King's Mill Anterior-Posterior and Transverse (KAPT) block versus paracervical block in operative outpatient hysteroscopy: a single-centre randomised controlled trial

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Abstract

Objective To compare the effectiveness of the King's Mill Anterior-Posterior and Transverse (KAPT) block with the paracervical block in reducing pain during operative outpatient hysteroscopy. **Design** Single-centre, single-blind randomised controlled trial. **Setting** UK District General Hospital. **Population** Forty-eight women aged 31–80 years undergoing operative outpatient hysteroscopy. **Methods** Participants were randomised 1:1 to receive either the KAPT block or paracervical block. Pain was measured using a 10-point Visual Analogue Scale (VAS) at cervical dilatation, during the procedure, and 10 minutes post-procedure. Analyses included Mann–Whitney U tests and linear regression. **Main outcome measures** Pain scores at three procedural stages; secondary outcomes were patient satisfaction and willingness to recommend. **Results** Median intra-procedural pain was significantly lower with the KAPT block (1, IQR 0–3) compared with the paracervical block (2, IQR 1–6; p=0.039; mean difference –1.7, 95% CI –3.2 to –0.2). Post-procedure pain was also lower with the KAPT block (0, IQR 0–1.5 vs 2, IQR 0–3.5; p=0.011; mean difference –1.7, 95% CI –2.8 to –0.5). Cervical dilatation pain did not differ significantly (p=0.143). Both groups reported high satisfaction and strong willingness to recommend. **Conclusions** The KAPT block provided superior analgesia during and after outpatient hysteroscopy compared with the paracervical block. It represents a safe and effective alternative for pain management in this setting. **Trial registration** ISRCTN15619382.

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Abstract

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Single-centre, single-blind randomised controlled trial.

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UK District General Hospital.

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Participants were randomised 1:1 to receive either the KAPT block or paracervical block. Pain was measured using a 10-point Visual Analogue Scale (VAS) at cervical dilatation, during the procedure, and 10 minutes post-procedure. Analyses included Mann–Whitney U tests and linear regression.

Main outcome measures

Pain scores at three procedural stages; secondary outcomes were patient satisfaction and willingness to recommend.

Results

Median intra-procedural pain was significantly lower with the KAPT block (1, IQR 0–3) compared with the paracervical block (2, IQR 1–6; p=0.039; mean difference –1.7, 95% CI –3.2 to –0.2). Post-procedure pain was also lower with the KAPT block (0, IQR 0–1.5 vs 2, IQR 0–3.5; p=0.011; mean difference –1.7, 95% CI –2.8 to –0.5). Cervical dilatation pain did not differ significantly (p=0.143). Both groups reported high satisfaction and strong willingness to recommend.

Conclusions

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Trial registration

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Funding

This study received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Keywords

Outpatient hysteroscopy; Randomised controlled trial; Local anaesthesia; Paracervical block; KAPT block

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Introduction

The golden fleece of outpatient hysteroscopy (OPH) is to establish the best anaesthetic technique to ensure minimal or no pain during the procedure. OPH has transformed the management of intrauterine pathology by enabling both diagnostic and operative interventions in a clinic setting without general anaesthesia, yet pain control remains a key challenge.[1] Effective analgesia is crucial not only for patient comfort and satisfaction but also for procedural success.[1] The importance of this issue has even reached Parliamentary debate in the UK, with repeated appeals in the House of Commons on behalf of the Campaign Against Painful Hysteroscopy.[2,3] Evidence indicates that around one in three women undergoing OPH report severe pain (VAS [?]7/10), and procedural discomfort contributes to failure rates in up to 84% of cases.[4,5]

Pain during hysteroscopy arises from multiple factors, including speculum insertion, cervical manipulation, uterine distension, and surgical intervention. Menopausal status and procedural complexity further influence the degree of discomfort.[6] While a variety of analgesic strategies have been evaluated, from oral agents to local anaesthetic techniques, no universally superior method has emerged.[1,7] The paracervical block (PCB) is widely used and supported by evidence, yet its variable efficacy and technique have prompted the search for more precise alternatives.[1,7]

