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Intraoperative Pain during Cesarean Delivery under Neuraxial Anesthesia: A Systematic Review and Meta-analysis

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EDITOR'S PERSPECTIVE

What We Already Know about This Topic

- Neuraxial anesthesia is the definitive standard technique for cesarean delivery; however, intraoperative pain during cesarean delivery under neuraxial anesthesia is common
- Comprehensive assessment of intraoperative pain under different neuraxial anesthesia modalities remains unavailable

What This Article Tells Us That Is New

- Spinal anesthesia had the lowest incidence of intraoperative pain, whereas epidural anesthesia had the highest, affecting one in three patients
- The incidence of intraoperative pain with combined spinal and epidural anesthesia was found to be between that of spinal or epidural anesthesia alone; this discrepancy is likely multifactorial

ABSTRACT

Background: Neuraxial anesthesia is the definitive standard technique for cesarean delivery; however, pain during cesarean delivery may be underreported. The primary aim of this systematic review and meta-analysis was to determine the incidence of patient-reported intraoperative pain during cesarean delivery under neuraxial anesthesia.

Methods: A literature search of databases (PubMed, MEDLINE, Embase, Web of Science, Scopus, Cochrane Database of Systematic Reviews, and Central Register of Controlled Trials) was conducted. Search topics included terminology concerning cesarean delivery, neuraxial anesthesia, pain, and incidence. Meta-analyses were performed to calculate pooled incidences of patient-reported pain and how mode of anesthesia influenced the incidence of patient-reported pain, with included articles assessed for risk of bias.

Results: A total of 2,061 abstracts were screened; 34 articles were included (21 randomized studies and 13 nonrandomized studies). The crude incidence of intraoperative pain under neuraxial anesthesia was 10.8% (1,229 of 11,351 patients), and the pooled incidence was 17% (95% CI, 13 to 22%; 1,229 of 11,351 patients). Patients who received spinal anesthesia had the lowest pooled incidence of pain of 14% (95% CI, 10.0 to 20.0%; 662 of 8,002 patients), and those who received epidural top-up had the highest pooled incidence of pain of 33% (95% CI, 17.0 to 54.0%; 253 of 1,395 patients). Risk of bias assessments showed high risk of bias in half of the included studies.

Conclusions: Patient-reported pain during cesarean delivery under neuraxial anesthesia is common, with spinal and combined spinal–epidural anesthesia reporting a lower incidence of pain than epidural anesthesia. Intraoperative pain can have significant psychologic impact for patients and medicolegal implications for providers. Further prospective studies are required to characterize and understand the impact of patient experiences of pain and develop techniques to reduce this complication.

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Cesarean delivery is the most common inpatient surgical procedure worldwide, with rates increasing annually.[1] Neuraxial anesthesia techniques are considered the definitive standard for cesarean delivery with many maternal

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Abbreviations: CSE, combined spinal–epidural; **PRISMA**, Preferred Reporting Items for Systematic reviews and Meta-Analyses; **PROSPERO**, International Prospective Register of Systematic Reviews; **RoB 2**, risk-of-bias tool, version 2; **ROBINS-I**, Risk of Bias in Non-randomised Studies of Interventions

and neonatal advantages when compared to general anesthesia.[2,3] However, neuraxial anesthesia is not completely failsafe, with the reported incidence rates of "inadequate anesthesia" ranging from 0.8 to 12%.[3,4,5]

To date, there has been marked heterogeneity in how studies have defined and approached intraoperative pain.[3,5–14] Many studies have relied on surrogates of patient-reported intraoperative pain such as conversion to general anesthesia, need for a repeat neuraxial procedure, and use of supplemental analgesia.[4–6,15,16] However, not all patients who report intraoperative pain receive supplemental interventions.[17] The American Society of Anesthesiologists' (Schaumburg, Illinois) "Statement on Pain during Cesarean Delivery" highlighted that a failure to focus on the occurrence of patient-reported pain risks significantly underestimating the true incidence of pain experienced by patients.[18] A systematic review of randomized controlled studies estimated the incidence to be approximately 15%. However, this analysis was limited to randomized controlled trials reporting surrogates of patient-reported pain, which may be affected by investigators' assessment and treatment practices. It also considered only scheduled cesarean deliveries and may not be generalizable to those intrapartum, which may exhibit higher intraoperative pain.[19,20]

Significant consequences can result from the experience of intraoperative pain during cesarean delivery. Analysis of litigation claims in the United Kingdom found that in obstetric cases, a high proportion of claims were due to pain during cesarean delivery.[21] The severity of reported harm after inadequate regional anesthesia is equivalent to that after awareness under general anesthesia.[22] Inadequate neuraxial anesthesia can lead to substantial psychological morbidity in the short and longer term, including an increased incidence of postpartum depression,[23] posttraumatic stress disorder, and its symptoms.[24,25] According to the General Medical Council, it is important that risks of harms that patients may consider significant should be discussed during the consent process.[26] In the context of cesarean delivery under neuraxial anesthesia, this could reasonably be expected to include an estimate of the incidence of intraoperative pain experienced by patients.

