0001 Baseline differences between groups (see Further information on studies)	○○○	endometrial resection

No data from the following reference on this outcome. [26]

Anaemia

Endometrial destruction (resection or ablation) compared with intrauterine progestogens Intrauterine progestogens may be less effective than endometrial destruction at reducing anaemia at 1 year compared with endometrial ablation. However, this is based on weak evidence (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Anaemia					
[20] Systematic review	33 women Data from 1 RCT	**Haemoglobin , 1 year** with progestogen-releasing IUD with endometrial ablation Absolute results not reported	Mean difference: 2.30 95% CI 0.97 to 3.63	●●○	endometrial ablation

No data from the following reference on this outcome. [18] [19] [26] [27]

Patient satisfaction

Endometrial destruction (resection or ablation) compared with intrauterine progestogens We don't know whether intrauterine progestogens and endometrial destruction differ in effectiveness at improving patient satisfaction (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Patient satisfaction					
[18] Systematic review	Women with menorrhagia 2 RCTs in this analysis	**Proportion of women satisfied with treatment** 51/66 (77%) with progestogen-releasing IUD 59/70 (84%) with endometrial destruction	OR 0.61 95% CI 0.26 to 1.46	⟷	Not significant
[20] Systematic review	Women with menorrhagia Data from 1 RCT	**Patient satisfaction , 6 months** 18/33 (55%) with progestogen-releasing IUD 23/30 (77%) with endometrial ablation	RR 1.41 95% CI 0.97 to 2.03 P = 0.07	⟷	Not significant
[20] Systematic review	Women with menorrhagia 4 RCTs in this analysis	**Patient satisfaction , 1 year** 102/138 (74%) with progestogen-releasing IUD 111/136 (82%) with endometrial ablation	RR 1.10 95% CI 0.97 to 1.24 P = 0.13	⟷	Not significant
[20] Systematic review	Women with menorrhagia 2 RCTs in this analysis	**Patient satisfaction , 2 years** 54/70 (77%) with progestogen-releasing IUD 48/61 (79%) with endometrial ablation	RR 1.03 95% CI 0.85 to 1.23 P = 0.79	⟷	Not significant
[26] RCT	58 women	**Proportion of people who answered 'definitely agree' or 'somewhat agree' to the statement 'I feel much better after treatment' , at 5 years follow-up** 100% with progestogen-releasing IUD	P = 0.009	○○○	progestogen-releasing IUD

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
		72% with thermal balloon ablation Absolute numbers not reported 52 women in this analysis			
[27] RCT	104 women with menorrhagia	**Mean satisfaction score (scale 1–5, whereby the higher score is 'most satisfied') , 1 year** 3.1 with transcervical resection of the endometrium 2.5 with progestogen-releasing IUD (levonorgestrel) 92 women in this analysis	P = 0.43 Baseline differences between groups (see Further information on studies)	⟷	Not significant

No data from the following reference on this outcome. [19]

Quality of life

Endometrial destruction (resection or ablation) compared with intrauterine progestogens We don't know whether intrauterine progestogens are more effective than endometrial ablation at improving quality of life (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Quality of life					
[19] Systematic review	Women with menorrhagia 3 RCTs in this analysis	**Overall scores or individual dimensions of the Short Form-36 (SF-36)** with progestogen-releasing IUD with endometrial ablation Absolute results not reported <210 women included in this analysis	Reported as not significant P value not reported	⟷	Not significant
[20] Systematic review	Women with menorrhagia 2 RCTs in this analysis	**SF-36 score (Mental health) , 1 year** with progestogen-releasing IUD with endometrial ablation Absolute results not reported 81 women included in this analysis	Mean difference 6.60 95% CI 0.55 to 12.65	○○○	endometrial ablation
[20] Systematic review	Women with menorrhagia 2 RCTs in this analysis	**SF-36 score (Vitality) , 1 year** with progestogen-releasing IUD with endometrial ablation Absolute results not reported 81 women included in this analysis	Mean difference +2.10 95% CI –3.89 to +8.10	⟷	Not significant
[20] Systematic review	Women with menorrhagia 2 RCTs in this analysis	**SF-36 score (Physical role limitation) , 1 year** with progestogen-releasing IUD with endometrial ablation Absolute results not reported 81 women included in this analysis	Mean difference +2.33 95% CI –5.65 to +10.31	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
[20] Systematic review	Women with menorrhagia 2 RCTs in this analysis	**SF-36 score (Emotional role limitation) , 1 year** with progestogen-releasing IUD with endometrial ablation Absolute results not reported 81 women included in this analysis	Mean difference 10.30 95% CI 2.15 to 18.46	○○○	endometrial ablation
[20] Systematic review	Women with menorrhagia 2 RCTs in this analysis	**SF-36 score (Social functioning) , 1 year** with progestogen-releasing IUD with endometrial ablation Absolute results not reported 81 women included in this analysis	Mean difference +4.48 95% CI –2.13 to +11.08	⟷	Not significant
[20] Systematic review	Women with menorrhagia Data from 1 RCT	**SF-36 score (General health) , 2 years** with progestogen-releasing IUD with endometrial ablation Absolute results not reported 79 women included in this analysis	Mean difference –2.60 95% CI –11.18 to +5.98	⟷	Not significant

No data from the following reference on this outcome. [18] [26] [27]

Need for re-treatment

Endometrial destruction (resection or ablation) compared with intrauterine progestogens Intrauterine progestogens and endometrial ablation seem to lead to equivalent need for further intervention because of menorrhagia (moderate-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Need for further intervention owing to menstrual blood loss					
[18] Systematic review	Women with menorrhagia 2 RCTs in this analysis	**Proportion of people needing further surgical treatment for heavy bleeding** 9/55 (16%) with progestogen-releasing IUD 7/55 (13%) with endometrial ablation	OR 1.33 95% CI 0.47 to 3.81	⟷	Not significant
[20] Systematic review	58 women Data from 1 RCT	**Treatment failure , 1 year** 1/30 (3%) with progestogen-releasing IUD 3/28 (11%) with endometrial ablation	RR 3.21 95% CI 0.35 to 29.12 P = 0.30	⟷	Not significant
[20] Systematic review	Women with menorrhagia 2 RCTs in this analysis	**Treatment failure , 2 years** 19/73 (26%) with progestogen-releasing IUD 14/69 (20%) with endometrial ablation	RR 0.77 95% CI 0.42 to 1.42 P = 0.41	⟷	Not significant
[26] RCT	58 women	**Required hysterectomy , 5-year follow-up**	P = 0.039	○○○	progestogen-releasing IUD

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
		1/27 (4%) with progestogen-releasing IUD 6/25 (24%) with thermal balloon ablation			

No data from the following reference on this outcome. [19] [27]

Intraoperative and postoperative complications

No data from the following reference on this outcome. [18] [19] [20] [26] [27]

Postoperative recovery

No data from the following reference on this outcome. [18] [19] [20] [26] [27]

Adverse effects

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Adverse effects					
[20] Systematic review	Women with menorrhagia 3 RCTs in this analysis	**Proportion of women with adverse effects , 1 year** 54/100 (54%) with progestogen-releasing IUD 28/101 (28%) with endometrial ablation	RR 0.51 95% CI 0.36 to 0.74 P = 0.00035	●○○	endometrial ablation
[27] RCT	104 women with menorrhagia	**Adverse effects , 1 year** with progestogen-releasing IUD (levonorgestrel) with transcervical resection of the endometrium Absolute results not reported Adverse effects reported in the progestogen-releasing IUD group: 4 cramps and pains, 19 spotting, 10 breast tenderness, 9 headaches, 2 acne, 4 mood changes, 1 weight gain, and 1 ovarian cyst Adverse effects reported in the transcervical resection of the endometrium group: 1 uterine perforation, and 2 haematometra due to cervical stenosis, which were released by cervical dilation	Between-group analysis not performed		

No data from the following reference on this outcome. [19] [26]

Endometrial destruction (resection or ablation) versus oral medical treatments (NSAIDs, tranexamic acid, combined oral contraceptive, oral progestogens):

We found one systematic review (search date 2010, 1 RCT, 187 women) comparing endometrial resection (93 women) with oral drugs. [20] See Comment, p 18 for further information from observational studies on intraoperative complications associated with endometrial destruction.