The King's Mill Anterior-Posterior and Transverse (KAPT) block is a novel technique targeting the Lee–Frankenhauser plexus within the uterosacral ligament complex, an anatomical zone containing the highest density of uterine and cervical nerve fibres 1.65–3.3 cm distal to the cervical insertion.[8–10] By delivering local anaesthetic into this region, the KAPT block achieves focused temporary denervation of the cervix and uterus, including the fundus. Its efficacy was first demonstrated in a prospective observational study presented at the RCOG World Congress in 2016, reporting mean pain scores below 1/10 for Myosure® and Novasure® procedures, with no abandonments due to pain.[11]

This randomised controlled trial aimed to directly compare the KAPT block with the PCB in OPH. By assessing pain during cervical dilatation, intraoperative manipulation, and post-procedural recovery, the study sought to determine which technique provides superior analgesia and to contribute evidence-based recommendations for optimising pain management in outpatient hysteroscopy.

Methods

This was a randomised controlled trial comparing the efficacy of the King's Mill Anterior-Posterior and Transverse (KAPT) block and the paracervical block in outpatient hysteroscopy. The design allowed a robust, direct comparison between the two anaesthetic techniques.

Data Collection

- **Patient questionnaires with Visual Analogue Scale (VAS):** Participants self-reported pain at three predefined stages of the procedure using a VAS ranging from 0 (no pain) to 10 (worst pain imaginable): during cervical dilatation, during the procedure itself, and 10 minutes post-procedure.
- This approach provided an objective, patient-centred measure of procedural pain.
- Satisfaction was recorded using binary (yes/no) responses immediately post-procedure.

Data Management

- All data were de-identified to maintain patient confidentiality.
- Electronic records were securely stored in encrypted format, accessible only to authorised personnel.
- Hard copy records, if produced, were stored securely.
- Data archiving followed institutional and legal requirements.

Study Setting

The study was conducted at King's Mill Hospital, a high-volume centre for outpatient hysteroscopy, providing an optimal setting for evaluating anaesthetic techniques in this context.

Participants

Eligibility Criteria

Inclusion Criteria

- Women attending outpatient hysteroscopy at King's Mill Hospital for Myosure® polyp removal, Myosure® fibroid removal, or Thermablate® , a second-generation endometrial ablation used in Kings Mill Hospital.
- Age [?] 18 years.
- Willing and able to provide informed consent.

Exclusion Criteria

Known contraindication to local anaesthetics.

Previous allergic reaction to the anaesthetics used in the study.

Recruitment

Participants were identified by the clinical care team using hospital appointment records. Personal health information was accessed only by members of the direct care team. Participants were not paid for taking part.

Informed consent was obtained after a detailed discussion of the study's purpose, procedures, potential risks and benefits, and the voluntary nature of participation. Written information leaflets and consent forms approved by the Research Ethics Committee were provided, and all questions were addressed before enrolment.

Randomisation and Blinding

Participants were randomised in a 1:1 ratio to receive either the KAPT block or the paracervical block using a block randomisation method. Block randomisation with varying block sizes (4, 6, or 8) ensured balanced allocation while maintaining concealment. The allocation sequence was computer-generated and managed by an independent research coordinator. Participants were blinded to their allocation; clinicians performing the blocks were not blinded due to the nature of the intervention.

Interventions

All procedures were performed by two experienced gynaecologists (a consultant and a post-CCT fellow) under a standardised protocol. During the consent process, patients were informed that while a brief "pinch" or sharp scratch might be felt during the local anaesthetic injection with a dental syringe, this sensation would **not** be included in the procedural pain scoring. All patients underwent a speculum examination with application of Instillagel(r) (Farco-Pharma GmbH, Cologne, Germany) to minimise discomfort during speculum insertion. The Visual Analogue Scale (VAS) was demonstrated and explained to all patients before the procedure, and they were advised to report any pain experienced during the procedure. Pain scores were recorded by a healthcare assistant (HCA) at three predefined stages using the VAS scale: during cervical dilatation, midway through the operative phase, and 10 minutes post-procedure. Pain scores were not shared with the operating gynaecologists and were only collated and analysed by the research team after completion of the trial.

