



TITLE: Swabbing Techniques for the Detection of Bacterial Colonization in Wounds: Comparative Clinical Evidence and Guidelines

DATE: 27 November 2013

RESEARCH QUESTIONS

1. What is the comparative effectiveness of the Levine versus the Z technique for swabbing wounds identified as at risk for bacterial colonization or infection?
2. What are the evidence-based guidelines regarding the optimal method of identifying bacterial colonization of wounds identified as at risk for bacterial colonization or infection?

KEY MESSAGE

One randomized controlled trial and nine evidence-based guidelines were identified regarding swabbing techniques or identification strategies for the detection of bacterial colonization of wounds.

METHODS

A limited literature search was conducted on key resources including PubMed, The Cochrane Library (2013, Issue 11), University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. No filters were applied to limit the retrieval by study type for question #1. A guideline filter was used for question #2. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between Jan 1, 2008 and Nov 14, 2013. Internet links were provided, where available.

The summary of findings was prepared from the abstracts of the relevant information. Please note that data contained in abstracts may not always be an accurate reflection of the data contained within the full article.

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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 randomized controlled trial and nine evidence-based guidelines were identified regarding swabbing techniques or identification strategies for the detection of bacterial colonization of wounds. No relevant health technology assessments, systematic reviews, or meta-analyses were identified.

Additional references of potential interest are provided in the appendix.

OVERALL SUMMARY OF FINDINGS

One RCT¹ compared the ability of the Levine and Z swabbing techniques to detect the presence of bacteria in infected wounds. The Levine technique identified significantly more organisms than the Z technique in both chronic and acute wounds.

Nine²⁻¹⁰ evidence-based guidelines were identified regarding the identification strategy for detection of infected wounds or testing of wounds at risk of infection. The main recommendations are presented below.

Diabetic foot ulcers

- Obtain a wound culture, using Levine's technique, when signs and symptoms of infection are present.²
- Low quality data was identified that suggests that swabs and deep tissue biopsy are able to identify the same organisms.³

Pressure ulcers

- For acute wounds, consider infection if signs of inflammation last longer than three to four days.⁴
- The first sign of critical colonization of a wound might be a delay in healing or increase in exudates.⁴
- While tissue biopsy is considered to be the gold standard for the determination of wound infection, wound swabs are often used to identify the presence of organisms instead⁴
- Infection can be clinically confirmed when bacteria counts reach 10⁵ organism per gram of tissue.⁴
- For chronic wounds, an increase or change in amount of exudate, abnormal odor, decolourization, undermining, epithelial bridging, or sudden pain may indicate infection⁴
- For chronic wounds, a tissue sample, wound swab, or bone culture should be obtained when infection is suspected or wounds are not healing as expected.^{6,8}

Lower extremity neuropathic diseases

- Extremity wounds should be monitored closely for signs of infection.⁵
- Levine technique should be used to collect swab cultures of chronic wounds.⁵
- Tissue biopsy should be used to confirm a diagnosis of infection. Swabbing may be an acceptable alternative in general practice settings.⁹

- Both the patient and the wound type should be considered when interpreting microbiology lab reports.⁵

Chronic venous leg ulcers

- In the absence of clinical signs of infection, there is no indication for routine swabbing of venous leg ulcers. All chronic wounds are colonized by bacteria so swabs should only be used when there is evidence of infection.⁷

Surgical site infections

- Swabs or samples from a surgical wound should be obtained when wounds show signs of clinically serious infection or when patients are hypersensitive to first-line antibiotics and when antibiotic resistant pathogens are suspected.¹⁰

REFERENCES SUMMARIZED

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

No literature identified.

Randomized Controlled Trials

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Non-Randomized Studies

No literature identified.

Guidelines and Recommendations

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See: Appendix J – Wound Swabbing Technique, page 127
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See: The clinical utility of assessment, investigative or diagnostic tools for diabetic foot infections, page 35
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 See: *3.3.3 Bacteriological Swabs, page 7*
 8. National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel. Pressure ulcer treatment recommendations. In: Prevention and treatment of pressure ulcers: clinical practice guideline [Internet]. Washington (DC): National Pressure Ulcer Advisory Panel; 2009. [cited 2013 Nov 26].
 Summary available from:
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 See: *9. Assessment and treatment of infection*
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 Summary available from:
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 See: *Infection*
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 See: *Antibiotic treatment of surgical site infection and treatment failure, page 97*

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APPENDIX – FURTHER INFORMATION:

Clinical Guidance

11. Wound management policy [Internet]. Doncaster: Doncaster and Bassetlaw Hospitals NHS Foundation Trust; 2012 May 24. [cited 2013 Nov 26]. Available from: http://www.dbh.nhs.uk/Library/Patient_Policies/PAT%20T%207%20v.3%20-%20Wound%20Management%20Policy%20-%20final.pdf
Note: see Appendix 1 – Wound Swabbing, page 14
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See: Infection, page 227
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See: 6.12 Wound Infection, page 39

Review Articles

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