The aim of this systematic review and meta-analysis was to provide an accurate estimate of the incidence of patient-reported intraoperative pain during cesarean delivery under neuraxial anesthesia. The secondary aim was to report the incidence of patient-reported intraoperative pain according to neuraxial anesthesia technique.

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Materials and Methods

This systematic review and meta-analysis were conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines[27] and was prospectively registered on the PROSPERO register of systematic reviews (CRD42023477114).

Search Strategy, Criteria, and Data Extraction

We conducted a systematic search with support from a medical librarian (L.B.). The databases searched included PubMed, MEDLINE, Embase, Web of Science, Scopus, Cochrane Database of Systematic Reviews, and the Central Register of Controlled Trials and covered a timeframe from inception of each database until the search date. Duplicates were removed, and abstracts were uploaded to Rayyan, Qatar Computing Research Institute (USA) on November 3, 2023.[28] A combination of keywords and controlled vocabulary was used, with terms covering "cesarean section," "neuraxial anesthesia," "pain," and "incidence." Only studies involving human subjects and in English were included. Study designs included randomized controlled trials, observational studies (including cohort and case–control studies), case series with more than 10 cases, and reviews containing novel data. Studies involving adult patients (aged 18 or older) undergoing scheduled or unscheduled cesarean delivery under neuraxial anesthesia, including those that were subsequently converted to general anesthesia, with outcomes related to patient-reported pain were considered for inclusion. A full search strategy and list of inclusion and exclusion criteria can be found in Supplemental Digital Content 1 (https://links.lww.com/ALN/D943) and Supplemental Digital Content 2 (https://links.lww.com/ALN/D944).

A minimum of two authors (E.A.C., H.C., J.K., and/or J.E.O.) screened articles by title and abstract against the inclusion and exclusion criteria (Supplemental Digital Content 2, https://links.lww.com/ALN/D944), followed by full-text screening to obtain a final set of included studies. Any conflicts regarding inclusion or exclusion of a study were settled by consultation with a third author (J.K., J.E.O., or B.C.).

Data extraction was performed independently by a minimum of two authors (E.A.C., H.C., J.K., and/or J.E.O.) using a standardized table on Word (Microsoft Corporation, USA). Any conflicts were resolved through discussion between all three involved authors. Extracted items included lead author, year of publication, study design, country, and any study variables relevant to our systematic review, including variables related to patient-reported pain.

Risk of Bias Assessment

Risk of bias assessments were performed using two tools: (1) version 2 of the Cochrane risk-of-bias tool (RoB 2) tool[29] for randomized studies and (2) the Risk of Bias in Non-randomised Studies of Interventions (ROBINS-I) tool[30] for nonrandomized studies. Each tool assesses bias across several different domains, categorizing them as either "low," "moderate," "serious," or "critical" risk of bias. A final overall risk is then designated for each study using the same risk categories.

Outcomes

The primary outcome was the incidence of patient-reported intraoperative pain during cesarean delivery. Secondary outcomes included the incidences of patient-reported intraoperative pain grouped according to neuraxial anesthetic techniques (spinal, combined spinal–epidural [CSE], and epidural). Pain was defined as any pain or discomfort described by the patient or from a pain-related patient-reported outcome measure. We defined intraoperative pain as pain occurring during and relating to the cesarean delivery surgery, including procedural and referred pain but excluding medication side effects.

Statistical Analysis

A meta-analysis of the included studies was performed to calculate pooled incidences of patient-reported pain, assuming a random effects model using the inverse-variance method. These incidences were accompanied by 95% CI calculated using the Wilson method and presented as forest plots. The I^2 statistic and prediction intervals were used as measures of heterogeneity. Meta-analysis was performed using R4.4.0 "meta" package (R Foundation for Statistical Computing, Vienna, Austria). A preplanned subgroup meta-analysis was conducted to investigate neuraxial anesthesia technique on incidence of patient-reported pain. We performed *post hoc* analyses for the incidence of conversion to general anesthesia and pooled incidences in those studies that used pain scales or binary pain assessment.

Results

After retrieval and deduplication, a total of 2,061 articles were screened for inclusion, with a resulting 34 studies being finally included in our review. A PRISMA flow diagram summarizing our screening process is shown in figure 1. The extracted data from each study are summarized as a table in Supplemental Digital Content 3 (https://links.lww.com/ALN/D945). The included studies were published between 1990 and 2023 and were from 20 different countries. A total of 21 studies were randomized studies[9,11,31–49] with the remaining 13 nonrandomized studies.[5,7,17,50–59] Of the 21 randomized studies, based on RoB 2 assessment, 6 studies were graded as "moderate" risk of bias, with the remaining 15 graded as "high" risk of bias. Of the 13 nonrandomized studies, 3 were graded as "low," 4 were graded as "moderate," and 6 were graded as "high" risk of bias using the ROBINS-I tool. Risk of bias assessments for included randomized and nonrandomized studies are shown in Supplemental Digital Content 4 (https://links.lww.com/ALN/D946) and Supplemental Digital Content 5 (https://links.lww.com/ALN/D947), respectively.

A crude overall incidence of patient-reported intraoperative pain during cesarean delivery from meta-analysis of all 34 studies was 10.8% (1,229 of 11,351). A pooled incidence of patient-reported pain was 17% (95% CI, 13 to 22%; 1,229 of 11,351 patients; fig. 2). Heterogeneity was present with an I^2 value of 96%.