Cervical dilation was routinely performed to Hegar size 6 prior to operative intervention. The duration of each procedure was recorded from the insertion of the hysteroscope until complete removal of polyps or fibroids or, in the case of ablation, until treatment completion. Operative hysteroscopies were carried out using the Omni Hysteroscope (OmniScope; Hologic Inc., Marlborough, MA, USA) and the MyoSure(r) tissue removal system (MyoSure; Hologic Inc., Marlborough, MA, USA). The OmniScope provides high-definition visualisation with a 0-degree lens, and the MyoSure(r) system allows efficient mechanical morcellation of

intrauterine polyps and submucosal fibroids under direct visualisation, supporting complete resection during a single outpatient procedure.

1. **Paracervical Block Technique**
2. 1 ml of local anaesthetic (Citanest(r)) was injected into the cervical stroma at 6 and 12 o'clock to facilitate tenaculum placement.
3. Local anaesthetic (Citanest(r)) was injected into the cervical stroma at the cervicovaginal junction to a depth of 10mm (one third of the dental syringe length) using a four-point injection at the 2, 4, 8, and 10 o'clock positions, with approximately 2 ml injected at each point.
4. A total of 10 ml of Citanest(r) was used.
5. A pause of at least 5 minutes was observed before commencing the procedure.
6. **KAPT Block Technique**
7. Step 1: 1 ml of local anaesthetic (Citanest(r)) was injected into the cervical stroma at 6 and 12 o'clock to facilitate tenaculum placement.
8. Step 2: The Lee–Frankenhauser plexus within the uterosacral ligament complex was located by measuring 3 cm inferolaterally from the external os toward the 5 and 7 o'clock positions using a Pipelle sampler as a measuring device.
9. Step 3: 4 ml was injected at each site (5 and 7 o'clock) using an inject–withdrawal technique: 2 ml anterior-to-posterior and 2 ml medial-to-lateral, to a depth of ˜25 mm (three-quarters of a dental syringe needle length).
10. Step 4: The objective was to infiltrate the Lee–Frankenhauser plexus in the anterior-posterior and lateral planes.
11. A total of 10 ml of Citanest(r) was used.
12. Step 5: A pause of at least 5 minutes was observed before starting the procedure.

Outcome Measures

Primary Outcome

- Pain during outpatient hysteroscopy, measured using the VAS (0 = no pain, 10 = worst pain imaginable) at:
- Cervical dilatation.
- During the procedure.
- 10 minutes post-procedure.

Secondary Outcomes

Patient satisfaction with pain management (yes/no).

Willingness to recommend the same anaesthetic method to others (yes/no).

Core outcome sets: No established core outcome set exists for outpatient hysteroscopy or procedural pain trials; outcomes were chosen based on prior literature and clinical relevance.

Patient and public involvement

Ten patients reviewed the study proposal and completed a short questionnaire. All agreed the research was valuable, supported participation, and found the study information clear. Feedback helped refine the protocol. Patients were not involved in recruitment or conduct.

Statistical Analysis

Prior research by Noor et al. (2021) demonstrated a statistically significant variation in pain scores with a relatively small sample (12). Based on these findings, the target sample size for this study was 48 participants (24 per group). This estimation was derived from an expected 30 eligible women per month, with at least a 80% attendance rate, over an 8-week study period (24th June 2024 – 16th August 2024). With a study

power of 80% (1 - β error probability) and a type I error probability ($\alpha = 0.05$), this sample size was deemed sufficient to detect a meaningful difference between the groups.

Data were analysed using IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp., Armonk, NY, USA). Quantitative variables were summarised as mean ± standard deviation (SD) for normally distributed data or median (interquartile range [IQR]) for skewed data. Categorical variables were expressed as frequency and percentage. Between-group comparisons used Chi-square or Fisher's exact test for categorical variables, independent-sample t-tests for normally distributed continuous variables, and Mann–Whitney U tests for non-normally distributed data. Effect sizes were presented as mean differences with 95% confidence intervals (95% CI). Correlations between continuous variables were analysed using Spearman's rank correlation coefficient. Linear regression was performed to evaluate whether anaesthetic type predicted pain scores at different time points. A p-value [?] 0.05 was considered statistically significant.