Menstrual blood loss

Endometrial destruction (resection or ablation) compared with oral medical treatments Endometrial resection may be more effective than tranexamic acid, danazol, oral progestogens, or combined oral contraceptives at reducing blood loss at 4 months (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Mean menstrual blood loss					
[20] Systematic review	187 women Data from 1 RCT	**Proportion of women with reduction in menstrual blood loss , 4 months** 77/93 (83%) with endometrial resection 29/93 (31%) with oral drugs Oral drugs assessed were: tranexamic acid (22 women), danazol (15 women), combined oral contraceptives (24 women), oral progestogens (31 women), and HRT plus an NSAID (2 women)	RR 2.66 95% CI 1.94 to 3.64	●●○	endometrial resection
[20] Systematic review	187 women Data from 1 RCT	**Proportion of women with reduction in menstrual blood loss , 5 years** with endometrial resection with oral drugs Absolute results not reported By 5 years, 77% of the women randomised to medical treatment had received surgery	Reported as non-significant P value not reported	⟷	Not significant

Anaemia

No data from the following reference on this outcome. [20]

Patient satisfaction

No data from the following reference on this outcome. [20]

Quality of life

No data from the following reference on this outcome. [20]

Need for re-treatment

No data from the following reference on this outcome. [20]

Intraoperative and postoperative complications

No data from the following reference on this outcome. [20]

Postoperative recovery

No data from the following reference on this outcome. [20]

Adverse effects

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Adverse effects					
[20] Systematic review	187 women Data from 1 RCT	**Proportion of women with adverse effects , 4 months** 12/93 (13%) with endometrial resection 46/93 (49%) with oral drugs Oral drugs assessed were: tranexamic acid (22 women), danazol (15 women), combined oral contraceptives (24 women), oral progestogens (31 women), and HRT plus an NSAID (2 women)	RR 0.26 95% CI 0.15 to 0.46	●○○	endometrial resection

Endometrial destruction (resection or ablation) versus hysterectomy:

See option on Hysterectomy, p 4 .

First-generation versus second-generation techniques:

We found one systematic review (search date 2013), [28] which analysed first-generation endometrial destruction techniques (e.g., laser ablation, rollerball, transcervical endometrial resection, and vaporising electrode ablation) and second-generation endometrial destruction techniques (e.g., thermal uterine balloon therapy, multi-electrode balloon ablation, microwave endometrial ablation, NovaSure endometrial ablation, electrode ablation, and heated saline) in the treatment of regular heavy periods in women of reproductive years. As well as clinical outcomes, the review also reported on operative outcomes such as duration of operation (see Further information on studies).

Menstrual blood loss

First-generation compared with second-generation techniques First-generation and second-generation endometrial destruction techniques may be equally effective at increasing rates of amenorrhoea and reducing blood loss (measured by Pictorial Blood Loss Assessment Chart [PBAC]) (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Amenorrhoea					
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Amenorrhoea , 6-month follow-up** 26/30 (87%) with second generation 13/19 (68%) with first generation	RR 1.27 95% CI 0.91 to 1.77 P = 0.17	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods 12 RCTs in this analysis	**Amenorrhoea , 1-year follow-up** 459/1128 (41%) with second generation 322/857 (38%) with first generation	RR 0.94 95% CI 0.74 to 1.20 P = 0.61 Significant heterogeneity: I^2 = 74%, P = 0.00002 See Further information on studies	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods 3 RCTs in this analysis	**Amenorrhoea , 2-year follow-up** 143/393 (36%) with second generation 110/308 (36%) with first generation	RR 0.97 95% CI 0.72 to 1.30 P = 0.84	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods 4 RCTs in this analysis	**Amenorrhoea , 2–5 years follow-up** 194/368 (53%) with second generation 147/304 (48%) with first generation	RR 1.16 95% CI 0.78 to 1.72 P = 0.47 Significant heterogeneity: I^2 = 80%, P = 0.002 See Further information on studies	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Amenorrhoea , >5 years follow-up** 78/94 (83%) with second generation 84/95 (88%) with first generation	RR 0.94 95% CI 0.83 to 1.05 P = 0.29	⟷	Not significant
Reduction in menstrual blood flow					
[28] Systematic review	Premenopausal women with heavy periods 6 RCTs in this analysis	**Success of treatment (PBAC <75 or acceptable improvement) , 12-month follow-up** 682/819 (83%) with second generation 449/556 (81%) with first generation	RR 1.02 95% CI 0.97 to 1.08 P = 0.36	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Success of treatment (PBAC <75 or acceptable improvement) , 2–5 years follow-up** 95/116 (82%) with second generation 88/120 (73%) with first generation	RR 1.12 95% CI 0.97 to 1.28 P = 0.12	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Success of treatment (PBAC <75 or acceptable improvement) , >5 years follow-up** 75/129 (58%) with second generation 72/134 (54%) with first generation	RR 1.08 95% CI 0.87 to 1.34 P = 0.47	⟷	Not significant

Anaemia

No data from the following reference on this outcome. [28]

Patient satisfaction

First-generation compared with second-generation techniques First-generation and second-generation endometrial destruction techniques may be equally effective at increasing patient satisfaction rates at 6 months to 5 years (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Patient satisfaction					
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Satisfaction rate , 6-month follow-up** 30/30 (100%) with second generation 19/20 (95%) with first generation	RR 1.06 95% CI 0.93 to 1.20 P = 0.37	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods 11 RCTs in this analysis	**Satisfaction rate , 1-year follow-up** 904/990 (91%) with second generation 619/700 (88%) with first generation	RR 1.00 95% CI 0.97 to 1.02 P = 0.72	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods 5 RCTs in this analysis	**Satisfaction rate , 2-year follow-up** 372/437 (85%) with second generation 279/365 (76%) with first generation	RR 1.09 95% CI 0.99 to 1.21 P = 0.075	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods 4 RCTs in this analysis	**Satisfaction rate , 2–5 years follow-up** 341/368 (93%) with second generation 264/304 (87%) with first generation	RR 1.02 95% CI 0.93 to 1.13 P = 0.63 Significant heterogeneity: I^2 = 81%, P = 0.001 See Further information on studies	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Satisfaction rate , >5 years follow-up** 77/129 (60%) with second generation 70/134 (52%) with first generation	RR 1.14 95% CI 0.92 to 1.42 P = 0.22	⟷	Not significant

Quality of life

No data from the following reference on this outcome. [28]

