

CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

Bacille Calmette-Guerin Vaccination for Newborns with Severe Combined Immunodeficiency: Safety and Guidelines

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Research Questions

1. What is the evidence regarding the safety of administration of bacille Calmette-Guerin vaccine to newborns with severe combined immunodeficiency?
2. What are the evidence-based guidelines regarding the administration of bacille Calmette-Guerin vaccine to newborns with severe combined immunodeficiency?

Key Findings

One non-randomized study was identified regarding the safety of administration of bacille Calmette-Guerin vaccine to newborns with severe combined immunodeficiency. No evidence-based guidelines were identified regarding the administration of bacille Calmette-Guerin vaccine to newborns with severe combined immunodeficiency.

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 BCG vaccine and infants with Severe Combined Immunodeficiency. No filters were applied to limit the retrieval by study type. The search was also limited to English language documents published between Jan 1, 2014 and Dec 4, 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	Newborns with severe combined immunodeficiency
Intervention	Bacille Calmette-Guerin vaccination
Comparator	Q1: No vaccination; Alternative vaccination schedule Q2: No comparator
Outcomes	Q1: Safety Q2: Evidence-based guidelines
Study Designs	Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, evidence-based guidelines

Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, and evidence-based guidelines.

One non-randomized study was identified regarding the safety of administration of bacille Guerin-Calmette (BCG) vaccine to newborns with severe combined immunodeficiency (SCID). No relevant systematic reviews, meta-analyses, randomized controlled trials, and evidence-based guidelines were identified.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings

One non-randomized study¹ was identified regarding the safety of administration of BCG vaccine to newborns with SCID. The authors of the non-randomized study compared the rate of adverse reactions among newborns with SCID who were administered different sub-strains of the BCG vaccine.¹ They found that the live BCG Moreau vaccine was significantly safer than other sub-strains.¹

Additional health technology assessments and non-comparative non-randomized studies describing the safety of the BCG vaccine in newborns with SCID are provided in the appendix.

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

1. Bernatowska E, Skomska-Pawliszak M, Wolska-Kusnierz B, et al. BCG Moreau Vaccine Safety Profile and NK Cells-Double Protection Against Disseminated BCG Infection in Retrospective Study of BCG Vaccination in 52 Polish Children with Severe Combined Immunodeficiency. *J Clin Immunol*. 2019 Nov 20;20:20. [PubMed: PM31749033](https://pubmed.ncbi.nlm.nih.gov/31749033/)

Guidelines and Recommendations

No literature identified.

Appendix — Further Information

Health Technology Assessments – Descriptive Safety

2. Health technology assessment of a selective BCG vaccination programme. Dublin: Health Information and Quality Authority; 2015:
https://www.hiqa.ie/sites/default/files/2017-01/BCG_technical_report.pdf. Accessed 17 Dec 2019.
See: 4.4.4 Safety, page 42; 5.3.2 Epidemiological Measures, page 60

Non-Randomized Studies – Descriptive Safety

3. Barkai G, Somech R, Stauber T, Barziali A, Greenberger S. Bacille Calmette-Guerin (BCG) complications in children with severe combined immunodeficiency (SCID). *Infect Dis (Lond)*. 2019 08;51(8):585-592.
[PubMed: PM31204539](#)
4. Marciano BE, Huang CY, Joshi G, et al. BCG vaccination in patients with severe combined immunodeficiency: complications, risks, and vaccination policies. *J Allergy Clin Immunol*. 2014 Apr;133(4):1134-1141.
[PubMed: PM24679470](#)
5. Mazzucchelli JT, Bonfim C, Castro GG, et al. Severe combined immunodeficiency in Brazil: management, prognosis, and BCG-associated complications. *J Investig Allergol Clin Immunol*. 2014;24(3):184-191.
[PubMed: PM25011356](#)

Guidelines and Recommendations – Methodology Not Described

6. Diagnosis and Management of Severe Combined Immunodeficiency (SCID) in Australia and New Zealand: A TAPID Consensus Guideline. Balgowlah (AU): The Australasian Society of Clinical Immunology and Allergy (ASCIA); 2019:
https://www.allergy.org.au/images/stories/pospapers/ASCIA_HP_Guidelines_SCID_2019.pdf Accessed 17 Dec 2019.
See: Supportive care for SCID patients prior to HSCT, 4.0 Vaccination, page 6
7. Ezeanolue E, Harriman K, Hunter P, Kroger A, Pellegrini C. General Best Practice Guidelines for Immunization. Best Practices Guidance of the Advisory Committee on Immunization Practices (ACIP). Atlanta: Centers for Disease Control and Prevention: www.cdc.gov/vaccines/hcp/acip-recs/generalrecs/downloads/general-recs.pdf Accessed 17 Dec 2019.
See: Live, Attenuated Viral and Bacterial Vaccines: Safety, page 125
8. Madkaikar M, Aluri J, Gupta S. Guidelines for Screening, Early Diagnosis and Management of Severe Combined Immunodeficiency (SCID) in India. *Indian J Pediatr*. 2016 May;83(5):455-462.
[PubMed: PM26920398](#)

9. Canadian Tuberculosis Standards 7th Edition. Chapter 16: Bacille Calmette-Guérin (BCG) vaccination in Canada. Ottawa: Public Health Agency of Canada; 2014.
<https://www.canada.ca/content/dam/phac-aspc/migration/phac-aspc/tbpc-latb/pubs/tb-canada-7/assets/pdf/tb-standards-tb-normes-ch16-eng.pdf> Accessed 17 Dec 2019.
See: Contraindications to BCG Vaccination, page 8

Review Articles

10. Lee PP. Disseminated Bacillus Calmette-Guerin and Susceptibility to Mycobacterial Infections-Implications on Bacillus Calmette-Guerin Vaccinations. *Ann Acad Med Singapore*. 2015 Aug;44(8):297-301.
[PubMed: PM26477962](#)

Additional References

11. Vaccines and primary immunodeficiencies. Downderry (GB): International Patient Organisation for Primary Immunodeficiencies (IPOPI); 2014:
https://primaryimmune.org/wp-content/uploads/2014/05/IPOPI_Booklet_Vaccines.pdf
Accessed 17 Dec 2019.
See: General vaccination guidance according to PID, page 8