Results

Participant Characteristics

A total of 48 women were randomised to receive either the KAPT block (n=24) or the paracervical block (n=24). Baseline characteristics, including age (mean 52.8 +- 10.2 years; KAPT: 50.9 +- 10.8, Paracervical: 54.7 +- 9.4; p=0.265) and BMI (mean 30.4 +- 6.1 kg/m2; KAPT: 31.5 +- 5.9, Paracervical: 29.3 +- 6.2; p=0.190), were comparable between groups. There were no statistically significant differences in parity, menopausal status, hysteroscopy indication, or pre-procedure analgesic use between the two groups (Table 1).

Primary Outcome: Pain Scores

Pain scores at all procedural stages were lower in the KAPT block group compared with the paracervical block group (Table 2).

Cervical dilatation:

The median pain score was 0 (IQR 0–1.5) in the KAPT group compared with 1 (IQR 0–2) in the paracervical group, with no statistically significant difference (Mann–Whitney U test, $p = 0.143$).

During the procedure:

The median pain score was 1 (IQR 0–3) in the KAPT group compared with 2 (IQR 1–6) in the paracervical group, demonstrating a statistically significant reduction in pain with the KAPT block (Mann–Whitney U test, $p = 0.039$).

10 minutes post-procedure:

The median pain score was 0 (IQR 0–1.5) in the KAPT group compared with 2 (IQR 0–3.5) in the paracervical group, indicating a statistically significant difference favouring the KAPT block (Mann–Whitney U test, $p = 0.011$).

Secondary Outcomes

Satisfaction with Pain Management:

All participants in both groups (KAPT: 24/24 [100%]; Paracervical: 24/24 [100%]) reported satisfaction with pain management (p=1.000).

Willingness to Recommend:

All KAPT block patients (24/24, 100%) and 23/24 (95.8%) of paracervical block patients stated they would recommend the pain management strategy to others (p=1.000).

Safety and Adverse Events

No serious adverse events or procedure abandonments occurred in either group. The distribution of hysteroscopic procedure type, indication, and pre-procedure analgesic use was similar between groups.

Discussion

Main findings

This single-centre randomised controlled trial found that the KAPT block significantly reduced pain during and after operative outpatient hysteroscopy compared with the paracervical block. Women receiving the KAPT block reported lower pain scores during the procedure and at 10 minutes post-procedure, with high satisfaction and willingness to recommend the technique. No serious adverse events were observed.

Pain management remains a central challenge in operative outpatient hysteroscopy, and inadequate anaesthesia can compromise both patient experience and procedural success.[1,4,7] Our findings suggest that the KAPT block, which targets the Lee-Frankenhauser plexus, provides a more effective anaesthetic approach than the paracervical block, especially for operative interventions involving uterine manipulation and tissue resection. Although the difference in pain scores during cervical dilatation did not reach statistical significance, the significant reductions observed during and after the procedure are likely to be clinically meaningful for both patients and practitioners.

Strengths and limitations

The strengths of this trial include its randomised design, participant blinding, and thorough assessment of pain at multiple procedural stages. Limitations include the single-centre setting and moderate sample size, which may limit the generalisability of findings and the detection of differences in less common subgroups or adverse events. There is also a learning curve associated with performing the KAPT block, although it was minimised in this trial by limiting the procedure to two experienced operators. Finally, there are anatomical scenarios where the KAPT block cannot be applied; in such cases, alternative anaesthetic strategies remain necessary.

Interpretation in light of other evidence

Sensory innervation of the uterus and cervix is localised around the Lee-Frankenhauser plexus within the uterosacral ligament complex. Sympathetic postganglionic fibres from T10 to L1 descend via the hypogastric nerves into the inferior hypogastric plexus before entering the uterus, while parasympathetic preganglionic fibres from S2 to S4 travel in the pelvic splanchnic nerves within the uterosacral ligaments and join the same plexus. Afferent fibres from both uterus and cervix converge in the cervical division of this plexus near the posterior cervical attachment of the uterosacral ligaments. Neural branches reach the uterus mainly at the isthmus alongside the uterine vessels, with ascending rami passing into the broad ligament toward the upper uterus and the medial fallopian tubes. The endocervix and isthmic region contain the highest density of nerve endings, particularly around the internal os, with a progressive decline toward the fundus.[13] These features make the zone approximately 1.5 to 3 cm distal to the cervical insertion of the uterosacral ligaments an anatomically rational target for local anaesthetic deposition, which underpins the KAPT block.[8,10] The LF plexus occupies an area of approximately 2 cm2 and is circumscribed medially by the ampulla of the rectum and lateral vaginal fornix, laterally by the uterine artery, and superiorly by the broad ligament.[10]