Spinal anesthesia was used in 8,002 patients in 25 studies,[5,7,9,11,31–34,36–38,41–47,50,53,55–59] with CSE anesthesia in 951 patients in 11 studies[5,32,35,37,39–41,48,49,55,59] and epidural top-up in 1,395 patients in 6 studies.[5,7,9,35,55,59] Some studies included more than one type of neuraxial anesthesia but provided a breakdown of incidence of patient-reported pain for each neuraxial technique. Four studies (accounting for 1,003 patients)[17,51,52,54] did not provide information on the incidence of intraoperative pain according to anesthesia technique.

The pooled incidence for patient-reported pain in those who had spinal anesthesia was 14.0% (95% CI, 10.0 to 20.0%; 662 of 8,002 patients; fig. 3). For patients who had epidural top-ups, the pooled incidence was 33.0% (95% CI, 17.0 to 54.0%; 253 of 1,395 patients; fig. 4). Finally, for those who had CSE, the pooled incidence was 18.0% (95% CI, 10.0 to 30.0%; 182 of 951 patients; fig. 5). In neuraxial subgroups, pooled incidences showed heterogeneity of I^2 of 96, 95, and 87% for spinal, epidural top-up, and CSE, respectively. Included nonrandomized and randomized studies showed a pooled incidence of 12% (95% CI, 9 to 16%) and 21% (95% CI, 15 to 30%), respectively (Supplemental Digital Content 6, https://links.lww.com/ALN/D948).

Patient-reported pain was assessed by differing methods in the included studies. Visual analog scales were most commonly used, in 13 studies; binary responses for the presence or absence of pain were used in 12 studies, and 3 studies each used numerical rating, visual numerical, or Likert-type scales. The pooled incidence for studies using binary responses was 11% (CI, 7 to 18%, I^2 = 95%; Supplemental Digital Content 7, https://links.lww.com/ALN/D949) and for using pain scores was 23% (17 to 31%, I^2 = 90%; Supplemental Digital Content 8, https://links.lww.com/ALN/D950). A total of 9 studies recorded the average (median or mean) reported pain scores, with these ranging from 0 to 6. A total of 13 studies reported the conversion to general anesthesia for pain, and the overall pooled incidence was 1% (95% CI, 1 to 2%; Supplemental Digital Content 9, https://links.lww.com/ALN/D951).

A total of 25 studies were conducted in the scheduled cesarean population, with 6 studies including both scheduled and emergency cesarean deliveries; in the final three,

