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CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

Continuous Perioperative Halo Traction for Partial Correction of the Spine in Pediatric Patients: Clinical Effectiveness and Guidelines

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Research Questions

1. What is the comparative clinical effectiveness of continuous versus daytime perioperative halo traction for partial correction of the spine in pediatric patients?
2. What are the evidence-based guidelines regarding the use of perioperative halo traction for partial correction of the spine in pediatric patients?

Key Findings

No relevant literature was identified regarding the comparative clinical effectiveness of continuous versus daytime perioperative halo traction for partial correction of the spine in pediatric patients. No evidence-based guidelines were identified regarding the use of perioperative halo traction for partial correction of the spine in pediatric patients.

Methods

A limited literature search was conducted by an information specialist on key resources including Medline via OVID the Cochrane Library, the University of York Centre for Reviews and Dissemination (CRD) databases, the websites of Canadian and major international health technology agencies, as well as a focused Internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were halo traction and pre-, peri-, or post-operative. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2014 and November 22, 2019. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Pediatric patients with spinal or neurological congenital abnormalities (e.g., scoliosis) requiring elective spinal surgery
Intervention	Q1. Continuous perioperative halo traction (i.e., 24/7 use) Q2. Perioperative halo traction
Comparator	Q1. Daytime perioperative halo traction (e.g., halo traction only during the day and no traction during nighttime) Q2. No comparator
Outcomes	Q1. Clinical benefits and harms (e.g., recovery time, neurological complications) Q2. Recommendations for use (e.g., care and maintenance of pediatric halo traction patients discharged from hospital [home care guidelines], protocols for setting up and maintaining halo-traction in the home, any guidance on patients traveling form the hospital to the home)
Study Designs	Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, and evidence-based guidelines

Results

No relevant literature was identified regarding the comparative clinical effectiveness of continuous versus daytime perioperative halo traction for partial correction of the spine in pediatric patients. No evidence-based guidelines were identified regarding the use of perioperative halo traction for partial correction of the spine in pediatric patients.

References of potential interest are provided in the appendix.

Overall Summary of Findings

No relevant literature was identified regarding the comparative clinical effectiveness of continuous versus daytime perioperative halo traction for partial correction of the spine in pediatric patients. No evidence-based guidelines were identified regarding the use of perioperative halo traction for partial correction of the spine in pediatric patients. Therefore, no summary can be provided.

References Summarized

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

No literature identified.

Randomized Controlled Trials

No literature identified.

Non-Randomized Studies

No literature identified.

Guidelines and Recommendations

No literature identified.

Appendix — Further Information

Systematic Reviews and Meta-analyses – Unclear Comparator

1. Yang C, Wang H, Zheng Z, et al. Halo-gravity traction in the treatment of severe spinal deformity: a systematic review and meta-analysis. *Eur Spine J*. 2017;26(7):1810-1816. PubMed: PM27858237

Non-Randomized Studies

Before and After Studies

2. Iyer S, Boachie-Adjei O, Duah HO, et al. Halo gravity traction can mitigate preoperative risk factors and early surgical complications in complex spine deformity. *Spine (Phila Pa 1976)*. 2019;44(9):629-636. PubMed: PM30325883

3. Iyer S, Duah HO, Wulff I, et al. The use of halo gravity traction in the treatment of severe early onset spinal deformity. *Spine (Phila Pa 1976)*. 2019;44(14):E841-E845. PubMed: PM30817734

4. LaMont LE, Jo C, Molinari S, et al. Radiographic, pulmonary, and clinical outcomes with halo gravity traction. *Spine Deform*. 2019;7(1):40-46. PubMed: PM30587319

5. Shi B, Xu L, Li Y, et al. Pre-operative halo-gravity traction in severe neurofibromatosis type 1 and congenital scoliosis with thoracic rotatory subluxation. *Clin Neurol Neurosurg*. 2019;187:105548. PubMed: PM31669930

6. Gomez JA, Grzywna A, Hanstein R, et al. Staged growing rods with preimplantation of spinal anchors for complex early onset scoliosis. *J Pediatr Orthop*. 2017;37(8):e606-e611. PubMed: PM28244928