The KAPT block offers a high degree of precision by targeting a well-defined anatomical zone. Fujii et al.[8]investigated the localisation of nerves in the uterosacral ligament to determine the optimal site for nerve ablation and identified the greatest concentration of nerve fibre bundles and nerve cells 1.65 to 3.30 cm distal to the cervical insertion at a depth of 0.3 to 1.5 cm. A relatively large number of nerve fibres were observed in the horizontal section at a depth of about 1 cm, supporting this as the most appropriate region for blocking afferent pain pathways to the uterus and cervix. This correlates directly with the injection site used in the KAPT block, which allows for reproducible, focused analgesia. Anatomically, this target corresponds to the terminal uterosacral segment described by Doyle et al. for paracervical uterine denervation.[9] In contrast, the paracervical block is less anatomically precise, and variation in injection location and depth, anaesthetic

agent and concentration, total volume, and timing prior to instrumentation has been noted in the literature, which may partly account for its inconsistent analgesic performance.

A case report by Benjamin P Jones et al.[14]laparoscopically targeted the same area of the uterosacral ligament as described by Fujii et al.[8] to provide effective treatment of a complex case of chronic pelvic pain. This pain relief lasted about 7 months. This further validates our technique of targeting this same area to produce temporary denervation of the uterus during operative OPH. Of note, our KAPT block technique preceded the publication of this case report, as our technique has been in use since 2015 and presented as a top scoring abstract in 2016.[11]

Across published trials there is no unifying concept of the paracervical block. Protocols vary by injection sites and depth, with at least four site patterns reported, different depths of infiltration, and use of either lidocaine or mepivacaine in a range of concentrations and total volumes. The interval from infiltration to instrumentation also varies, typically from 3 to 10 minutes. This heterogeneity likely contributes to the inconsistent analgesic performance attributed to the paracervical block in outpatient hysteroscopy.[7,15,16] Citanest(r) (prilocaine) provides rapid onset, typically under 2 minutes for infiltration and around 3 minutes for nerve blocks, with a duration of soft-tissue anaesthesia lasting approximately 2–2.5 hours depending on technique and dosage.[17]

However, there are situations where the KAPT block is not applicable, such as cases with a flush or enlarged cervix where lateral movement of the cervix is not possible, for example history of very large loop excisions where large amount of cervical tissue has been removed. In these cases, a paracervical block may be more feasible, although our data suggest it is associated with higher pain scores during and after the procedure.

Previous systematic reviews and meta-analyses have shown that while the paracervical block reduces pain compared with placebo or no local anaesthesia, it does not consistently provide adequate comfort, particularly in operative settings, and its efficacy is influenced by injection technique and operator experience.[1,7,15] Our results align with these observations, supporting the view that more precise and anatomically targeted methods, such as the KAPT block, may offer superior analgesia. Emerging evidence and observational studies have highlighted the potential of the KAPT block to improve procedural comfort through focused cervical and uterine denervation.[11] Recent guidance also encourages optimisation and standardisation of analgesia in operative outpatient hysteroscopy.[4,7]

Routine adoption of the KAPT block could meaningfully enhance the experience and outcomes of women undergoing operative outpatient hysteroscopy. The technique is practical, safe, and compatible with existing outpatient workflows. High satisfaction and willingness to recommend support its acceptability. Training in the KAPT block can be incorporated into current clinical practice with relative ease, and implementation may contribute to increased uptake of minimally invasive ambulatory gynaecological procedures.

Conclusion

The KAPT block offers a significant advance in pain management for operative outpatient hysteroscopy, providing superior analgesia compared to the paracervical block without compromising safety or patient satisfaction. Adoption of the KAPT technique has the potential to transform the patient experience in operative outpatient hysteroscopy by minimising procedural discomfort, supporting successful completion of complex cases, and enhancing overall service quality.

