Prediction of preoperative nasal carriage of Methicillin-resistant Staphylococcus aureus in an outpatient evaluation clinic by using a simple questionnaire.

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Abstract

Objectives: To develop a questionnaire based on known risk factors for nasal carriage of Methicillin-resistant Staphylococcus aureus (MRSA) and to test this instrument for sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) in a preoperative outpatient evaluation clinic at the University Hospitals Leuven. This questionnaire would allow a more selective screening for MRSA carriage, the recovery rate of the systematic nasal screening for MRSA being only 1.36% at that moment.

Methods: As a standard of care, all patients presenting at the preoperative outpatient clinic are screened for nasal carriage of MRSA. A questionnaire including 7 questions (prior hospitalisation in the last year, resident of a long-term care facility, antibiotic use in the last 6 months, presence of a chronic wound, presence of diabetes, health care worker or professional contact with animals and prior carriage of MRSA) was developed. During February 2007, all patients were asked to answer the questionnaire. Sensitivity, specificity, PPV, NPV and likelihood ratio of a positive and negative test result (LR+ and LR−) were calculated, both when patients answered positive on 1 of the 7 questions (cut-off value of 1) and on 2 of the 7 questions (cut-off value of 2). No difference was made between the questions.

Results: 680 patients answered the questionnaire. As a cut-off value of 1, a sensitivity of 100% and a specificity of 40% was measured (PPV 80%, LR+ 1.6 and LR− 0.4). By using a cut-off value of 2 instead of 1, the sensitivity dropped to 67% and the specificity rose to 74% (PPV 93.3% and NPV 99%, LR+ 2.0 and LR− 0.6). No difference was made between the questions.

Conclusion: By using a simple questionnaire with a limited number of questions and a cut-off value of 1, all MRSA-positive patients were identified and 40% of the microbiological analyses was possible. This methodology has a considerable financial impact without consequences on the quality of care in general or on infection control in particular.

Background

Methicillin-Resistant Staphylococcus aureus is an important causative agent of infections, including surgical site infections. Unknown carriers of MRSA also play a role in the transmission of infections to other patients. Systematic screening of all patients on admittance is labor-intensive and expensive. We have therefore developed a questionnaire based on known risk factors for nasal carriage allowing a more selective screening of high-risk patients.

Methods

As a standard of care, all patients presenting at the preoperative outpatient clinic are screened for nasal carriage of MRSA. A questionnaire including 7 questions (prior hospitalisation in the last year, resident of a long-term care facility, antibiotic use in the last 6 months, presence of a chronic wound, presence of diabetes, health care worker or professional contact with animals and prior carriage of MRSA) was developed. During February 2007, all patients were asked to answer the questionnaire. Sensitivity, specificity, PPV, NPV and likelihood ratio of a positive and negative test result (LR+ and LR−) were calculated, both when patients answered positive on 1 of the 7 questions (cut-off value of 1) and on 2 of the 7 questions (cut-off value of 2).

Results

As a cut-off value of 1, a sensitivity of 100% and a specificity of 40% was measured (PPV 80%, LR+ 1.6 and LR− 0.4). By using a cut-off value of 2 instead of 1, the sensitivity dropped to 67% and the specificity rose to 74% (PPV 93.3% and NPV 99%, LR+ 2.0 and LR− 0.6). No difference was made between the questions.

Conclusion

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Questionnaire

Possible answers: Yes / No / Unknown

1. Have you been admitted to a hospital in the past year?
2. Are you a resident of a long-term care facility?
3. Were you treated with antibiotics in the past 6 months?
4. Are you suffering from a chronic wound (pressure score, vascular ulcer ...)?
5. Do you suffer from diabetes?
6. Do you have regular contact (as a professional, or as a household contact) with: • The hospital? • Long-term care facility? • Patients? • Pigs, cows, other farm animals?
7. Did you have MRSA in the past?

Statistical analysis:

Sensitivity, specificity, positive predictive value, likelihood ratio of a positive and negative test result were calculated with Confidence Interval Analysis® (CIA program), both when patients answered positive on 1 of the 7 questions (cut-off value of 1) and on 2 of the 7 questions (cut-off value of 2). No difference in value was given to the different questions.

Background

Methicillin-Resistant Staphylococcus aureus is an important causative agent of infections, including surgical site infections. Unknown carriers of MRSA also play a role in the transmission of infections to other patients. Systematic screening of all patients on admittance is labor-intensive and expensive. We have therefore developed a questionnaire based on known risk factors for nasal carriage allowing a more selective screening of high-risk patients.

Aim

To develop a questionnaire to predict nasal carriage of MRSA in a preoperative outpatient evaluation clinic, and to test this instrument for sensitivity, specificity, positive and negative predictive value.

References