7. Li P, Bao D, Cheng H, Meng F, Li J. Progressive halo-vest traction preceding posterior occipitocervical instrumented fusion for irreducible atlantoaxial dislocation and basilar invagination. *Clin Neurol Neurosurg*. 2017;162:41-46. PubMed: PM28917092

8. Mehrpour S, Sorbi R, Rezaei R, Mazda K. Posterior-only surgery with preoperative skeletal traction for management of severe scoliosis. *Arch Orthop Trauma Surg*. 2017;137(4):457-463. PubMed: PM28185083

9. Han X, Sun W, Qiu Y, et al. Halo gravity traction is associated with reduced bone mineral density of patients with severe kyphoscoliosis. *Biomed Res Int*. 2016;2016:8056273. PubMed: PM27896274

10. Pourtaheri S, Shah SA, Ditro CP, Holmes L, Jr., Mackenzie WG. Preoperative halo-gravity traction with and without thoracoscopic anterior release for skeletal dysplasia patients with severe kyphoscoliosis. *J Child Orthop*. 2016;10(2):135-142. PubMed: PM27016925

11. Zhang Z, Hui H, Liu T, Zhang Z, Hao D. Two-staged correction of severe congenital scoliosis associated with intraspinal abnormalities. *Clin Spine Surg*. 2016;29(8):E401-405.
PubMed: PM25310398

12. Nemani VM, Kim HJ, Bjerke-Kroll BT, et al. Preoperative halo-gravity traction for severe spinal deformities at an SRS-GOP site in West Africa: protocols, complications, and results. *Spine (Phila Pa 1976)*. 2015;40(3):153-161.
PubMed: PM25668334

13. Garabekyan T, Hosseinzadeh P, Iwinski HJ, et al. The results of preoperative halo-gravity traction in children with severe spinal deformity. *J Pediatr Orthop B*. 2014;23(1):1-5.
PubMed: PM23942045

14. Pang X, Li D, Wang X, et al. Thoracolumbar spinal tuberculosis in children with severe post-tubercular kyphotic deformities treated by single-stage closing-opening wedge osteotomy: preliminary report a 4-year follow-up of 12 patients. *Childs Nerv Syst*. 2014;30(5):903-909.
PubMed: PM24249208

Alternative Comparator

15. Welborn MC, Krajbich JI, D'Amato C. Use of magnetic spinal growth rods (MCGR) with and without preoperative halo-gravity traction (HGT) for the treatment of severe early-onset scoliosis (EOS). *J Pediatr Orthop*. 2019;39(4):e293-e297.
PubMed: PM30475319

16. Da Cunha RJ, Al Sayegh S, LaMothe JM, et al. Intraoperative skull-femoral traction in posterior spinal arthrodesis for adolescent idiopathic scoliosis: the impact on perioperative outcomes and health resource utilization. *Spine (Phila Pa 1976)*. 2015;40(3):E154-160.
PubMed: PM25398036

Clinical Practice Guidelines

17. Roye BD, Campbell ML, Matsumoto H, et al. Establishing consensus on the best practice guidelines for use of halo gravity traction for pediatric spinal deformity. *J Pediatr Orthop*. 2019;15:15.
PubMed: PM30994582

Review Articles

18. McIntosh AL, Ramo BS, Johnston CE. Halo gravity traction for severe pediatric spinal deformity: a clinical concepts review. *Spine Deform*. 2019;7(3):395-403.
PubMed: PM31053309

19. Lewis SJ, Zamorano JJ, Goldstein CL. Treatment of severe pediatric spinal deformities. *J Pediatr Orthop*. 2014;34 Suppl 1:S1-5.
PubMed: PM25207730

Additional References

20. Reference care plan - halo vest / halo traction. Vancouver (BC) : BC Children's Hospital and BC Women's Hospital & Health Centre; [no date]: http://policyandorders.cw.bc.ca/resource-gallery/Documents/BC%20Children's%20Hospital/00.00%20Reference%20Care%20Plan%20Halo%20Vest%20-%20Halo%20Traction.pdf. Accessed 2019 Dec 5.