Need for re-treatment

First-generation compared with second-generation techniques First-generation and second-generation endometrial destruction techniques seem to be equally effective at reducing the need for any additional surgery or hysterectomy at 1 to 5 years (moderate-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Need for further surgery					
[28] Systematic review	Premenopausal women with heavy periods 7 RCTs in this analysis	**Requirement for any additional surgery , 1-year follow-up** 24/569 (4%) with second generation 31/459 (7%) with first generation	RR 0.77 95% CI 0.46 to 1.28 P = 0.31	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods 5 RCTs in this analysis	**Requirement for any additional surgery , 2-year follow-up** 44/556 (8%) with second generation 40/432 (9%) with first generation	RR 0.83 95% CI 0.52 to 1.32 P = 0.43	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods 3 RCTs in this analysis	**Requirement for any additional surgery , 2–5 years follow-up** 76/367 (21%) with second generation 70/280 (25%) with first generation	RR 0.95 95% CI 0.72 to 1.26 P = 0.74	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Requirement for any additional surgery , >5 years follow-up** 34/129 (26%) with second generation 51/134 (38%) with first generation	RR 0.69 95% CI 0.48 to 0.99 P = 0.046	●○○	second generation
[28] Systematic review	Premenopausal women with heavy periods 4 RCTs in this analysis Subgroup analysis	**Requirement for hysterectomy , 1-year follow-up** 14/401 (4%) with second generation 20/371 (5%) with first generation	RR 0.72 95% CI 0.37 to 1.39 P = 0.33	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods 4 RCTs in this analysis Subgroup analysis	**Requirement for hysterectomy , 2-year follow-up** 32/522 (6%) with second generation 27/398 (7%) with first generation	RR 0.86 95% CI 0.52 to 1.42 P = 0.55	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods 4 RCTs in this analysis Subgroup analysis	**Requirement for hysterectomy , 2–5 years follow-up** 60/423 (14%) with second generation 64/335 (19%) with first generation	RR 0.85 95% CI 0.59 to 1.22 P = 0.38	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT Subgroup analysis	**Requirement for hysterectomy , >5 years follow-up** 22/129 (17%) with second generation 38/134 (28%) with first generation	RR 0.60 95% CI 0.38 to 0.96 P = 0.032	●○○	second generation

Intraoperative and postoperative complications

First-generation compared with second-generation techniques First-generation endometrial destruction techniques seem to be associated with an increase in the proportion of women with fluid overload, cervical lacerations, and haematometra compared with second-generation techniques, but they seem to be associated with a decrease in the proportion of women with nausea, vomiting, and uterine cramping. We don't know how first- and second-generation techniques compare with regard to other intraoperative and postoperative complications (moderate-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Complications of surgery					
[28] Systematic review	Premenopausal women with heavy periods 4 RCTs in this analysis	**Fluid overload** 0/354 (0%) with second generation 10/327 (3%) with first generation	RR 0.18 95% CI 0.04 to 0.79 P = 0.024	●●●	second generation
[28] Systematic review	Premenopausal women with heavy periods 8 RCTs in this analysis	**Perforation** 3/1114 (<1%) with second generation 10/771 (1%) with first generation	RR 0.32 95% CI 0.10 to 1.01 P = 0.051	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods 8 RCTs in this analysis	**Cervical lacerations** 2/1005 (<1%) with second generation 15/671 (2%) with first generation	RR 0.22 95% CI 0.08 to 0.61 P = 0.0033	●●○	second generation
[28] Systematic review	Premenopausal women with heavy periods 5 RCTs in this analysis	**Endometritis** 15/744 (2%) with second generation 6/444 (1%) with first generation	RR 1.25 95% CI 0.45 to 3.49 P = 0.67	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods 8 RCTs in this analysis	**Urinary tract infection** 19/1132 (2%) with second generation 12/702 (2%) with first generation	RR 0.89 95% CI 0.44 to 1.80 P = 0.74	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods 5 RCTs in this analysis	**Haematometra** 5/673 (1%) with second generation 11/460 (2%) with first generation	RR 0.32 95% CI 0.12 to 0.85 P = 0.023	●●○	second generation
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Hydrosalpinx** 0/125 (0%) with second generation 1/114 (1%) with first generation	RR 0.30 95% CI 0.01 to 7.39 P = 0.46	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods 5 RCTs in this analysis	**Haemorrhage** 7/582 (1%) with second generation 12/400 (3%) with first generation	RR 0.74 95% CI 0.29 to 1.91 P = 0.53	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Muscle fasciculation** 1/144 (1%) with second generation 0/123 (0%) with first generation	RR 2.57 95% CI 0.11 to 62.41 P = 0.56	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods 3 RCTs in this analysis	**Fever** 4/399 (1%) with second generation 3/272 (1%) with first generation	RR 0.92 95% CI 0.20 to 4.29 P = 0.91	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods 4 RCTs in this analysis	**Nausea/vomiting** 120/620 (20%) with second generation 29/377 (8%) with first generation	RR 1.98 95% CI 1.30 to 3.02 P = 0.0014	●●●	first generation

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Myometritis** 0/144 (0%) with second generation 1/123 (1%) with first generation	RR 0.29 95% CI 0.01 to 6.93 P = 0.44	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Pelvic inflammatory disease** 2/175 (2%) with second generation 1/90 (1%) with first generation	RR 1.03 95% CI 0.09 to 11.19 P = 0.98	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Pelvic abscess** 0/175 (0%) with second generation 1/90 (1%) with first generation	RR 0.17 95% CI 0.01 to 4.19 P = 0.28	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Cervical stenosis** 1/215 (1%) with second generation 0/107 (0%) with first generation	RR 1.50 95% CI 0.06 to 36.52 P = 0.8	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods 2 RCTs in this analysis	**Uterine cramping** 157/408 (38%) with second generation 64/193 (33%) with first generation	RR 1.21 95% CI 1.01 to 1.44 P = 0.035	●○○	first generation
[28] Systematic review	Premenopausal women with heavy periods 3 RCTs in this analysis	**Severe pelvic pain** 9/445 (2%) with second generation 5/238 (2%) with first generation	RR 0.87 95% CI 0.19 to 3.98 P = 0.85	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**External burns** 2/184 (1%) with second generation 0/85 (0%) with first generation	RR 2.32 95% CI 0.11 to 47.89 P = 0.58	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Blood transfusion** 2/40 (5%) with second generation 0/42 (0%) with first generation	RR 5.24 95% CI 0.26 to 105.97 P = 0.28	⟷	Not significant

Postoperative recovery

No data from the following reference on this outcome. [28]

Adverse effects

No data from the following reference on this outcome. [28]

Different first-generation techniques versus each other:

We found one systematic review (search date 2013, 3 RCTs [28]) and one additional RCT comparing cutting and coagulating waveforms with rollerball ablation. [29] One RCT included in the review (120 women with heavy dysfunctional bleeding) has published a 10-year follow-up assessing need for re-treatment (hysterectomy). [30] See Further information on studies for data on operative difficulty.

Menstrual blood loss

Different first-generation techniques compared with each other We don't know whether laser ablation, transcervical endometrial resection, vaporising electrode ablation, and rollerball (with unmodulated cutting current ablation or with modulated coagulating current) differ in effectiveness at increasing rates of amenorrhoea (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Amenorrhoea					
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Amenorrhoea , 1 year** 37/160 (23%) with laser ablation 32/146 (22%) with transcervical endometrial resection	RR 1.06 95% CI 0.70 to 1.60 P = 0.80	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Amenorrhoea , 1 year** 17/47 (36%) with vaporising electrode ablation 21/44 (47%) with transcervical endometrial resection	RR 0.76 95% CI 0.46 to 1.24 P = 0.27	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods 2 RCTs in this analysis	**Amenorrhoea , 6 months** 38/176 (22%) with laser ablation 38/172 (22%) with transcervical endometrial resection	RR 0.97 95% CI 0.66 to 1.45 P = 0.90	⟷	Not significant
[29] RCT	50 women	**Amenorrhoea , 2 years** 36% with 5-mm rollerball with unmodulated cutting current 7% with 5-mm rollerball with modulated coagulating current Absolute numbers not reported	P = 0.54	⟷	Not significant

