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“Pain Free Day Surgery?”:

Evaluating pain and pain assessment during hysteroscopy

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Summary

Hysteroscopy is a gynaecological procedure used to inspect for pathological conditions in the uterine cavity. Multiple sources in the UK describe this procedure as non-painful, although this description is being challenged by public campaigns. We evaluated surgical data from 801 hysteroscopy patients, primarily focussing on patient's retrospective ratings of intraoperative pain. We also compared these ratings to the clinician's estimates of patient pain, and to the dosage of anaesthetic applied. It was found that hysteroscopy is associated with a range of pain intensities (M^{rating}= 3.97, s.d. =2.45), with only a small subset of patients (7.8%) experiencing no pain at all. Patients who received the highest dose of analgesia described the most pain. However, clinicians viewed these patients as being in the least pain, potentially indicating an overestimation of the efficacy of the analgesia. Our findings indicate that severe pain is a genuine risk within hysteroscopy.

Hysteroscopy is a diagnostic gynaecological procedure traditionally requiring the administration of general anaesthetic, but more frequently completed using local anaesthetic within a day-case pathway. Advantages associated with this transition include decreased completion times, fewer risks and lower clinical costs.[1,2] However, maintaining patient satisfaction should continue to remain a high priority, as the risk of pain and discomfort remains a primary concern.[3] Numerous services advertise the procedure as being either pain-free or low pain, however it is estimated that 25% of patients report experiencing intense or intolerable pain.[4] For severe pain, local anaesthetic can be administered, but this does not guarantee effective pain management[5].

In 2013, Parliament instigated a campaign to "End barbaric NHS hysteroscopies with inadequate pain relief".[6] Nevertheless, a disconnect remains between the view of hysteroscopy as a low-pain procedure, and frequent patient reports of severe pain. For some, hysteroscopy may be a routine and painless procedure, whilst for others it can elicit severe pain.[4] To evaluate the incidence of pain during hysteroscopy, and the congruency of patient and clinician assessments of pain, we examined hysteroscopy outcomes.

Between 2009 and 2017, data was recorded from 804 hysteroscopy patients (M^{age}=51.8 years, s.d.=12.17) at the Royal Berkshire Hospital in Reading, UK. Permission to analyse and disseminate the data was obtained via the local Research & Development department, in line with the National Research Ethics Service's (NRES) guidance on the completion of clinical audits. We collected post-operative clinical reports including ampules of anaesthetic administered (0-3 ampules; 3% plain mepivacaine hydrochloride administered via a 2.2ml Scadonest dental cartridge and needle) and the clinician's estimate of pain during the procedure, recorded on a 5-point verbal descriptive scale with the following labels: none; discomfort; mild; moderate; severe. Patients provided a retrospective verbal report of pain experienced using a numeric rating scale between 0-10, with 0 representing no pain and 10, the most severe pain ever experienced. During the 8-year period of data entry and collection, the clinician and patient remained blinded towards each other's impressions, and each of the separate questionnaires remained consistent.

During their hysteroscopy, patients could be administered anaesthetic, on the basis of clinical judgement based on pre- and intra-operative indications. After the procedure, the patient returned to a waiting room and provided a retrospective pain report. During this time, the clinician completed their clinical report.

Analysis was restricted to the responses to three variables; Clinicians' retrospective pain ratings, patients' retrospective rating of their own pain during the procedure, and number of ampules of anaesthetic. Spearman's rank-order correlation coefficients were calculated to investigate the congruence of pain assessment between patients & doctors, and how analgesia administration was related to these assessments.

Mean patient pain rating was 3.97/10 (s.d=2.45), with 17.6% of patients reporting pain >7 (n=126) and only 7.8% being pain-free (n=64). Mean clinicians pain rating was 3.92/5 (s.d=1.00). Patient pain ratings were negatively correlated with clinician estimates of patient pain ($r_s(714)=-.525$, $p<0.0001$; Figure 1a).