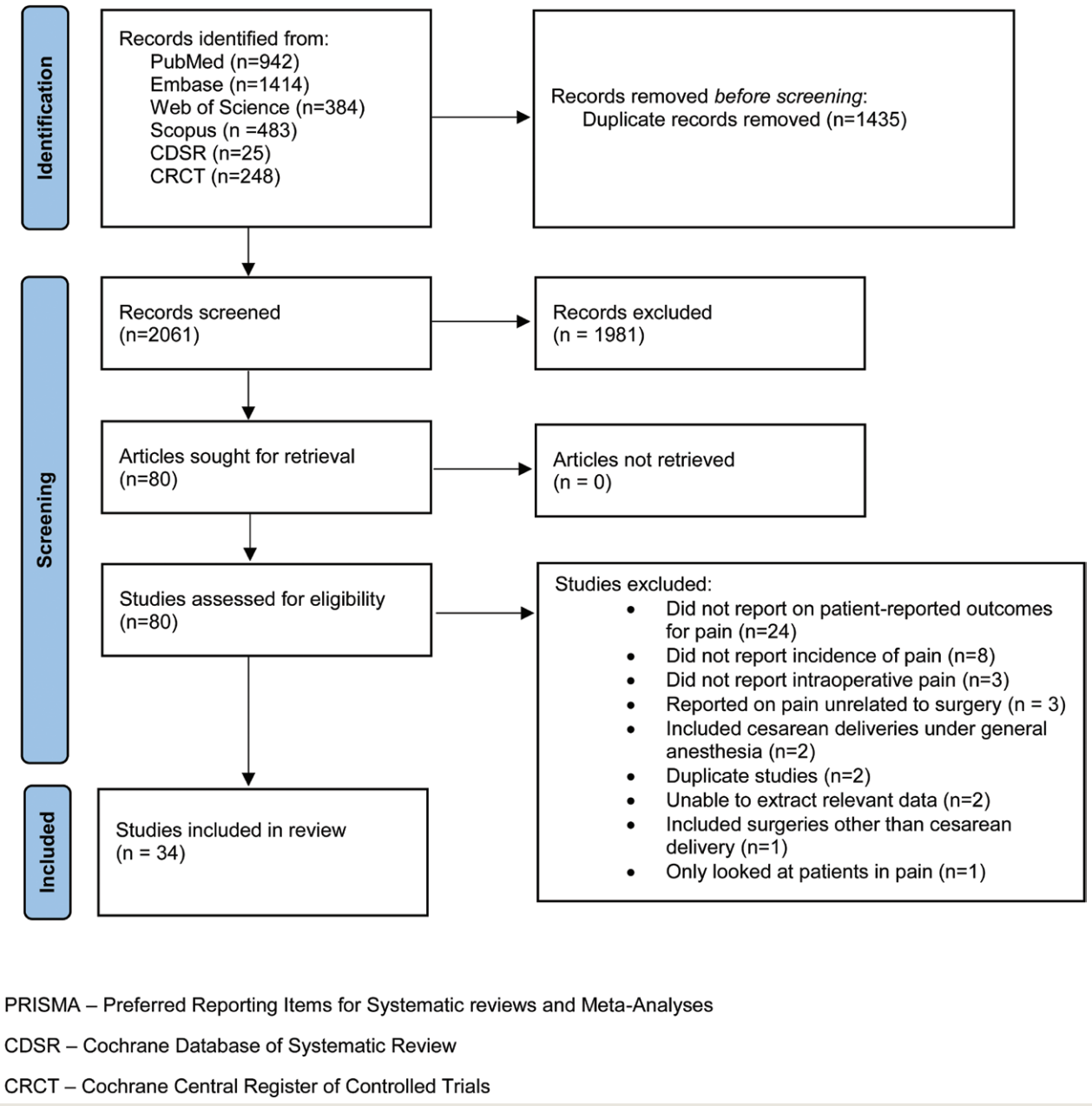

Fig. 1. PRISMA flowchart. CDSR, Cochrane Database of Systematic Review; CRCT, Cochrane Central Register of Controlled Trials; PRISMA, Preferred Reporting Items for Systematic reviews and Meta-Analyses.

it was not discernable. The incidence in the scheduled setting was 20% (95% CI, 15 to 26.0%; Supplemental Digital Content 10, https://links.lww.com/ALN/D952).

Discussion

Our systematic review and meta-analysis revealed a pooled incidence of 17% for patient-reported intraoperative pain, meaning that more than one in six patients reported experiencing pain during their cesarean delivery. Spinal anesthesia had the lowest pooled incidence (14%, or one in seven), and epidural top-up had the highest (33%, or one in three). Beyond the presence or absence of pain, there was substantial variation between studies in the methods used to assess levels of patient-reported intraoperative pain.

Clinical Relevance

Pain during their cesarean is a concern for many patients. In a survey of 100 pregnant patients, 49% ranked pain