Anaemia

No data from the following reference on this outcome. [28] [29]

Patient satisfaction

Different first-generation techniques compared with each other We don't know whether laser ablation, transcervical endometrial resection, vaporising electrode ablation, and rollerball (with unmodulated cutting current ablation or with modulated coagulating current) differ in effectiveness at increasing patient satisfaction (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Patient satisfaction					
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Patient satisfaction , 12 months** 148/166 (89%) with laser ablation 140/155 (90%) with transcervical endometrial resection	RR 0.99 95% CI 0.92 to 1.06 P = 0.73	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Patient satisfaction (very/moderately satisfied) , 12 months** 45/47 (96%) with vaporising electrode ablation 41/44 (93%) with transcervical endometrial resection	RR 1.03 95% CI 0.93 to 1.14 P = 0.60	⟷	Not significant
[29] RCT	50 women	**Satisfied or very satisfied , 2 years** 64% with 5-mm rollerball with unmodulated cutting current 68% with 5-mm rollerball with modulated coagulating current Absolute numbers not reported	P = 0.46	⟷	Not significant

Quality of life

No data from the following reference on this outcome. [28] [29]

Need for re-treatment

Different first-generation techniques compared with each other We don't know whether rollerball ablation, laser ablation, and transcervical endometrial resection differ in effectiveness at reducing rates of re-treatment or re-intervention (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Need for re-treatment					
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Rates of hysterectomy , 5+ years** 23/61 (38%) with rollerball ablation 16/59 (27%) with transcervical endometrial resection 22% of the women who were randomised had proceeded to hysterectomy in the 10 years after the initial ablation	RR 1.39 95% CI 0.82 to 2.36 P = 0.22	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods 2 RCTs in this analysis	**Need for re-treatment , 1 year** 32/197 (16%) with laser ablation 37/191 (19%) with transcervical endometrial resection	RR 0.84 95% CI 0.55 to 1.29 P = 0.43	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Need for further surgery , 2 years** 15/61 (25%) with rollerball ablation 14/59 (24%) with transcervical endometrial resection	RR 1.04 95% CI 0.55 to 1.95 P = 0.91	⟷	Not significant
[29] RCT	50 women	**Re-intervention , 2 years** 36% with 5-mm rollerball with unmodulated cutting current 32% with 5-mm rollerball with modulated coagulating current Absolute numbers not reported	P = 0.75	⟷	Not significant

Intraoperative and postoperative complications

Different first-generation techniques compared with each other Laser ablation may be associated with an increase in the proportion of women with fluid overload (>1.5 L) compared with transcervical endometrial resection, but we don't know whether rollerball ablation, transcervical endometrial resection, and laser ablation differ with regard to reducing the rate of other intraoperative and postoperative complications (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Intraoperative and postoperative complications					
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Fluid deficit** 0/61 (0%) with rollerball ablation 1/59 (2%) with transcervical endometrial resection	RR 0.32 95% CI 0.01 to 7.76 P = 0.49	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Fluid overload (>1.5 L)** 15/185 (8%) with laser ablation 3/181 (2%) with transcervical endometrial resection	RR 4.89 95% CI 1.44 to 16.61 P = 0.011	●●●	transcervical endometrial resection
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Urinary tract infection** 4/185 (2%) with laser ablation 2/181 (1%) with transcervical endometrial resection	RR 1.96 95% CI 0.36 to 10.55 P = 0.43	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Pelvic sepsis** 5/185 (3%) with laser ablation 6/181 (3%) with transcervical endometrial resection	RR 0.82 95% CI 0.25 to 2.62 P = 0.34	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Haematometra** 0/185 (0%) with laser ablation 2/181 (1%) with transcervical endometrial resection	RR 0.20 95% CI 0.01 to 4.05 P = 0.29	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Perforation** 0/185 (0%) with laser ablation 3/181 (2%) with transcervical endometrial resection	RR 0.14 95% CI 0.01 to 2.69 P = 0.19	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Uterine tamponade** 7/185 (4%) with laser ablation 6/181 (3%) with transcervical endometrial resection	RR 1.14 95% CI 0.39 to 3.33 P = 0.81	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Perforation** 0/61 (0%) with rollerball ablation 1/59 (2%) with transcervical endometrial resection	OR 0.32 95% CI 0.01 to 7.76 P = 0.49	⟷	Not significant

No data from the following reference on this outcome. [29]

Postoperative recovery

No data from the following reference on this outcome. [28] [29]

Adverse effects

No data from the following reference on this outcome. [28] [29]

Different second-generation techniques versus each other:

We found one systematic review (search date 2013), [28] which compared second-generation endometrial destruction techniques with each other (see Comment, p 18 section). We found one additional RCT, [31] which was a 10-year follow-up of one RCT included in the review.

Menstrual blood loss

Different second-generation techniques compared with each other Bipolar radiofrequency ablation seems more effective than balloon ablation or hydrothermal ablation at increasing rates of amenorrhoea, but we don't know whether other second-generation techniques differ in effectiveness at improving menstrual blood loss (moderate-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Amenorrhoea					
[28] Systematic review	Premenopausal women with heavy periods 2 RCTs in this analysis	**Amenorrhoea , 6-month follow-up** 51/118 (43%) with bipolar radiofrequency electrode 6/61 (10%) with balloon ablation	RR 4.39 95% CI 2.00 to 9.66	●●○	bipolar radiofrequency electrode
[28] Systematic review	Premenopausal women with heavy periods 3 RCTs in this analysis	**Amenorrhoea , 12-month follow-up** 64/145 (44%) with bipolar radiofrequency electrode 11/86 (13%) with balloon ablation	RR 3.78 95% CI 2.07 to 6.91	●●○	bipolar radiofrequency electrode
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Amenorrhoea , 2–5 years follow-up** 39/81 (48%) with bipolar radiofrequency electrode 12/39 (31%) with balloon ablation	RR 1.56 95% CI 0.93 to 2.64	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Median Pictorial Blood Loss Assessment Chart (PBAC) score after treatment , 1 year** 3 with electrode 21 with balloon 55 women in this analysis	P = 0.2	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Amenorrhoea , 6-month follow-up** 56/139 (40%) with microwave ablation 37/138 (27%) with balloon ablation	RR 1.50 95% CI 1.07 to 2.12	●○○	microwave ablation
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Amenorrhoea , 1-year follow-up** 61/147 (41%) with microwave ablation 51/135 (38%) with balloon ablation	RR 1.10 95% CI 0.82 to 1.47	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean PBAC score , 1 year** 3 with microwave ablation 4 with balloon ablation 278 women in this analysis	Incidence rate ratio 0.91 95% CI 0.6 to 1.5	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Amenorrhoea , 6-month follow-up** 28/76 (37%) with bipolar radiofrequency electrode 12/74 (16%) with hydrothermal ablation	RR 2.27 95% CI 1.25 to 4.12	●●○	bipolar radiofrequency electrode
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Amenorrhoea , 1-year follow-up** 35/75 (47%) with bipolar radiofrequency electrode 17/71 (24%) with hydrothermal ablation	RR 1.95 95% CI 1.21 to 3.15	●○○	bipolar radiofrequency electrode
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Amenorrhoea , 2–5 years follow-up** 41/74 (55%) with bipolar radiofrequency electrode 23/65 (35%) with hydrothermal ablation	RR 1.57 95% CI 1.06 to 2.31	●○○	bipolar radiofrequency electrode
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Amenorrhoea , 3-year follow-up** 36/50 (72%) with ablative curettage 8/50 (16%) with overcurettage	RR 4.50 95% CI 2.33 to 8.69 See Further information on studies	●●○	ablative curettage
[31] RCT	104 premenopausal women with heavy menstrual bleeding 10-year follow-up of an RCT included in review [28]	**Amenorrhoea , 10-year follow-up** 50/69 (73%) with bipolar radiofrequency electrode 23/35 (66%) with balloon ablation	RR 1.1 95% CI 0.83 to 1.5	⟷	Not significant