Our trial has shown that the KAPT block is superior to the paracervical block and should become the primary method of local anaesthesia in OPH. However, if not possible due to the anatomical reasons discussed, the paracervical block remains an alternative, particularly for cervical dilatation.

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Conflict of Interest

The authors declare that there are no conflicts of interest.

Contribution to authorship

Contribution to Authorship

RL conceived the study, developed the protocol, and contributed to recruitment and data collection. MS contributed to study design, participant recruitment, data analysis, and drafting of the manuscript. Both authors reviewed and approved the final version and accept responsibility for the paper as published.

Ethics and Registration

Ethical approval was granted by the Research Ethics Committee of the Health Research Authority (HRA) and Health and Care Research Wales (HCRW) (IRAS reference: 339976). The study was registered with ISRCTN (15619382).

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References

1. Cooper NAM, Khan KS, Clark TJ. Local anaesthesia for pain control during outpatient hysteroscopy: systematic review and meta-analysis.**BMJ.** 2010;340:c1130. doi:10.1136/bmj.c1130.
2. UK Parliament. **NHS Hysteroscopy Treatment.** House of Commons debate, 31 Jan 2022. [Internet]. London: Hansard; 2022 [cited 2025 Sep 5]. Available from: https://hansard.parliament.uk
3. UK Parliament Health and Social Care Committee. **Written evidence submitted by the Campaign Against Painful Hysteroscopy (CAPH).** [Internet]. 2022 [cited 2025 Sep 5]. Available from: https://committees.parliament.uk
4. Royal College of Obstetricians and Gynaecologists. **Pain Relief and Informed Decision Making for Outpatient Hysteroscopy (Good Practice Paper No. 16).** London: RCOG; 2023 [cited 2025 Sep 5]. Available from: https://www.rcog.org.uk

5. Nagele F, Lockwood G, Magos AL. Randomised placebo-controlled trial of mefenamic acid for premedication at outpatient hysteroscopy: a pilot study. **Br J Obstet Gynaecol.** 1997;104(7):842–4. doi:10.1111/j.1471-0528.1997.tb12031.x.
6. Angioli R, De Cicco Nardone C, Plotti F, Aloisi A, Luvero D, Terranova C, **et al.** Use of music to reduce anxiety during office hysteroscopy: prospective randomized trial. **J Minim Invasive Gynecol.** 2014;21(3):454–9. doi:10.1016/j.jmig.2013.09.009.
7. Ahmad G, Saluja S, O'Flynn H, Sorrentino A, Leach D, Watson A. Pain relief for outpatient hysteroscopy. **Cochrane Database Syst Rev.** 2017;10:CD007710. doi:10.1002/14651858.CD007710.pub3.
8. Fujii M, Sagae S, Sato T, Tsugane M, Murakami G, Kudo R. Investigation of the localization of nerves in the uterosacral ligament: determination of the optimal site for uterosacral nerve ablation.**Gynecol Obstet Invest.** 2002;54(Suppl 1):11–6. doi:10.1159/000066289.
9. Doyle JB. Paracervical uterine denervation by transection of the cervical plexus for the relief of dysmenorrhea. **Am J Obstet Gynecol.** 1955;70(1):1–16. doi:10.1016/0002-9378(55)90282-9.
10. Spackman R, Wrigley B, Roberts A, Quinn M. The inferior hypogastric plexus: a different view. **J Obstet Gynaecol.** 2007;27(2):130–3. doi:10.1080/01443610601113839.
11. Jawad I, Laiyemo R. KAPT block: a new innovative precision block for operative outpatient hysteroscopy. **BJOG.** 2016;123(Suppl 2):5–248. Abstract 012. doi:10.1111/1471-0528.14080.
12. Noor N, Roy KK, Zangmo R, Das A, Rai R, Kumari A, **et al.** Role of para-cervical block in reducing immediate postoperative pain after total laparoscopic hysterectomy: a prospective randomized placebo-controlled trial. **Obstet Gynecol Sci.** 2021;64(1):122–9. doi:10.5468/ogs.20337.
13. DeCherney AH, Nathan L, Laufer N, Roman AS. **Current Diagnosis & Treatment: Obstetrics & Gynecology.** 12th ed. New York: McGraw-Hill Education; 2019. p. 18.
14. Jones BP, Saso S, Bracewell-Milnes T, Barcroft J, Borley J, Goroszeniuk T, **et al.** Laparoscopic uterosacral nerve block: a fertility preserving option in chronic pelvic pain. **AIMS Med Sci.** 2019;6(4):260–7. doi:10.3934/medsci.2019.4.260.
15. Tangsiriwatthana T, Sangkomkamhang US, Lumbiganon P, Laopaiboon M. Paracervical local anaesthesia for cervical dilatation and uterine intervention. **Cochrane Database Syst Rev.** 2013;9:CD005056. doi:10.1002/14651858.CD005056.pub3.
16. Cicinelli E, Didonna T, Schonauer LM, Stragapede S, Falco N, Pansini N. Paracervical anesthesia for hysteroscopy and endometrial biopsy in postmenopausal women: a randomized, double-blind, placebo-controlled study. **J Reprod Med.** 1998;43(12):1014–8. PMID:9883403.
17. Drugs.com. **Prilocaine: professional monograph.** [Internet]. Updated 2024 Sep 23 [cited 2025 Sep 5]. Available from: https://www.drugs.com/monograph/prilocaine.html