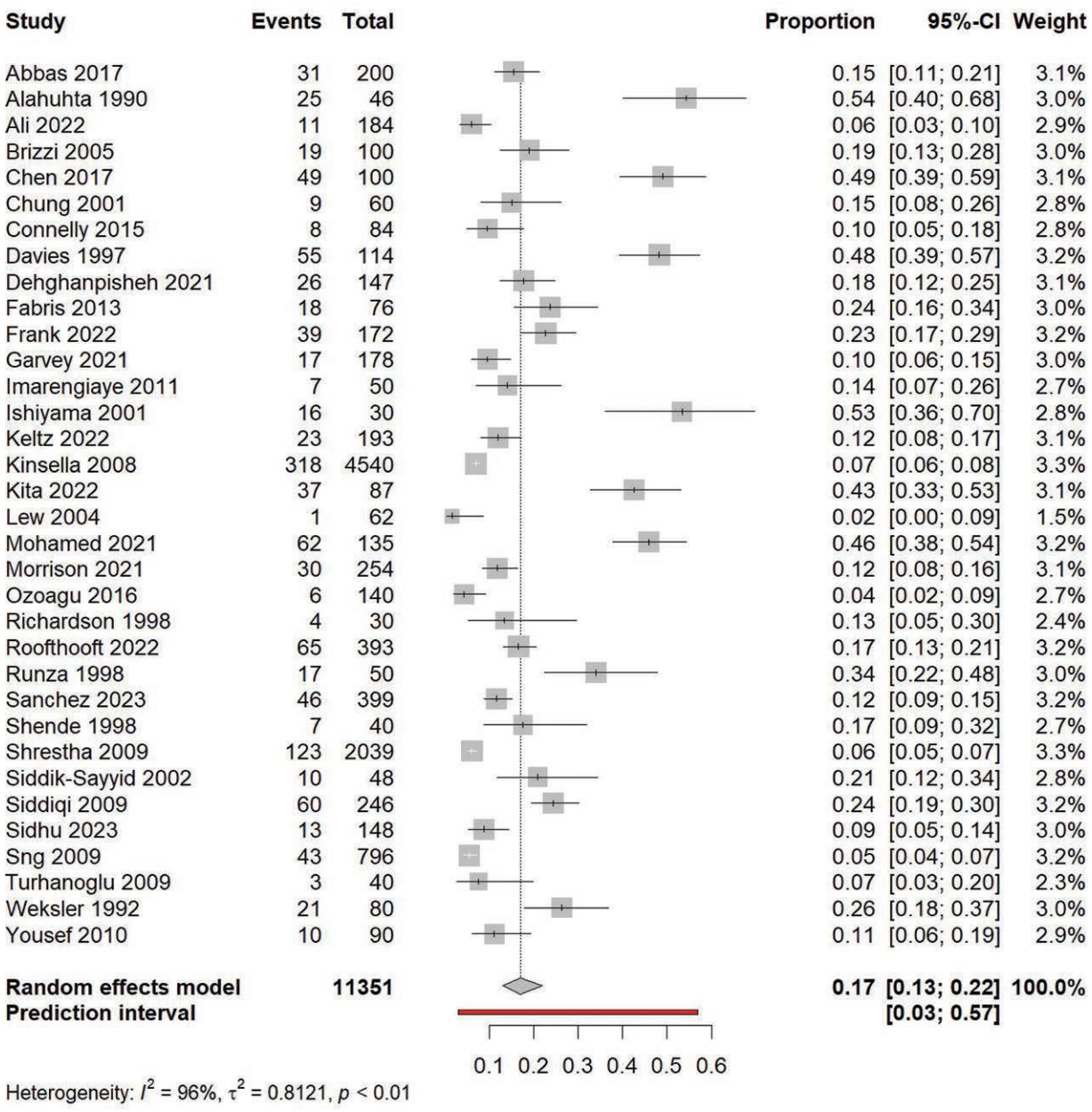

Fig. 2. Forest plot of overall incidence of pain during cesarean delivery under neuraxial anesthesia.

as the least desirable anesthetic outcome related to their cesarean delivery, ahead of postoperative pain, vomiting, nausea, and itching.[60] Best practice in obstetric anesthesia includes preoperatively informing patients of the potential for pain, setting expectations about discomfort, and involving patients in a conversation about how to manage pain should it arise.[18] Assumptions about patients' thresholds for discomfort and/or pain, and subsequent optimal management should be avoided. Preoperative patient concerns have been shown to include both fear of inadequate anesthesia and fear of being rendered completely insensate.[61] Some patients prefer to accept moderate pain to avoid analgesic side effects for them and/or their baby.[60] It is hoped that our study results will help clinicians quantify the risk of intraoperative pain during cesarean delivery and support patients in establishing their boundaries and preferences with regards to this pain should it occur.

The definition of pain was based on the patients' self-reported unpleasant sensory and emotional experience. The distinction between "pain" and "discomfort" is not always clear; however, both states are at best subjectively unpleasant and at worst permanently traumatizing. The distinction also