Anaemia

No data from the following reference on this outcome. [28] [31]

Patient satisfaction

Different second-generation techniques compared with each other Bipolar radiofrequency ablation seems more effective than hydrothermal ablation at increasing the rate of patient satisfaction, but we don't know whether other second-generation techniques differ in effectiveness at improving rates of patient satisfaction (moderate-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Patient satisfaction					
[28] Systematic review	Premenopausal women with heavy periods 2 RCTs in this analysis	**Satisfaction , 6-month follow-up** 106/120 (88%) with bipolar radiofrequency electrode 50/61 (81%) with balloon ablation	RR 1.08 95% CI 0.94 to 1.24	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods 3 RCTs in this analysis	**Satisfaction , 1-year follow-up** 132/143 (92%) with bipolar radiofrequency electrode 74/87 (85%) with balloon ablation	RR 1.10 95% CI 0.99 to 1.22	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Satisfaction , 1-year follow-up** 109/143 (76%) with microwave ablation 103/135 (76%) with balloon ablation	RR 1.00 95% CI 0.88 to 1.14	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Satisfaction , 6-month follow-up** 65/76 (85%) with bipolar radiofrequency electrode 44/74 (59%) with hydrothermal ablation	RR 1.44 95% 1.17 to 1.77	●○○	bipolar radiofrequency electrode
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Satisfaction , 1-year follow-up** 74/75 (99%) with bipolar radiofrequency electrode 63/71 (89%) with hydrothermal ablation	RR 1.11 95% CI 1.02 to 1.21	●○○	bipolar radiofrequency electrode
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Satisfaction , 2–5 years follow-up** 59/74 (80%) with bipolar radiofrequency electrode 32/65 (49%) with hydrothermal ablation	RR 1.62 95% CI 1.23 to 2.13	●○○	bipolar radiofrequency electrode
[31] RCT	104 premenopausal women with heavy menstrual bleeding 10-year follow-up of RCT in review [28]	**Satisfaction , 10-year follow-up** 56/69 (81%) with bipolar radiofrequency electrode 27/35 (77%) with balloon ablation	RR 1.1 95% CI 0.82 to 1.2	⟷	Not significant

Quality of life

Different second-generation techniques compared with each other We don't know whether one second-generation technique is more effective than another at improving quality-of-life scores in premenopausal women with heavy periods (moderate-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Quality of life					
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean SF-12 Physical score , 1-year follow-up** 52.1 with bipolar radiofrequency electrode 50.5 with balloon ablation	Mean difference +1.60 95% CI –4.27 to +7.47	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
		55 women in this analysis			
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean SF-12 Mental score , 1-year follow-up** 49.5 with bipolar radiofrequency electrode 42.0 with balloon ablation 55 women in this analysis	Mean difference +7.50 95% CI –0.52 to +15.52	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean SF-36 Physical functioning score , 1-year follow-up** 91 with bipolar radiofrequency electrode 88 with balloon ablation 78 women in this analysis	Mean difference +3.00 95% CI –6.44 to +12.44	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean SF-36 Physical functioning score , 2–5 years follow-up** 86 with bipolar radiofrequency electrode 84 with balloon ablation 98 women in this analysis	Mean difference +2.00 95% CI –8.26 to +12.26	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean SF-36 Role physical score , 1-year follow-up** 94 with bipolar radiofrequency electrode 89 with balloon ablation 78 women in this analysis	Mean difference +5.00 95% CI –6.96 to +16.96	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean SF-36 Role physical score , 2–5 years follow-up** 94 with bipolar radiofrequency electrode 86 with balloon ablation 98 women in this analysis	Mean difference +8.00 95% CI –2.66 to +18.66	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean SF-36 Role emotional score , 1-year follow-up** 99 with bipolar radiofrequency electrode 95 with balloon ablation 78 women in this analysis	Mean difference +4.00 95% CI –1.92 to +9.92	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean SF-36 Role emotional score , 2–5 years follow-up** 90 with bipolar radiofrequency electrode 99 with balloon ablation 98 women in this analysis	Mean difference –9.00 95% CI –14.45 to –3.55	○○○	balloon ablation
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean SF-36 Social functioning score , 1-year follow-up** 89 with bipolar radiofrequency electrode 86 with balloon ablation 78 women in this analysis	Mean difference +3.00 95% CI –6.17 to +12.17	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean SF-36 Social functioning score , 2–5 years follow-up** 88 with bipolar radiofrequency electrode 84 with balloon ablation 98 women in this analysis	Mean difference +4.00 95% CI –5.60 to +13.60	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean SF-36 Mental health score , 1-year follow-up** 80 with bipolar radiofrequency electrode 80 with balloon ablation 78 women in this analysis	Mean difference 0.00 95% CI –8.03 to +8.03	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean SF-36 Mental health score , 2–5 years follow-up** 76 with bipolar radiofrequency electrode 81 with balloon ablation 98 women in this analysis	Mean difference –5.00 95% CI –11.39 to +1.39	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean SF-36 Energy/vitality score , 1-year follow-up** 73 with bipolar radiofrequency electrode 64 with balloon ablation 78 women in this analysis	Mean difference +9.00 95% CI –0.44 to +18.44	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean SF-36 Energy/vitality score , 2–5 years follow-up** 65 with bipolar radiofrequency electrode 68 with balloon ablation 98 women in this analysis	Mean difference –3.00 95% CI –10.39 to +4.39	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean SF-36 Pain score , 1-year follow-up** 76 with bipolar radiofrequency electrode 77 with balloon ablation 78 women in this analysis	Mean difference –1.00 95% CI –12.61 to +10.61	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean SF-36 Pain score , 2–5 years follow-up** 78 with bipolar radiofrequency electrode 83 with balloon ablation 98 women in this analysis	Mean difference –5.00 95% CI –14.79 to +4.79	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean SF-36 General health score , 1-year follow-up** 81 with bipolar radiofrequency electrode 75 with balloon ablation 78 women in this analysis	Mean difference +6.00 95% CI –4.10 to +16.10	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean SF-36 General health score , 2–5 years follow-up** 77 with bipolar radiofrequency electrode 71 with balloon ablation 98 women in this analysis	Mean difference +6.00 95% CI –5.72 to +17.72	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean quality of life scores (EQ-5D)** 0.84 with microwave ablation 0.82 with balloon ablation 285 women in this analysis	Mean difference +0.02 95% CI –0.04 to +0.08	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean SF-12 Physical score** 52.8 with microwave ablation 53.5 with balloon ablation 285 women in this analysis	Mean difference –0.70 95% CI –2.64 to +1.24	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean SF-12 Mental score** 47.6 with microwave ablation 48.8 with balloon ablation 285 women in this analysis	Mean difference –1.20 95% CI –3.67 to +1.27	⟷	Not significant

No data from the following reference on this outcome. [31]

