Colonization With Vancomycin-Resistant Enterococci After Discharge From an Epidemic Ward: Results of Outpatient Contact Screening by Visiting Nurses.


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Colonization with Vancomycin-Resistant Enterococci (VRE) after Discharge from an Epidemic Ward: Results of Outpatient Contact Screening by Visiting Nurses

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Short title: Colonization with Vancomycin-Resistant Enterococci (VRE): Outpatient Screening

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Following a hospital outbreak of vancomycin-resistant *E. faecium vanB* involving 44 patients, we initiated screening of contacts (roommates or patients hospitalized in an epidemic ward) who had not been screened before discharge. Between July and December 2011, a mobile team of 5 nurses performed home screening. Of 256 eligible contacts, 223 (87%) were screened. Median time between discharge from the epidemic ward and screening was 163 days (range 0-361). No contact patient was found to be positive. We showed the feasibility of home screening by visiting nurses and concluded that preemptive isolation is not justified for contacts readmitted 3 months after discharge.
Vancomycin-resistant enterococcus (VRE) is a significant healthcare associated pathogen. VRE has become endemic in many countries and repeatedly causes nosocomial outbreaks. Some epidemic clones are highly transmissible and able to persist up to 16 weeks on inert surfaces \(^1\)\(^-\)\(^3\). Measures to limit the spread of this bacterium, notably cohorting of VRE carriers and extensive screening and cohorting of contact patients, appears essential to control a VRE outbreak \(^4\)\(^-\)\(^7\).

Contact patients discharged before exclusion of VRE carriage can be the source of reintroduction of VRE into the hospital upon readmission. Despite this risk, there is no recommendation about the optimal management of contact patients. At Lausanne University hospital, readmitted contact patients are quarantined in contact isolation until 3 consecutive rectal swabs are negative.

After a \(\text{vanB Enterococcus faecium}\) outbreak, we evaluated the VRE carriage of discharged contact patients through VRE home screenings by visiting nurses. A VRE contact was defined as a patient who had shared the room of a patient carrying VRE or who had stayed in a ward with \(\geq 2\) VRE cases within previous month. Contact patients were identified through administrative databases. VRE colonization was ruled out when 3 rectal swabs taken at least a week apart were negative \(^4\). Contact patients who had left the hospital before performing the 3 swabs were introduced into an alert system and followed-up: those who lived in Lausanne and suburbs were first informed by letter and then contacted by phone in order to obtain their consent for VRE screening at home. A
mobile team of five nurses visited the consenting patients and completed the screening protocol.

Rectal swabs were inoculated into an enrichment broth containing vancomycin and incubated at 37°C for 24h. The broth was inoculated onto a selective chromogenic plate (ChromID VRE, Biomérieux) and incubated at 37°C for 48h.

The cost of the ambulatory screening campaign were computed by summing up the nursing wage (€48.74 per hour), the travel cost (€0.67 per Km) and the laboratory cost of swab tests (€100.- if positive, €40.- if negative). The isolation cost was estimated by summing up the costs of contact precautions material, additional nurse and physician time, cleaning of room \(^8\) and extra for single room (€100.- per day).

In our hospital, the prevalence of vancomycin-resistance in enterococci isolated from clinical samples is below 1%. During the course of the outbreak, we identified 44 VRE-positive patients, of whom 5 were identified by clinical samples and 39 were contact patients detected by screening during their hospital stay \(^9\). Within the 453 remaining contact patients, 115 (25%) had three negative screenings before discharge, 28 (6%) had died, and 54 (12%) lived outside the investigation area. Thus, 256 contact patients were eligible for ambulatory screening, of whom 33 (13%) were excluded: 27 could not be reached and 6 refused to participate. Of the 223 included patients, 203 (91%) completed the screening protocol (3 swabs), 16 (7%) had 2 swabs and 4 (2%) one swab. Characteristics of the patients are presented in Table 1. All included patients were ambulatory and living independently. The median length of stay in an epidemic ward was 7 days (range 1-119) and the median time elapsed between discharge and
the first VRE screening was 163 days (range 0-361). The majority of patients had the 3 successive screenings done at home (170 of 203 patients, 84%). None of the included patients were colonized by VRE. The mobile team needed 554 hours (€27’000.-) and 2’396 km (€1’600.-), and performed 645 screening swabs (€25’800.-). Thus, the total cost of the home screening process was €54’400.-. Twenty-five of the 223 contact patients included (11%) were readmitted within 3 months, totaling 214 isolation days at a cost of €21’400.-.

To our knowledge, this is the first report of a home screening campaign of VRE contacts. Patient acceptance was good. We did not identify any VRE carriage. Hypotheses to explain this result could be and the relatively short length of stay on an epidemic ward (median 7 days) and the delay between discharge and VRE screening (median of 163 days), whereas the median time of VRE carriage during a large outbreak was 42 days 10. A screening performed faster after discharge and longer hospitalizations could have led to higher rate of VRE-positive contacts. Pearman et al. described the screening of 1’977 ward contacts after discharge from hospital 11. Screening swabs were obtained in outpatient clinic, upon readmission or upon admission to another hospital. Screening lasted for 7 months and detected 54 cases of VRE carriage (acquisition rate: 2.73%), with a declining yield over time.

Screening contact patients at home by a mobile team managed by the hospital, guarantees an exhaustive monitoring and centralization of results. The cost generated by the procedure and the time required for the organization of the mobile team are
limiting factors. However, the cost is partially offset as screened contact patients will not
be the source of new transmissions in case of readmission, and contact isolation days
are avoided.

In conclusion, we showed the feasibility of home screening by visiting nurses. It could
be useful in case of an outbreak of a virulent pathogen that requires strict infection
control measures in contact patients. Based on our experience and the literature \textsuperscript{10,}\textsuperscript{11},
we now recommend in our hospital isolation and screening of VRE contact patients if
readmitted within 3 months after discharge, and screening without isolation beyond that
time.
References


Table 1. Characteristics of VRE contact patients screened at home (n=223)

<table>
<thead>
<tr>
<th>Characteristic</th>
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<tr>
<td>Age (years, range)</td>
<td>64</td>
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<tr>
<td>Male gender (%)</td>
<td>104 (46.6)</td>
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<tr>
<td>Hospitalization in surgical ward (%)</td>
<td>166 (74.4)</td>
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<tr>
<td>Hospitalization in medical ward (%)</td>
<td>57 (25.6)</td>
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<td>Median length of stay (days; range)</td>
<td>7 (1-119)</td>
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<tr>
<td>Median length of stay on an epidemic ward (days; range)</td>
<td>6 (1-60)</td>
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<tr>
<td>Median time elapsed between discharge and VRE screening (days; range)</td>
<td>163 (0-361)</td>
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<td>Readmission within 3 months (%)</td>
<td>25 (11.2)</td>
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