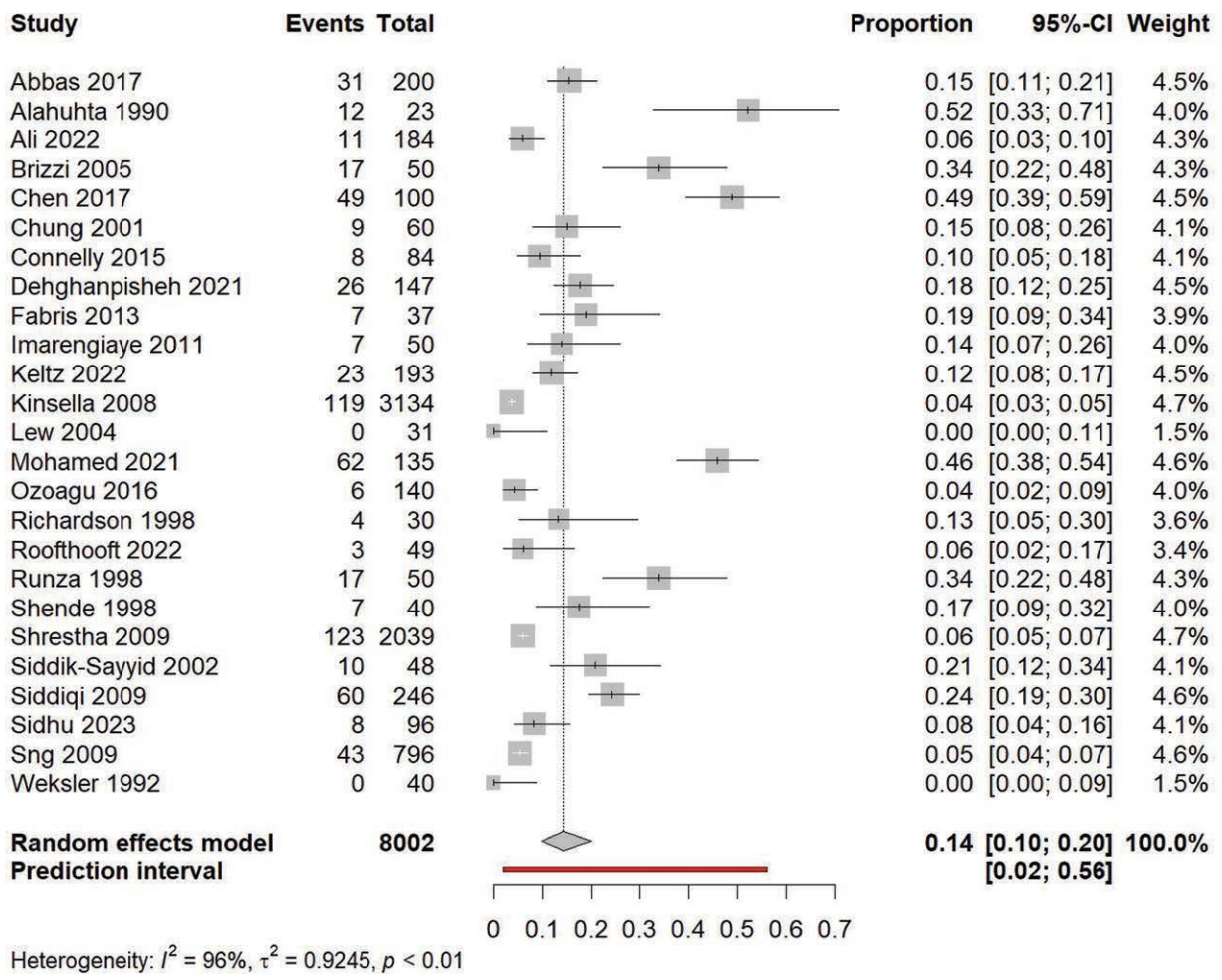

Fig. 3. Forest plot of incidence of pain during cesarean delivery under spinal anesthesia.

fails to account for interindividual differences in the experience of pain. It has been shown that those patients not requiring supplemental analgesia or conversion to general anesthesia still report a wide variation in the intensity of sensation experienced during cesarean delivery, ranging from minimal discomfort to pain.[61] Two of the seven included studies using numerical scales for pain reported a median pain score of 6 of 10, which is considered a moderate to severe level of pain. The negative psychological impact of experiencing intraoperative pain may be a result of failure to acknowledge the patient's experience; consequently, it is of importance to provide an estimate of the incidence of all reported intraoperative pain.[20]

An adverse event with an incidence greater than 1 in 10 is classified as "very common."[62] Informed consent is a fundamental component of good medical practice and should involve discussion and disclosure of "all material risks," including those occurring most frequently.[26] In a review of greater than 360 medicolegal claims concerning pain during cesarean delivery, a substandard consent process was identified in 50% of cases. Discussion around expected sensation during the procedure was not documented in many cases.[22] Although there is strong consensus that the risk of intraoperative pain under neuraxial anesthesia should be discussed with the patient during the consent process,[22] this is difficult to facilitate when the true incidence is unknown. Our study offers an up-to-date estimate of overall incidence, as well as incidences based on neuraxial anesthetic technique, which can be used to guide the consent content and process.

These results could be concerning to patients, especially those receiving epidural top-up, who face a one-in-three risk of intraoperative pain or discomfort.[22] For clinicians, our results may lower the threshold for diagnosing and managing intraoperative pain when epidural top-up is the primary technique. Care must be taken to consider the psychological impact of language used by clinicians,[63] for example, acknowledging the range of experiences captured in these data including both "discomfort" and "pain" and to avoid the "nocebo effect,"[64,65] in which the expectation of pain could precipitate or worsen its experience. These

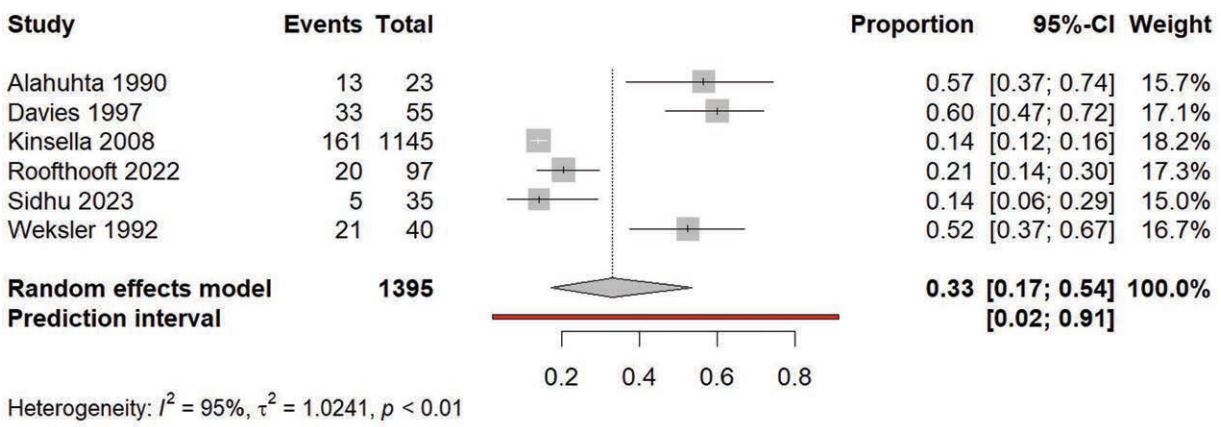

Fig. 4. Forest plot of incidence of pain during cesarean delivery under epidural anesthesia.