Need for re-treatment

Different second-generation techniques compared with each other Bipolar radiofrequency ablation seems more effective than hydrothermal ablation at reducing the need for further surgery at 1 to 5 years, but we don't know whether it is more effective at reducing hysterectomy rates, or whether other second-generation techniques differ in effectiveness at reducing the need for re-treatment or re-intervention (moderate-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Re-treatment or re-intervention rate					
[28] Systematic review	Premenopausal women with heavy periods 2 RCTs in this analysis	**Requirement for further surgery (ablation or hysterectomy) , 1-year follow-up** 7/79 (9%) with bipolar radiofrequency electrode 3/56 (5%) with balloon ablation	RR 1.36 95% CI 0.34 to 5.42	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Requirement for further surgery (ablation or hysterectomy) , at 2–5 years follow-up** 9/81 (11%) with bipolar radiofrequency electrode 6/39 (15%) with balloon ablation	RR 0.72 95% CI 0.28 to 1.89	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Requirement for further surgery (any) , 1 year** 5/82 (6%) with bipolar radiofrequency electrode 17/78 (21%) with hydrothermal ablation	RR 0.28 95% CI 0.11 to 0.72	●●○	bipolar radiofrequency electrode

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Requirement for further surgery (any) , 2–5 years follow-up** 11/71 (15%) with bipolar radiofrequency electrode 23/65 (35%) with hydrothermal ablation	RR 0.44 95% CI 0.23 to 0.83	●○○	bipolar radiofrequency electrode
[31] RCT	104 premenopausal women with heavy menstrual bleeding 10-year follow-up of RCT in review [28]	**Need for re-intervention , 10 years** 14/69 (20%) with bipolar radiofrequency electrode 9/35 (26%) with balloon ablation	RR 0.9 95% CI 0.63 to 1.3	⟷	Not significant
Rates of hysterectomy					
[28] Systematic review	Premenopausal women with heavy periods 2 RCTs in this analysis	**Requirement for hysterectomy , 1-year follow-up** 5/125 (4%) with bipolar radiofrequency electrode 5/82 (6%) with balloon ablation	RR 0.59 95% CI 0.18 to 1.93	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Requirement for hysterectomy , 2–5 years follow-up** 8/81 (10%) with bipolar radiofrequency electrode 5/39 (13%) with balloon ablation	RR 0.77 95% CI 0.27 to 2.20	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Requirement for hysterectomy , 1-year follow-up** 6/147 (4%) with microwave ablation 6/138 (4%) with balloon ablation	RR 0.94 95% CI 0.31 to 2.84	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Requirement for hysterectomy , within 3 years** 5/50 (10%) with microwave ablation 12/50 (24%) with balloon ablation	RR 0.42 95% CI 0.16 to 1.10	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Requirement for hysterectomy , 1 year** 4/82 (5%) with bipolar radiofrequency 9/78 (12%) with hydrothermal ablation	RR 0.42 95% CI 0.14 to 1.32	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Requirement for hysterectomy , 2–5 years follow-up** 9/71 (13%) with bipolar radiofrequency 13/65 (20%) with hydrothermal ablation	RR 0.63 95% CI 0.29 to 1.38	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Requirement for hysterectomy , within 3 years** 5/50 (10%) with ablative curettage 12/50 (24%) with overcurettage	RR 0.42 95% CI 0.16 to 1.10 See Further information on studies	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
[31] RCT	104 pre-menopausal women with heavy menstrual bleeding 10-year follow-up of RCT in review [28]	**Requirement for hysterectomy, within 10 years** 10/69 (14%) with bipolar radiofrequency electrode 5/35 (14%) with balloon ablation	RR 1.0 95% CI 0.69 to 1.49	⟷	Not significant

Intraoperative and postoperative complications

Different second-generation techniques compared with each other We don't know whether one second-generation technique is more effective than another at reducing intraoperative and postoperative complications (moderate-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Intraoperative and postoperative complications					
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Uterine perforation** 1/82 (1%) with bipolar radiofrequency 0/74 (0%) with hydrothermal ablation	RR 2.71 95% CI 0.11 to 65.54 P = 0.54	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Saline leakage** 0/82 (0%) with bipolar radiofrequency 3/74 (4%) with hydrothermal ablation	RR 0.13 95% CI 0.01 to 2.46 P = 0.17	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Endometritis** 2/42 (7%) with bipolar radiofrequency 5/31 (16%) with balloon ablation	RR 0.30 95% CI 0.06 to 1.42 P = 0.13	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Bleeding** 3/50 (6%) with ablative curettage 14/50 (28%) with over-curettage	RR 0.21 95% CI 0.07 to 0.70 P = 0.011 See Further information on studies	●●○	ablative curettage
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Infection/leukorrhoea** 4/50 (8%) with ablative curettage 5/50 (10%) with over-curettage	RR 0.80 95% CI 0.23 to 2.81 P = 0.73 See Further information on studies	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Uterine perforation** 0/50 (0%) with ablative curettage 3/50 (6%) with over-curettage	RR 0.14 95% CI 0.01 to 2.70 P = 0.19 See Further information on studies	⟷	Not significant

No data from the following reference on this outcome. [31]

Postoperative recovery

Different second-generation techniques compared with each other Over-curettage may be more effective than ablative curettage at reducing mean hospital stay in premenopausal women with heavy periods, but we don't know whether

it is more effective at reducing mean time taken off work or reducing the time taken to return to normal activities. However, the evidence was weak, and this is a non-standard procedure. We don't know whether other second-generation techniques differ in effectiveness at reducing postoperative recovery in premenopausal women with heavy periods (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Postoperative recovery					
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean hospital stay** 3.2 days with ablative curettage 1.6 days with over-curettage	Mean difference 1.6 days 95% CI 1.18 days to 2.02 days P <0.00001 See Further information on studies	○○○	overcurettage
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean time taken off work** 6.4 days with bipolar radiofrequency 6.6 days with balloon ablation 81 women in this analysis	Mean difference +0.2 days 95% CI –5.9 days to +6.2 days	⟷	Not significant
[28] Systematic review	Premenopausal women with heavy periods Data from 1 RCT	**Mean time to resume normal activities** 4.9 days with bipolar radiofrequency 8.1 days with balloon ablation 81 women in this analysis	Mean difference +3.2 days 95% CI –1.6 days to +8.1 days	⟷	Not significant

No data from the following reference on this outcome. [31]

Adverse effects

No data from the following reference on this outcome. [28] [31]

Further information on studies

[27] There was a significant difference between groups at baseline for duration of complaint (3.35 years with levonorgestrel IUD *v* 2.07 years with endometrial resection, P = 0.03) and menstrual interval (25.6 days with levonorgestrel IUD *v* 21.7 days with endometrial resection, P = 0.005). The degree of blinding at outcome assessment was unclear.

[18] The review found that most adverse effects in women using a progestogen-releasing IUD were typical of progestogens (bloating, weight gain, and breast tenderness).

[18] The review reported that there was significant heterogeneity in amenorrhoea rates, particularly after 24 months of follow-up in two trials. Although the two trials used different ablation techniques, the review reported that this would be unlikely to cause heterogeneity. However, the review reported that in one trial the results were based on a per-protocol analysis, whereas the other trial used an ITT analysis; therefore, the results of these two trials could not be reliably compared. The review also reported that there was no other heterogeneity in the analyses that would be likely to affect the reliability of results. A sensitivity analysis was not performed due to the small number of studies in the review.

[28] *General — endometrial destruction (resection and ablation)* Overall, the review included 25 RCTs including 4040 women of reproductive years with regular heavy periods, with trial sizes ranging from 20 to 372 women. The review noted that the majority of trials had adequate randomisation and description of drop-outs with no evidence of selected reporting, but that less than half had adequate allocation concealment and most were

unblinded, which could have led to bias. Most of the studies had some form of treatment prior to surgery (e.g., gonadotrophin-releasing hormone, progestogens, NSAIDs). The review also noted that there were a wide range of surgical methods employed, using a variety of outcome measures, which made clear comparisons between studies difficult. There was substantial heterogeneity in some analyses. It noted that while women had heavy menstrual bleeding, there is likely to be a large variation in the extent of the problem due to the subjective nature of the condition.

