

PICO Search Assignment Worksheet

PICO #6- Effect of epidural anesthesia on possible fetal delivery methods - Tara Capo

Brief description of patient problem/setting (summarize the case very briefly)

A 28 year old female, G1P0 at 37 weeks gestation presents to the OBGYN clinic for a routine prenatal visit. Her pregnancy has been uncomplicated, and she has a strong preference for vaginal delivery compared to C-section. She expresses increasing anxiety about the pain associated with labor and asks about available options for pain control. She states she has heard mixed opinions from friends and family about epidural anesthesia and is unsure how it might affect the progression of labor or overall delivery outcomes. Her concerns are acknowledged and the provider engages in shared decision making reviewing different pain management options. The provider explains the benefits of epidural anesthesia for pain relief, while also addressing common perceptions and uncertainties surrounding its potential impact on labor progression and delivery methods. The patient is encouraged to consider her preferences, with reassurance that her care team will support her choices throughout labor.

Search Question: Clearly state the question (including outcomes or criteria to be tracked)

In pregnant patients undergoing labor with planned vaginal delivery, does epidural anesthesia compared to no epidural anesthesia increase the likelihood of cesarean section?

Question Type: What kind of question is this? (boxes now checkable in Word)

- Prevalence Screening Diagnosis
 Prognosis Treatment Harms

Assuming that the highest level of evidence to answer your question will be meta-analysis or systematic review, what other types of study might you include if these are not available (or if there is a much more current study of another type)? Please explain your choices.

- If meta-analysis or systematic reviews are not available, there are a variety of other options, including RCTs, cohort studies, and case control studies. Randomized controlled trials (RCTs) are the highest-quality studies for treatment questions. RCTs that evaluate epidural use in labor, while allowing for patient preference and appropriate pain management, can help minimize bias and better assess any association with C-section rates. Prospective and retrospective cohort studies can also be used; prospective cohort studies follow patients over time based on exposure (epidural vs no epidural) and assess outcomes (vaginal delivery vs C-section). Retrospective cohort studies use existing data to evaluate outcomes and are useful for studying large populations and real-world outcomes, but they are more prone to bias and confounding compared to prospective studies. Case control studies compare patients who had C-sections to those who had vaginal deliveries and look back to assess whether they had an epidural.

PICO search terms:

| P | I | C | O |
|-------------------------|---------------------|--------------------------------|------------------|
| Pregnant patients | Epidural anesthesia | No epidural | Cesarean section |
| Pregnant women in labor | Epidural analgesia | IV morphine | C-section |
| Vaginal delivery | Labor epidural | No analgesia | Mode of delivery |
| | | Non-pharmacologic pain control | |

Search tools and strategy used:

Please indicate what data bases/tools you used, provide a list of the terms you searched together in each tool, and how many articles were returned using those terms and filters. Explain how you narrow your choices to the few selected articles.

Results found:

PubMed:

Pregnant patient AND Epidural anesthesia AND Cesarean section: 366 results

Filters: free full text, meta analysis, RCT, systematic review: 16 results

Pregnant women in labor AND Vaginal delivery AND Epidural AND C-section: 65 results

Filters: free full text, meta analysis, RCT, systematic review: 7 results

Planned vaginal delivery AND Epidural analgesia AND C-section: 52 results

Filters: free full text, meta analysis, RCT, systematic review: 8 results

Google Scholar:

Epidural during labor: C-section vs vaginal delivery: 48,000 results

Filters: since 2022, review articles, sort by relevance: 2,420 results

Epidural anesthesia on mode of delivery in pregnancy: 17,300 results

Filters: since 2026, review articles, sort by relevance: 529 results

Cochrane:

Pregnant patient AND epidural anesthesia AND mode of delivery: 38 results

Pregnant women in labor AND epidural AND C-section: 3 results

How I chose the articles:

I chose these articles by applying relevant filters to obtain the highest level of evidence, including available full-text articles, systematic reviews, meta-analyses, and RCTs. From the initial large number of results, I narrowed my selection to studies that were most relevant to my PICO components, by first reading the titles and then the abstracts of the articles. There were many articles that were directly related to the PICO, but were not conducted in the US, therefore I continued my research to find articles from the US.

Identify at least 3 articles (or other appropriate reputable sources) that answer your specific question with the highest available level of evidence (you will probably need to look at more than 3 articles to get the 3 most focused and highest level articles to address your question). Please make sure that they are Medline indexed.

Please post the citation and abstract for each article (to include the journal and authors' names and date) and say why you chose it. Please also note what kind of article it is (e.g. meta-analysis, cohort study, or independent blind comparison with gold standard of diagnosis, etc.). At the bottom of each abstract, please comment on what your key points are from this article (including any points or concepts included in the article, but not present in the abstract – i.e. make the concepts understandable to the reader). Please note that if the evidence is not in the abstract, you must clearly summarize the evidence in your posting.