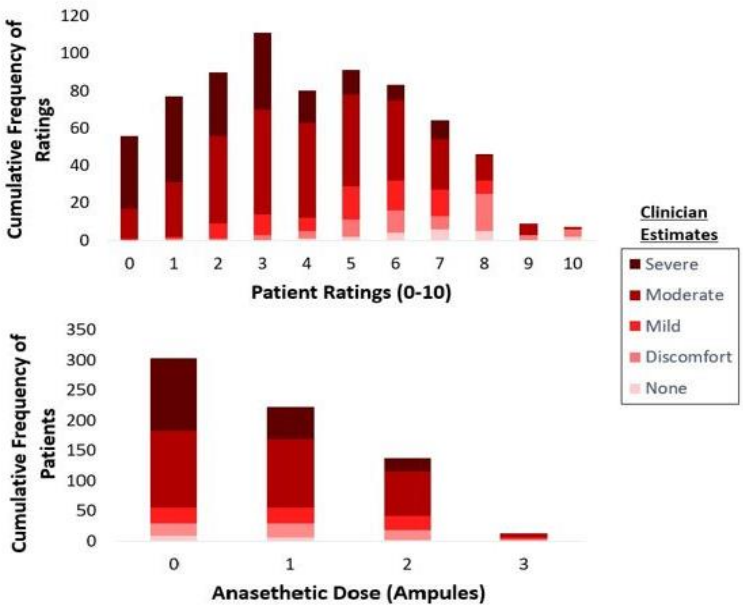

Figure 1 | **Hysteroscopy pain reports, clinician estimates and anaesthetic administration.** **a** | Association between patient's pain ratings and the estimated rating of the patient's pain provided by the clinician that completed the hysteroscopy. Stacked bars indicate the proportion of clinician ratings for each unit of patient ratings. **b** | Estimated clinician pain ratings associated with number of ampules of anaesthetic applied intrasurgically. Stacked bars indicate the proportion of clinician ratings for each unit of administered anaesthetic.

Clinicians retrospective pain estimates were negatively correlated with anaesthetic dose ($r_s(678)=-.213$, $p<0.0001$). However, patient pain ratings were positively correlated with anaesthetic dose ($r_s(673)=0.110$, $p<.005$). As demonstrated in Figure 1b, clinicians were relatively conservative with pain medication, with a high percentage of patients (n= 303; 37.7%) receiving no medication at all, and only very few (n =14; 1.9%) given the maximum dose. A substantial number of individuals

given no pain medication were judged to be in severe (n=120) or moderate (n=128) pain. Additionally, a significant proportion of patients given a non-maximal dose rated pain >7/10 (0 ampules: n=46; 1 ampule: n=50; 2 ampules: n=15).

These results suggest descriptions of hysteroscopy should be updated to reflect the actual risk of pain likely to be experienced during the procedure, as well as the need to re-evaluate extant pain management strategies. Patients' ratings of surgical pain were negatively correlated with clinicians' estimates, suggesting a disconnect between clinician pain assessment and patient experience. This disconnect directly influenced patient outcomes: Clinicians showed high confidence in the efficacy of their interventions, reporting lower pain for patients given higher doses of analgesia. In fact, patients who received more analgesia reported higher pain ratings. Recognition of this disconnect suggests that use of increased dosages could improve pain management, as clinicians rarely utilised the maximum dose available. Importantly, this correlation could include successful pain management interventions with over half (55.2%) of patients with low pain ratings (0-3) being administered anaesthetic. This may contribute to the inverse correlation with high clinician pain estimates leading to the administration of anaesthetic facilitating low post-operative pain patient ratings.

Decisive clinical action frequently necessitate the use of heuristics, thus examining biases can help us understand intraoperative pain management.[7] Clinicians frequently err on the side of trusting their own clinical skills at the expense of patient statements[8] and can also be over-confident in the effectiveness of their pain management.[9,10] Overestimate of analgesic efficacy could explain why patients receiving the highest dose of analgesia received lower clinician pain estimates, despite their own higher ratings.

In summary, these findings illuminate the experience of pain during hysteroscopies. We provide support for campaigns raising awareness of pain within this procedure, with 17.6% of patients reporting pain >7/10 and only 7.8% reporting no pain at all. This indicates that patients are likely to experience pain during their procedure, and the descriptions provided to our patients should reflect this. Our results also identified a disconnect between clinician and patient pain reports, as we observed an inverse relationship between patient pain ratings and clinician estimates of the same pain. It is important to note, these results require confirmation via follow-up, as multiple factors are likely to be important when investigating individuals differences in pain vulnerability and the efficacy

of analgesia, however, these data do suggest a need to base evaluation of intra-operative hysteroscopic pain on a more reliable assessment framework.

Declarations of interests

The authors declare that they have no conflict of interests

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Authors Contributions

RH:- Final write-up & analysis of dataset

WK:- Data collection & lead clinician

AK:- Detailing of clinical details of procedure & scope of clinical problem

ML:- Consultation on clinical methods and redrafting at 2nd draft stage

WG:- Wrote 2nd and 3rd draft of discussion and added details of scope of expectations on pain

DR:- Consultation on patient perspective and current patient advertisement literature. Redrafted 3rd draft of paper

CvR:- Statistical expertise on large datasets and non-parametric ordinal statistics

TS:- Senior author, provided guidance on manuscript, analysis, redrafting and submission.

All authors included within this manuscript meet the four criteria recommended by the International Committee of Medical Journal Editors; as below:

1) Substantial contribution to conception & design (WK, AK), acquisition of data (WK), analysis (RH, ML, WG, CvR, TS) and interpretation of data (RH, ML, WG, AK, DR, CvR, TS)
2) Drafting the article or revising it critically for important intellectual content (All authors)
3) Final approval of the version to be published (All authors)
4) Agreement to be accountable for all aspects of the work… (All authors)

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