[28] *First-generation versus second-generation techniques* The review found that second-generation techniques significantly reduced operating times compared with first-generation techniques (9 RCTs, 988 women with first-generation techniques, 774 women with second-generation techniques; mean difference [MD]: –14.86 minutes, 95% CI –19.68 minutes to –10.05 minutes). It found that operative difficulties were significantly higher in the second-generation technique group compared with the first-generation group (equipment failure: 18/197 [9%] with second generation *v* 3/187 [2%] with first generation, RR 4.26, 95% CI 1.46 to 12.43, P = 0.008), but there was no significant difference between groups in the proportion of abandoned procedures (3 RCTs, 629 women, RR 1.18, 95% CI 0.38 to 3.67, P = 0.78). Local anaesthetic rather than general anaesthetic was significantly more likely to be used with second-generation techniques (6 RCTs, 1434 women, RR 2.78, 95% CI 1.76 to 4.40), although there was significant heterogeneity in the trials when reporting this outcome (I^2 = 85%, P <0.00001). There was no significant difference between groups in inability to work (2 RCTs, 479 women, RR 0.84, 95% CI 0.30 to 2.30, P = 0.73).

[28] *Heterogeneity* The review noted that substantial heterogeneity was recorded for some outcomes. The review noted that both groups of interventions were broad and included several different ablative techniques. In addition, outcomes such as duration of surgery were likely to be affected by extraneous factors (e.g., skill of the surgeon, hospital policy, and operating environment). It performed a sensitivity analysis, which did not alter the direction of effects. It noted that the difference of 15 minutes in operative time between first- and second-generation techniques, given the extraneous variables, was unlikely to be clinically significant.

[28] *Different first-generation techniques versus each other* Among hysteroscopic techniques, the review found that laser ablation significantly increased procedural length compared with transcervical endometrial resection (TCRE) (2 RCTs, 386 women, MD 9.15 minutes, 95% CI 7.20 minutes to 11.10 minutes). When laser ablation was compared with TCRE, the rates of equipment failure were significantly higher in the laser ablation group (1 RCT, 17/185 [9%] with laser *v* 3/181 [2%] with TCRE, RR 5.54, 95% CI 1.65 to 18.60, P = 0.0055). The review found that operative time with vaporising electrode ablation was significantly shorter than with TCRE, although the difference was small in absolute terms (1 RCT, 91 women, MD –1.5 minutes, 95% CI –0.35 minutes to –2.65 minutes, P = 0.011). The single RCT comparing cutting and coagulating waveforms with rollerball ablation showed that both were equally effective. [29]

[28] *Different second-generation techniques versus each other* In RCTs comparing bipolar radiofrequency with balloon ablation, two RCTs found a significantly longer operation duration time with balloon (mean: 55 women in analysis, 4 minutes with electrode *v* 23 minutes with balloon, P = 0.0001; 81 women in analysis, 5.7 minutes with electrode *v* 12.5 minutes with balloon, MD 6.7 minutes, 95% CI 5.8 minutes to 7.7 minutes, P <0.001). One RCT found a significantly shorter operation time with microwave compared with balloon (mean: 314 women, 4.7 minutes with microwave *v* 11.3 minutes with balloon, MD –6.60 minutes, 95% CI –5.84 minutes to –7.36 minutes, P <0.00001). One RCT found a significantly shorter duration of procedure with bipolar radiofrequency compared with hydrothermal ablation (median: 156 women, 11.8 minutes with bipolar *v* 27.8 minutes with hydrothermal ablation, P <0.001).

[28] Comparison of curettage techniques: The review noted that this small RCT was at considerable risk of bias and compared ablative curettage (devised by the author of the trial) with over-currettage (where the curettage is continued beyond "the gritty sensation" felt at the basal endometrium). It noted that the aim of the study was to develop a technique for developing countries that may not have resources for other techniques, but that the authors acknowledged that curettage may only have a temporary role.

Comment: **General — endometrial destruction (resection or ablation)** Intraoperative complications of endometrial destruction include uterine perforation, haemorrhage, and fluid overload from the distension medium. Immediate postoperative complications include infection, haemorrhage, and, rarely, bowel injury. One large prospective survey of 10,686 women having endometrial destruction in the UK found an immediate complication rate of 4%. [32] Intraoperative emergency procedures were performed in 1% of people, and two procedure-related deaths occurred.

GLOSSARY

European Quality of Life (Euroqol)–5 Dimensions (EQ–5D) A descriptive system of health-related quality of life states, consisting of 5 dimensions (mobility, self-care, usual activities, pain/discomfort, anxiety/depression), each of which allows one of 3 (or 5) responses. The responses record 3 (no problems, some or moderate problems, extreme

problems) or 5 (no problems, slight problems, moderate problems, severe problems, or extreme problems) levels of severity.

First-generation endometrial destruction techniques Procedures including rollerball ablation (a hysteroscopic procedure in which endometrium is destroyed under direct vision using cautery from a electrosurgical rollerball), laser ablation (a hysteroscopic procedure in which endometrium is destroyed under direct vision by a laser beam), and transcervical endometrial resection (a hysteroscopic procedure in which endometrium is removed under direct vision by using an electrosurgical loop). All these techniques involve hysteroscopy and fluid distension of the uterus.

High-quality evidence Further research is very unlikely to change our confidence in the estimate of effect.

Low-quality evidence Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Moderate-quality evidence Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

Research and Development (RAND)-36 A widely used survey instrument designed to assess health-related quality of life. The RAND-36 comprises 36 items that assess 8 health concepts: physical functioning, role limitations caused by physical health problems, role limitations caused by emotional problems, social functioning, emotional well being, energy/fatigue, pain, and general health perceptions. Physical and mental health summary scores are also derived from 8 RAND-36 scales.

Second-generation endometrial destruction techniques These techniques do not require hysteroscopy and in general are techniques that are easier to learn and perform. Destruction of the endometrium is achieved via various devices using different energies, such as bipolar radiofrequency electrical energy (NovaSure); balloon ablation, which uses high-temperature fluid at high pressure within an intrauterine balloon (Thermachoice, Thermablate, and Cavaterm); hydrothermal ablation using free fluid within the uterus at high temperature (Hydro ThermAblator); microwave energy (Microsulis); and cryoablation (Her Option).

Short Form (SF)-12 A generic, multi-purpose short form survey with 12 questions selected from the SF-36 Health Survey; the responses, when combined, scored, and weighted, result in 2 scales of mental and physical functioning and overall health-related quality of life.

Short Form (SF)-36 A health-related quality-of-life scale across 8 domains: limitations in physical activities (physical component), limitations in social activities, limitations in usual role activities owing to physical problems, pain, psychological distress and wellbeing (mental health component), limitations in usual role activities because of emotional problems, energy and fatigue, and general health perceptions.

Very low-quality evidence Any estimate of effect is very uncertain.

SUBSTANTIVE CHANGES

Endometrial destruction (resection or ablation) One systematic review updated [20] and one systematic review added, [28] as well as three RCTs. [26] [27] [31] Categorisation unchanged (likely to be beneficial).

Hysterectomy One systematic review updated, [23] and two RCTs added. [21] [22] Categorisation unchanged (beneficial).