(1) **Citation:** Liu, E. H. C., & Sia, A. T. H. (2004). Rates of caesarean section and instrumental vaginal delivery in nulliparous women after low concentration epidural infusions or opioid analgesia: Systematic review. *BMJ*, 328(7453), 1410. <https://doi.org/10.1136/bmj.38097.590810.7C>

Type of article: Systematic Review

Abstract:

Objective: To compare the effects of low concentration epidural infusions of bupivacaine with parenteral opioid analgesia on rates of caesarean section and instrumental vaginal delivery in

nulliparous women.

Data sources: Medline, Embase, the Cochrane controlled trials register, and handsearching of the International Journal of Obstetric Anesthesia.

Study selection: Randomised controlled trials comparing low concentration epidural infusions with parenteral opioids.

Data synthesis: Seven trials fulfilled the inclusion criteria for meta-analysis. Epidural analgesia does not seem to be associated with an increased risk of caesarean section (odds ratio 1.03, 95% confidence interval 0.71 to 1.48) but may be associated with an increased risk of instrumental vaginal delivery (2.11, 0.95 to 4.65). Epidural analgesia was associated with a longer second stage of labour (weighted mean difference 15.2 minutes, 2.1 to 28.2 minutes). More women randomised to receive epidural analgesia had adequate pain relief, with fewer changing to parenteral opioids than vice versa (odds ratio 0.1, 0.05 to 0.22).

Conclusions: Epidural analgesia using low concentration infusions of bupivacaine is unlikely to increase the risk of caesarean section but may increase the risk of instrumental vaginal delivery. Although women receiving epidural analgesia had a longer second stage of labour, they had better pain relief.

Key points:

- There was no significant increase in C-section rates with epidural analgesia compared to opioid analgesia
- There were, however, higher rates of instrumental vaginal deliveries (i.e forceps/vaccum) with epidural use
- Epidural use was associated with a longer second stage of labor, which likely contributes to increased instrumental delivery rates
- There was improved pain control with epidural analgesia compared to systemic opioids, leading to better maternal comfort during labor
- Low-dose epidural techniques are associated with lower rates of instrumental delivery compared to high-dose regimens

I chose this article because it is a systemic review that synthesizes multiple randomized controlled trials, which provides high-level evidence to my PICO question as it helps minimize bias and increase reliability. The study matches my population of (nulliparous) women in labor, and directly compares epidural analgesia vs non-epidural (opioid) analgesia, aligning well with my intervention vs comparison. The article evaluates C-section rates, which is the main outcome in my PICO question, and emphasizes that epidurals do not increase rates of C-sections, but that they are associated with increased rates of instrumental deliveries. It also mentions that low-dose epidural techniques reflect modern practice, making the findings more applicable to real-world care.

(2) **Citation:** Wong, C. A., Scavone, B. M., Peaceman, A. M., McCarthy, R. J., Sullivan, J. T., Diaz, N. T., Yaghmour, E., Marcus, R. J., & Grouper, S. (2005). The risk of cesarean delivery with neuraxial analgesia given early versus late in labor. *New England Journal of Medicine*, 352(7), 655–665. <https://doi.org/10.1056/NEJMoa042573>

Type of article: Randomized Controlled Trial

Abstract:

Background: Epidural analgesia initiated early in labor (when the cervix is less than 4.0 cm dilated) has been associated with an increased risk of cesarean delivery. It is unclear, however, whether this increase in risk is due to the analgesia or is attributable to other factors.

Methods: We conducted a randomized trial of 750 nulliparous women at term who were in spontaneous labor or had spontaneous rupture of the membranes and who had a cervical dilatation of less than 4.0 cm. Women were randomly assigned to receive intrathecal fentanyl or systemic hydromorphone at the first request for analgesia. Epidural analgesia was initiated in the intrathecal group at the second request for analgesia and in the systemic group at a cervical dilatation of 4.0 cm or greater or at the third request for analgesia. The primary outcome was the rate of cesarean delivery.

Results: The rate of cesarean delivery was not significantly different between the groups (17.8 percent after intrathecal analgesia vs. 20.7 percent after systemic analgesia; 95 percent confidence interval for the difference, -9.0 to 3.0 percentage points; $P=0.31$). The median time from the initiation of analgesia to complete dilatation was significantly shorter after intrathecal analgesia than after systemic analgesia (295 minutes vs. 385 minutes, $P<0.001$), as was the time to vaginal delivery (398 minutes vs. 479 minutes, $P<0.001$). Pain scores after the first intervention were significantly lower after intrathecal analgesia than after systemic analgesia (2 vs. 6 on a 0-to-10 scale, $P<0.001$). The incidence of one-minute Apgar scores below 7 was significantly higher after systemic analgesia (24.0 percent vs. 16.7 percent, $P=0.01$).

Conclusions: Neuraxial analgesia in early labor did not increase the rate of cesarean delivery, and it provided better analgesia and resulted in a shorter duration of labor than systemic analgesia.