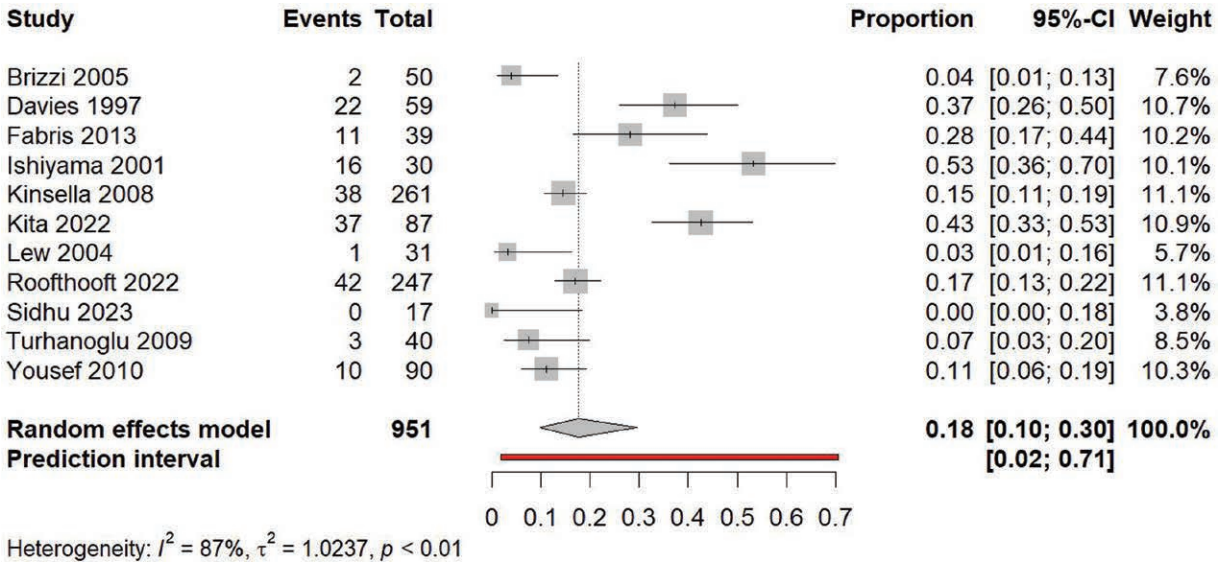

Fig. 5. Forest plot of incidence of pain during cesarean delivery under combined spinal epidural anesthesia.

results should be contextualized with additional information—for example, the likelihood of requiring supplemental analgesia or conversion to general anesthesia—so that the patient is fully informed of what to expect. Respect for patient autonomy must be balanced against the principle of nonmaleficence,[65] and further qualitative research is needed to establish how best to communicate these risks in the obstetric setting without causing harm.

The American Society of Anesthesiologists and Obstetric Anaesthetists' Association (London, United Kingdom) have published guidance on the prevention and management of intraoperative pain during cesarean delivery.[18,66] It is of importance to have preoperative shared decision-making, during which the potential for pain is acknowledged. Whenever possible, patient preferences should be discussed regarding analgesic supplementation and conversion to general anesthesia, with a plan for managing intraoperative pain agreed. In the operating room, the block should be tested for absence of light touch to the T5 dermatome in the first instance, and the lower limits of the block should tested. In addition, Obstetric Anaesthetists' Association guidelines recommend using the straight leg raise test to confirm adequate motor block.[66] These details should be carefully documented on the patient's anesthetic records.

Intraoperatively, the patient should be the primary source of information, and any discomfort and/or pain experienced by the patient should be immediately acknowledged. In the event of pain, the surgical team should be informed and surgery paused if possible. The patient should be reassured that

their clinician will manage the pain, including the option of general anesthesia. If the patient decides to continue, incremental boluses of fast-acting potent analgesia—for example fentanyl, alfentanil, or ketamine—can be used. Importantly, pain should not be treated with anxiolysis such as midazolam, and patient comfort should be confirmed before surgery is recommenced. Document clear, detailed evidence of events in the patients' record, which should include pharmacologic agents offered, the patient's response, and any discussion of general anesthesia. Postoperatively, follow-up is important to reduce the risk of longer-term psychological sequelae. This should include a discussion as to the possible reasons for intraoperative pain, and questions or concerns the patient has should be addressed.

Research Context

Previously, a systematic review of randomized control trial data from scheduled cesarean deliveries highlighted the use of supplemental analgesia or anesthesia in 14.6% of patients, with higher rates of inadequate anesthesia seen with epidural top-up (30.3%) compared to spinal and CSE techniques (10.2%).[19] Our systematic review and meta-analysis included three studies that were included in this aforementioned review.[35,44,46] The requirement for supplemental analgesia or anesthesia is often used as a surrogate for pain. However, these can both underestimate and overestimate the true incidence of pain as experienced by patients. A recent study of 399 cesarean delivery patients under neuraxial anesthesia found that not all reporting pain received analgesia and that not all receiving analgesia reported pain.[17] The most accurate measure of intraoperative pain is the patient; if a patient says they are experiencing pain, then there is pain.[20] Our study defined intraoperative pain as any discomfort or pain *reported by the patient* and is therefore a more accurate and patient-centric estimate of the incidence of intraoperative pain.