Attached Materials

Table1. Baseline characteristics of women undergoing outpatient hysteroscopy by allocation group (KAPT block vs paracervical block). Values are mean +- standard deviation, median (interquartile range), or n (%).

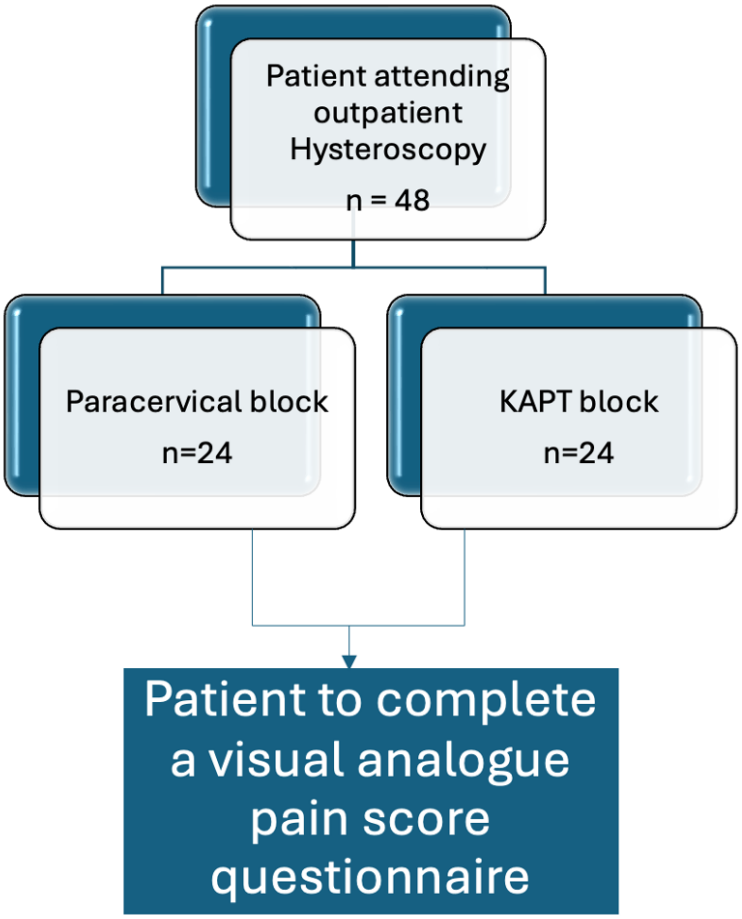
Table2. Pain scores and secondary outcomes for women undergoing outpatient hysteroscopy, by allocation group. Pain scores were measured using a 10-point visual analogue scale (VAS). Values are mean +- standard deviation, median (interquartile range), or n (%).

