

Is Throat Screening Necessary To Detect Methicillin-Resistant *Staphylococcus aureus* Colonization in Patients upon Admission to an Intensive Care Unit?[∇]

In response to the report by Nilsson and Ripa of higher rates of *Staphylococcus aureus* carriage in the throat compared with the rates in the nose (3), Harbarth et al. reported contrary findings for a small number of intensive care unit (ICU) patients (1). They reported a 62% sensitivity of throat swabs for detecting methicillin-resistant *Staphylococcus aureus* (MRSA) carriage, with only 1 of 13 patients being exclusively a throat carrier.

We previously reported results from a study where we screened 1,181 patients during 1,306 medical and surgical ICU admissions in the nose, throat, groin, and axilla on admission, discharge, and twice weekly during a 9.5-month period (3,730 swab sets). This report provides additional analysis of swab results. Swabs were processed by using mannitol-salt agar with 5 mg/liter methicillin by previously described methods (2).

A total of 224 patients had MRSA isolated from 686 swab sets. A total of 319/1,306 had one set taken and 987 had two or more sets taken (range, 1 to 28). The patients had 2 to 26 positive sets (median, 3 sets). We previously reported that 155/224 (69.2%) patients were positive in the nose, 160 (71.4%) in the throat, 151 (67.4%) in the groin, and 97 (43.3%) in the axilla at some time (2). A total of 13/224 (5.8%) patients were positive in the nose only, 18 (8.0%) in the throat only, 26 (11.6%) in the groin only, and 8 (3.6%) in the axilla only.

Table 1 shows the sensitivities of different sites for detecting an MRSA-colonized patient. Being positive at any screening site at any time was used as the denominator. Table 1 represents the situation where patients may have been swabbed on multiple occasions. If patients had been swabbed only once, the sensitivity for detection of a carrier was up to 13.7% less in some sites (data not shown).

The level of agreement between positive anatomical sites was calculated by using the kappa statistic (Stata software, version 9). Agreement between nose and throat swabs was substantial (kappa value, 0.74; $P < 0.001$), compared with

moderate agreement for nose/groin, throat/groin, and groin/axilla and fair agreement for throat/axilla and nose/axilla.

Our results show that the throat is an important site of MRSA colonization in ICU patients. More colonized patients would have been missed without throat or groin swabs than without nasal swabs. A one-sample comparison of proportions gave P values of 0.47 for comparison of throat and nose swab sensitivity and 0.57 for comparison of groin and nose. There were no significant differences if nose and throat were substituted in various swab combinations (for example, for nose and groin compared with throat and groin, P was 0.26 and for nose, groin, and axilla compared with throat, groin, and axilla, P was 0.16).

We found substantial agreement between the results of nose and throat swabs. This relationship makes intuitive sense because of the close anatomical connection between the two. This has not been noted in other studies but may be particularly strong in ours because of its ICU location, where the majority of patients were intubated, many with nasogastric tubes and with many undergoing nasopharyngeal suction, which may have impaired the normal anatomy of the area and facilitated spread between the two sites.

We have found throat and groin swabs to be at least as important as nose swabs for MRSA detection in ICU patients. More patients were positive only in each of these sites than in the nose. Failure to detect all colonized patients may result in the underuse of infection control measures. Our results suggest that, for optimal sensitivity, either throat or nose swabs are essential, but both are preferable, with the addition of groin swabs.

REFERENCES

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TABLE 1. Sensitivities of combinations of anatomical sites for detecting an MRSA-positive patient at some time during their admission

Anatomical sites positive for MRSA	No. of carriers detected (n = 224)	Sensitivity (%) for detection of carrier
Nose only	155	69.2
Throat only	160	71.4
Groin only	151	67.4
Axilla only	97	43.3
Nose and throat	183	81.7
Nose and groin	198	88.4
Nose and axilla	175	78.1
Throat and groin	203	90.6
Throat and axilla	180	80.4
Groin and axilla	167	74.6
Nose, throat, and groin	216	96.4
Nose, throat, and axilla	198	88.4
Nose, groin, and axilla	206	92.0
Throat, groin, and axilla	211	94.2
Nose, throat, groin, and axilla	224	100

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