



Neonatal outcomes with regional versus general anesthesia for cesarean delivery: A meta-analysis of randomized controlled trials

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BACKGROUND

- 1 in 3 births occur via cesarean delivery in the US.
- Regional anesthesia (e.g., spinal, epidural, CSE) is recommended over general in most cases; general anesthesia may be appropriate for some patients.
- Conversion to general anesthesia may be required in cases of failed/inadequate regional anesthesia.
- Associations of anesthetic techniques with neonatal outcomes remain poorly characterized.

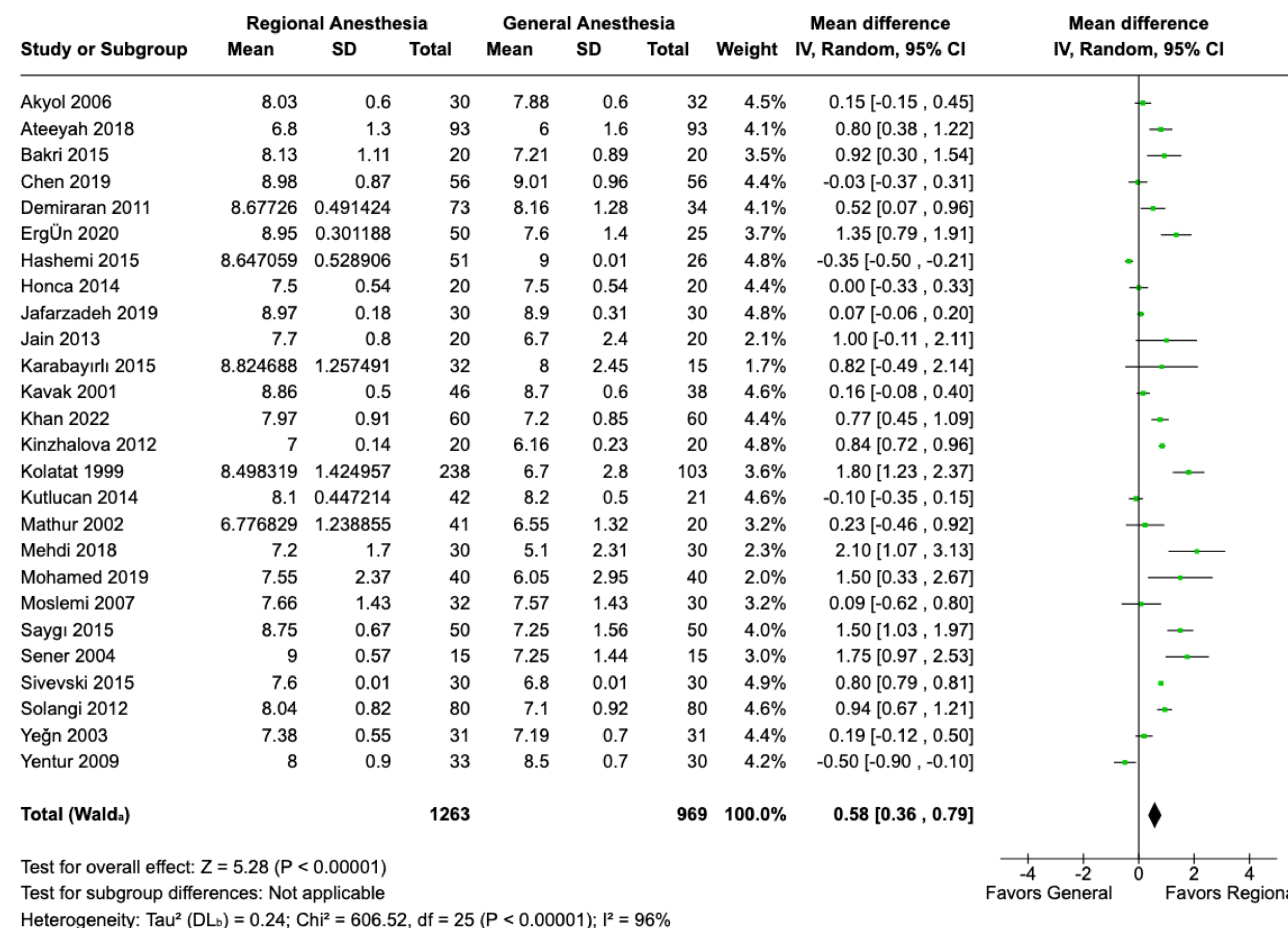
METHODS

- We searched PubMed, Embase, CENTRAL, ClinicalTrials.gov, and ICTRP for randomized controlled trials between 1994 and 2023.
- Outcomes included Apgar score at 1 and 5 minutes, Apgar score <7 at 1 and 5 minutes, respiratory support requirement, and NICU admission.
- Summary data were extracted and analyzed using random-effects model.