Figure1. CONSORT flow diagram showing the flow of participants through the trial, from assessment of eligibility to randomisation, allocation, follow-up, and analysis.

Figure2. Injection sites for the King's Mill Anterior-Posterior and Transverse (KAPT) block and the paracervical block. The KAPT block involves deep injections at the 5 and 7 o'clock positions, 3 cm inferolateral to the external os. The paracervical block involves superficial injections at the 2, 4, 8, and 10 o'clock positions at the cervicovaginal junction.

Figure3. Laparoscopic view of the targeted KAPT injection site as described by Fujii et al.

Video1. KAPT block technique



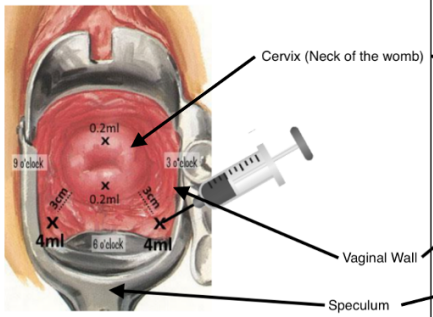


Illustration of where we inject the numbing injection in a KAPT Block

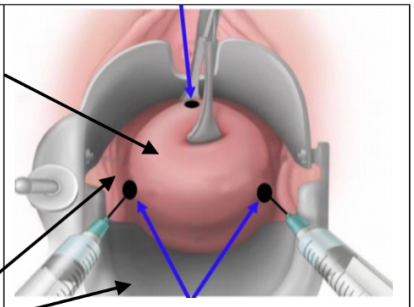


Illustration of where we inject the numbing injection in a paracervical Block

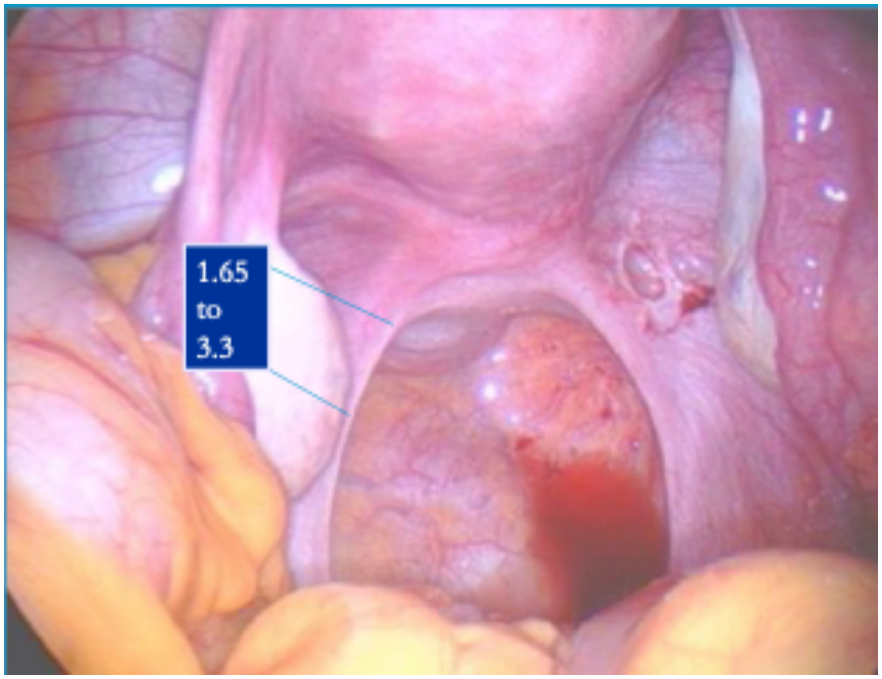


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Table 1.docx available at https://authorea.com/users/964689/articles/1333300-king-s-mill-anterior-posterior-and-transverse-kapt-block-versus-paracervical-block-in-operative-outpatient-hysteroscopy-a-single-centre-randomised-controlled-trial

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Table 2.docx available at https://authorea.com/users/964689/articles/1333300-king-s-mill-anterior-posterior-and-transverse-kapt-block-versus-paracervical-block-in-operative-outpatient-hysteroscopy-a-single-centre-randomised-controlled-trial