Key points:

- There was no significant difference in C-section rates between the two groups
 - ~17.8% with early epidural vs ~20.7% with systemic analgesia
- Patients who received early epidural reported significantly better pain relief compared to systemic opioids
- Time to full cervical dilation was shorter in patients who received early epidural
- Epidural did not increase instrumental delivery or other complications compared to systemic analgesia

I chose this article because it is a RCT which provides high level of evidence and minimizes confounding factors. The study directly challenged assumptions about early epidural use causing increased rates of C-sections, and showed that the timing of epidural does not causally increase emergent cesarean delivery rates. I appreciated that the study took into account the timing of epidural administration, because it helps determine whether timing itself influences labor outcomes, rather than simply whether an epidural is used. The article is directly relevant to my PICO question, including population, interventions, comparison, and outcomes.

(3) **Citation:** Abhirami, G. R., Suresh, S., & Bhat, R. (2022). The effect of epidural analgesia on the maternal and fetal outcomes in induced labour. *The Journal of Obstetrics and Gynecology of India*, 72(Suppl 1), 79–85. <https://doi.org/10.1007/s13224-022-01622-1>

Type of article: Cross-Sectional Study

Abstract

Introduction: Elective labour induction is associated with more pain, intrapartum interventions, cesarean deliveries, as compared with spontaneous labour, necessitating the use of labour analgesia. Epidural analgesia is one popular method for control of pain. This study was to determine the effect of epidural analgesia on the maternal and fetal outcomes in women undergoing induction of labour, as adequate data in this specific population is relatively sparse.

Materials and Methods: This was a cross-sectional study conducted over a period of 18 months which included mothers with singleton term gestation with cephalic presentation admitted for induction of labour.

Result: A sample of 238 mothers were included in the study. Among the study population, 52.7% opted for epidural analgesia. The pain score was less than 3/10 (VAS) in 81% of mothers who opted for epidural analgesia. The cesarean section rate was 20.5% and 34.3% in the epidural and non-epidural groups, respectively. After adjusting the confounding factors, there was a positive effect noted in the caesarean section rate among the epidural group, which was lesser than the non-epidural group. However, a higher instrumental delivery rate (18.8% vs. 10.5%, p-value<0.05) was noted in the epidural group. There was no significant difference in the duration of labour and fetal outcome in the two groups.

Conclusion: Epidural analgesia providing good pain relief in the majority of the mothers was reinforced. In our study, epidural analgesia was associated with a reduction of caesarean section rate after adjusting the confounding factor. Epidural analgesia did not affect the duration of labour, cesarean section rate and fetal outcome independently, however, it was associated with increased risk of instrumental delivery. The outcomes mainly depend on the confounding factors. Therefore, mothers can be provided with an evidence-based information regarding the effect of epidural analgesia in induced labour and help those seeking epidural analgesia to make an informed choice.

Key points:

- Epidural analgesia was associated with lower C-section rates after adjustment (20.5% with epidural vs 34.3% with no epidural)
 - The difference in C-section rates may not be caused by the epidural itself, but by differences in the patients who did vs did not receive epidurals (including labor difficulty, higher risk pregnancies)
- There was a significant increase in instrumental delivery (i.e forceps/vacuum) in epidural group (18.8%) vs non-epidural group (10.5%)
- Duration of both first and second stages of labor were similar between groups (epidural vs non epidural)
- APGAR scores were similar between groups
- There was excellent pain control in the epidural group (81% of patients had pain scores <3/10)

I chose this article because it directly evaluates my PICO question by comparing C-section rates in groups that received epidural during labor vs groups that did not. The article emphasized the importance of confounding factors; after adjusting for multiple confounding variables, the study demonstrated that the epidural group had a lower rate of C-sections compared to non epidural group. However, a review of the literature suggests that epidural analgesia itself is unlikely to significantly influence the likelihood of a normal vaginal delivery, and that C-sections are more strongly affected by other underlying factors such as labor progression and patient characteristics. This makes the conclusions more reliable than unadjusted observational data.

What is the clinical “bottom line” derived from these articles in answer to your question?

Based on the articles' evidence, epidural anesthesia does not increase the likelihood of C-sections in pregnant women undergoing labor with a planned vaginal delivery. High-evidence studies, including systematic reviews and RCTs consistently demonstrate no causal relationship between epidural administration and increased C-section rates. My last article took into account confounding factors, such as labor difficulty, patient characteristics, and obstetric risk and after they were adjusted for, it was concluded that epidural analgesia does not independently affect cesarean delivery rates. The evidence also shows that epidural use is associated with improved pain control and increased rates of instrumental vaginal deliveries using forceps and vacuum. In conclusion, epidural anesthesia is a safe and effective method of pain control during labor that does not increase the risk of C-section delivery, and decisions regarding its use should be guided by patient preference and clinical context.