RESULTS

- 36 studies identified; 3,456 neonates included.
- 42.7% received general (n=1,476) ; 57.3% received regional (spinal, epidural, or CSE; n=1,980).
- Regional anesthesia was associated with slightly higher Apgar scores at 1 and 5 minutes; fewer neonates with Apgar <7 at 1 minute; and decreased need for respiratory support.
- No difference in Apgar <7 at 5 minutes or NICU admission.

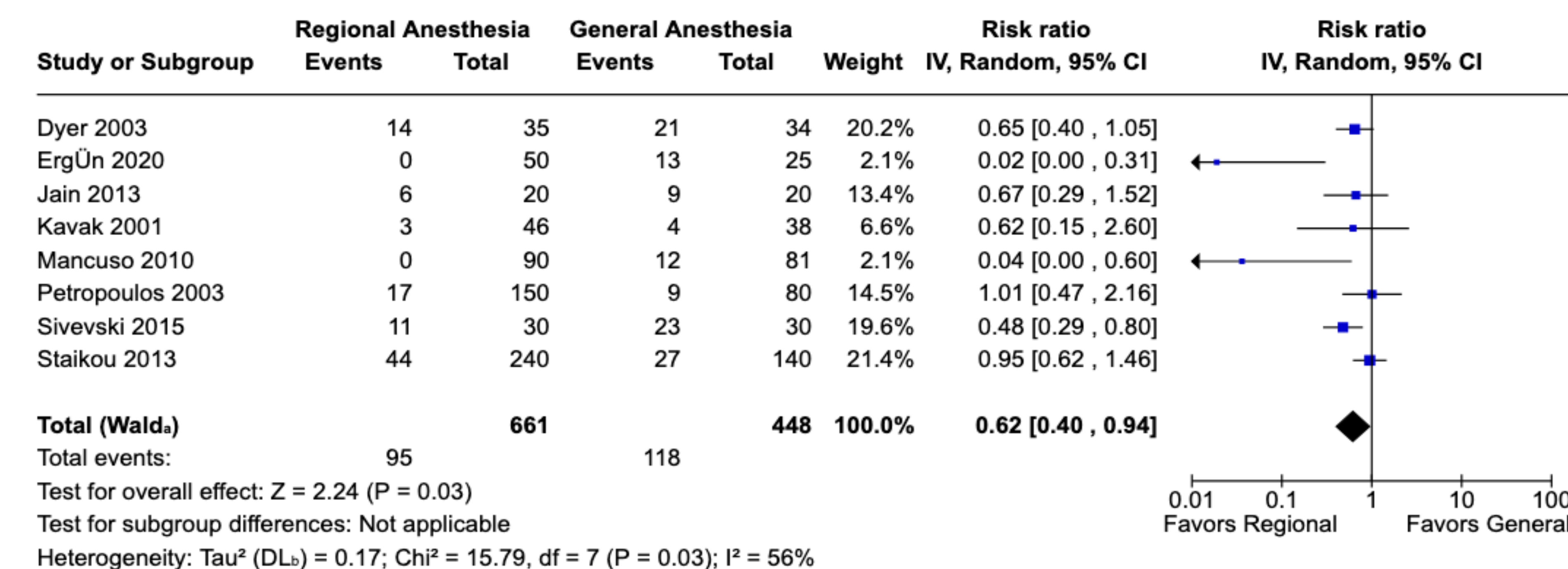
Figure 1. Regional anesthesia is associated with slightly higher Apgar scores at 1 min (mean difference= 0.58 points on 0-9 scale); and at 5 minutes (not shown, mean difference= 0.09 points, 95% confidence interval: 0.05, 0.13).



REFERENCES

- Practice guidelines for obstetric anesthesia: an updated report by the American Society of Anesthesiologists Task Force on Obstetric Anesthesia and the Society for Obstetric Anesthesia and Perinatology. *Anesthesiology*. 2016;124(2):270-300. doi:10.1097/ALN.0000000000000935
- Statement on pain during cesarean delivery. <https://www.asahq.org/standards-and-practice-parameters/statement-on-pain-during-cesarean-delivery>. Accessed February 25, 2025.

Figure 2. Regional anesthesia is associated with a lower rate of respiratory support after delivery (risk ratio= 0.62, 95% confidence interval: 0.40, 0.94).



LIMITATIONS

- Risk of bias within studies was typically unclear or high
- Results may reflect publication bias and/or selective outcome reporting
- Heterogeneity exists between studies due to differences in population demographics, healthcare settings, and anesthetic techniques.

CONCLUSION

- Regional anesthesia is associated with improved Apgar scores at 1 and 5 minutes, lower rate of Apgar score <7 at 1 minute, and lower rate of respiratory support.
- There is no difference between general and regional anesthesia in rate of Apgar score <7 at 5 minutes or NICU admission.
- Our analysis confirms short-term benefits of choosing regional over general anesthesia for neonatal outcomes.
- General anesthesia may be appropriate where potential benefits outweigh risks.