Our subgroup analysis found lower incidence of pain reported with spinal compared to CSE anesthesia; however, one might consider both techniques to provide equivalent quality anesthesia. A previous review comparing the use of spinal and combined spinal–epidural anesthesia for cesarean delivery found 40% (6 of 15) of the included studies used a lower intrathecal dose in the CSE group compared with the spinal group.[67] A subsequent Cochrane review comparing CSE anesthesia with spinal found there was insufficient evidence to establish whether CSE *versus* high-dose spinal or CSE *versus* low-dose spinal were associated with the requirement for intraoperative supplemental analgesia or conversion to general anesthesia.[68] Patient-reported pain were not considered in these studies. In our review, all three studies comparing CSE and spinal techniques had lower doses of intrathecal local anesthetic.[32,37,41] The higher incidence with CSE techniques compared to spinal is likely multifactorial. Patient selection may differ from spinal alone, for example obesity or surgical complexity; needle through needle techniques and positioning delays after placement may be all contribute to this variation. However, the data in this review do not allow us to explore the reasons beyond that incidence differences were found.

Strengths and Limitations

This systematic review and meta-analysis has several strengths. First is the patient-centered focus on the incidence of intraoperative pain as reported by patients rather than using clinician-reported surrogates for pain. We included data from more than 11,000 patients and 20 countries, allowing a more globally representative view of patient-reported experiences.

The study addressed key limitations of a previous systematic review.[19] Specifically, it included both scheduled *and* emergency/urgent cesarean deliveries, which increases the generalizability of results, and considered *both* randomized and nonrandomized studies, which increased the sample size and reduced the impact of investigators on patient pain reporting. Subgroup meta-analysis provides separate incidence estimates for spinal, epidural, and CSE anesthesia, which may be helpful details to aid patient consent. In addition, we reported prediction intervals, as recommended with heterogenous included articles, which are infrequently described.[69]

Our study has limitations. We did not undertake a subgroup analysis of techniques performed in the scheduled *versus* emergency context, and it is acknowledged that epidural top-up is generally used in the emergency setting. Further, there was high risk of bias in more than half of the included studies, reflecting the relative lack of high-quality evidence in this area. In these studies, sources of bias included reporting multiple outcome measures, pain as a secondary outcome measure, and failing to provide appropriate power calculations. This outlines the need for further prospective studies designed specifically to assess pain during cesarean delivery.

A challenge in this review was data heterogeneity. Heterogeneity was lower in subgroup analyses, most markedly for incidence for pain with CSE (I^2 = 87%). Despite focusing on patient-reported outcomes, there was wide variation in how pain was assessed in the studies. In subgroup analyses according to pain assessment type, there was marginally lower heterogeneity. This likely reflects variation in anesthetic practice, with differences in neuraxial techniques, drugs, and doses at the patient, provider, and institutional levels. Intraoperative pain can be affected by multiple factors, and in the absence of standardized pain assessment methodology, differences in reported pain incidences are likely.

Conclusions

In summary, we found pain during cesarean delivery under neuraxial anesthesia to be very common, affecting

more than one in six patients. Spinal anesthesia had the lowest pooled incidence of pain, while epidural anesthesia had the highest, affecting one in three patients. This has implications for the preoperative consent process and choice of neuraxial anesthesia. Preoperative discussions acknowledging the potential for intraoperative pain are best practice, and risks should be discussed in the context of understanding patients' preferences regarding pain tolerance and management. Further work is required to prospectively quantify intraoperative pain experience from a patient's perspective across multiple centers. In addition, the sequelae of pain during cesarean delivery surgery in the short- and medium-term postpartum needs further investigation. Ultimately, evidence-based recommendations for counseling, management, and follow-up of patients that experience pain during cesarean delivery are required.

Research Support

Support was provided solely from institutional and/or departmental sources.

Competing Interests

The authors declare no competing interests.

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Supplemental Digital Content

Supplemental Digital Content 1. Full Search Strategy, https://links.lww.com/ALN/D943

Supplemental Digital Content 2. Table of Inclusion/Exclusion Criteria, https://links.lww.com/ALN/D944

Supplemental Digital Content 3. Table providing full summary of extracted data from each of the 34 included studies along with the overall judgement for risk of bias based on: (1) version 2 of the Cochrane risk of bias tool for randomized trials (RoB 2) for randomized controlled trials and (2) Risk Of Bias In Non-randomized Studies - of Exposure (ROBINS-E) tool for observational studies, https://links.lww.com/ALN/D945

Supplemental Digital Content 4. Table providing full summary of risk of bias for each of the included randomized controlled trials based on version 2 of the Cochrane risk of bias tool for randomized trials (RoB 2), https://links.lww.com/ALN/D946

Supplemental Digital Content 5. Table providing full summary of risk of bias for each of the included studies based on the Risk Of Bias In Non-randomized Studies - of Exposures (ROBINS-E) tool, https://links.lww.com/ALN/D947

Supplemental Digital Content 6. Forest plots of included randomized controlled trials and nonrandomized studies. Figure A and B, respectively, https://links.lww.com/ALN/D948

Supplemental Digital Content 7. Forest plot of included trials that used binary pain assessment, https://links.lww.com/ALN/D949

Supplemental Digital Content 8. Forest plot of included trials using pain scales, https://links.lww.com/ALN/D950

Supplemental Digital Content 9. Forest plot of studies reporting on incidence of conversion to general anesthesia, https://links.lww.com/ALN/D951

Supplemental Digital Content 10. Forest plot of included studies for scheduled cesarean deliveries, https://links.lww.com/ALN/D952

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