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Disclaimer

GRADE **Evaluation of interventions for Menorrhagia.**

Important outcomes	Anaemia, Intraoperative and postoperative complications, Menstrual blood loss, Need for re-treatment, Patient satisfaction, Postoperative recovery, Quality of life								
Studies (Participants)	**Outcome**	**Comparison**	**Type of evidence**	**Quality**	**Consistency**	**Directness**	**Effect size**	**GRADE**	**Comment**
What are the effects of surgical treatments for menorrhagia?									
1 (72) [22]	Menstrual blood loss	Hysterectomy versus intrauterine progestogens	4	–1	0	–1	0	Low	Quality point deducted for sparse data; directness point deducted for unclear clinical importance
3 (536) [18] [19] [20] [21] [22]	Anaemia	Hysterectomy versus intrauterine progestogens	4	–1	0	–1	0	Low	Quality point deducted for incomplete reporting of results; directness point deducted for high switch rates to surgery
1 (232) [18]	Patient satisfaction	Hysterectomy versus intrauterine progestogens	4	0	0	–1	0	Moderate	Directness point deducted for high switch rates to surgery
3 (at least 308) [18] [19] [20] [21] [22]	Quality of life	Hysterectomy versus intrauterine progestogens	4	–1	0	–1	0	Low	Quality point deducted for incomplete reporting; directness point deducted for high switch rates to surgery
at least 4 (at least 650) [23]	Menstrual blood loss	Hysterectomy versus endometrial destruction (resection or ablation)	4	–1	0	0	0	Moderate	Quality point deducted for weak methods
at least 5 (at least 836) [23] [24]	Patient satisfaction	Hysterectomy versus endometrial destruction (resection or ablation)	4	–1	0	0	0	Moderate	Quality point deducted for weak methods
at least 4 (at least 513) [23] [24]	Quality of life	Hysterectomy versus endometrial destruction (resection or ablation)	4	–1	0	–1	0	Low	Quality point deducted for weak methods; directness point deducted for inconsistent results depending on analysis undertaken
at least 6 (at least 930) [23]	Need for re-treatment	Hysterectomy versus endometrial destruction (resection or ablation)	4	–1	0	0	+2	High	Quality point deducted for weak methods. Effect size points added for RR 11 to 36
at least 5 (at least 858) [23] [24]	Intraoperative and postoperative complications	Hysterectomy versus endometrial destruction (resection or ablation)	4	–1	0	0	0	Moderate	Quality point deducted for weak methods.
at least 7 (at least 1066) [23] [24]	Postoperative recovery	Hysterectomy versus endometrial destruction (resection or ablation)	4	–1	–1	0	0	Low	Quality point deducted for weak methods; consistency point deducted for statistical heterogeneity
at least 6 (at least 385) [18] [19] [20] [27]	Menstrual blood loss	Endometrial destruction (resection or ablation) versus intrauterine progestogens	4	–1	–1	–1	0	Very low	Quality point deducted for incomplete reporting of results; consistency point deducted for conflicting results; directness point deducted for study involving mainly women <40 years
1 (33) [20]	Anaemia	Endometrial destruction (resection or ablation) versus intrauterine progestogens	4	–2	0	0	0	Low	Quality points deducted for sparse data and incomplete reporting of results

Important outcomes	Anaemia, Intraoperative and postoperative complications, Menstrual blood loss, Need for re-treatment, Patient satisfaction, Postoperative recovery, Quality of life								
Studies (Participants)	Outcome	Comparison	Type of evidence	Quality	Consistency	Directness	Effect size	GRADE	Comment
at least 6 (at least 378) [18] [20] [26] [27]	Patient satisfaction	Endometrial destruction (resection or ablation) versus intrauterine progestogens	4	–2	0	0	0	Low	Quality points deducted for incomplete reporting of results and weak methods (baseline differences, lack of standardisation of outcome)
3 (210 at most) [19] [20]	Quality of life	Endometrial destruction (resection or ablation) versus intrauterine progestogens	4	–1	–1	0	0	Low	Quality point deducted for incomplete reporting of results; consistency point deducted for conflicting results
at least 3 (at least 194) [18] [20] [26]	Need for re-treatment	Endometrial destruction (resection or ablation) versus intrauterine progestogens	4	–1	0	0	0	Moderate	Quality point deducted for sparse data
1 (187) [20]	Menstrual blood loss	Endometrial destruction (resection or ablation) versus oral medical treatments (NSAIDs, tranexamic acid, combined oral contraceptive, oral progestogens)	4	–1	0	–1	0	Low	Quality point deducted for sparse data; directness point deducted for range of drugs in comparison
at least 12 (at least 1985) [28]	Menstrual blood loss	First-generation versus second-generation techniques	4	–1	–1	0	0	Low	Quality point deducted for weak methods; consistency point deducted for statistical heterogeneity
at least 11 (at least 1690) [28]	Patient satisfaction	First-generation versus second-generation techniques	4	–1	–1	0	0	Low	Quality point deducted for weak methods; consistency point deducted for statistical heterogeneity
at least 7 (at least 1028) [28]	Need for re-treatment	First-generation versus second-generation techniques	4	–1	0	0	0	Moderate	Quality point deducted for weak methods
at least 8 (at least 1885) [28]	Intraoperative and postoperative complications	First-generation versus second-generation techniques	4	–1	0	0	0	Moderate	Quality point deducted for weak methods
at least 3 (at least 398) [28] [29]	Menstrual blood loss	Different first-generation techniques versus each other	4	–1	0	–1	0	Low	Quality point deducted for weak methods; directness point deducted for small number of comparators
3 (462) [28] [29]	Patient satisfaction	Different first-generation techniques versus each other	4	–1	0	–1	0	Low	Quality point deducted for weak methods; directness point deducted for small number of comparators
at least 3 (at least 438) [28] [29]	Need for re-treatment	Different first-generation techniques versus each other	4	–1	0	–1	0	Low	Quality point deducted for weak methods; directness point deducted for small number of comparators
2 (486) [28]	Intraoperative and postoperative complications	Different first-generation techniques versus each other	4	–1	0	–1	0	Low	Quality point deducted for weak methods; directness point deducted for small number of comparators
at least 6 (at least 758) [28] [31]	Menstrual blood loss	Different second-generation techniques versus each other	4	–1	0	0	0	Moderate	Quality point deducted for weak methods

Important outcomes	Anaemia, Intraoperative and postoperative complications, Menstrual blood loss, Need for re-treatment, Patient satisfaction, Postoperative recovery, Quality of life								
Studies (Participants)	**Outcome**	**Comparison**	**Type of evidence**	**Quality**	**Consistency**	**Directness**	**Effect size**	**GRADE**	**Comment**
at least 4 (at least 658) [28] [31]	Patient satisfaction	Different second-generation techniques versus each other	4	–1	0	0	0	Moderate	Quality point deducted for weak methods
at least 3 (at least 438) [28]	Quality of life	Different second-generation techniques versus each other	4	–1	0	0	0	Moderate	Quality point deducted for weak methods
at least 5 (at least 495) [28] [31]	Need for re-treatment	Different second-generation techniques versus each other	4	–1	0	0	0	Moderate	Quality point deducted for weak methods
at least 3 (at least 329) [28]	Intraoperative and postoperative complications	Different second-generation techniques versus each other	4	–1	0	0	0	Moderate	Quality point deducted for weak methods
2 (181) [28]	Postoperative recovery	Different second-generation techniques versus each other	4	–2	0	0	0	Low	Quality points deducted for sparse data and weak methods

We initially allocate 4 points to evidence from RCTs, and 2 points to evidence from observational studies. To attain the final GRADE score for a given comparison, points are deducted or added from this initial score based on preset criteria relating to the categories of quality, directness, consistency, and effect size. Quality: based on issues affecting methodological rigour (e.g., incomplete reporting of results, quasi-randomisation, sparse data [<200 people in the analysis]). Consistency: based on similarity of results across studies. Directness: based on generalisability of population or outcomes. Effect size: based on magnitude of effect as measured by statistics such as relative risk, odds ratio, or hazard ratio.