Letters to the Editor

Optimization of Detection and Yield of Methicillin-Resistant *Staphylococcus aureus* Phage Type III-29

To the Editor:

In recent years, methicillin-resistant *Staphylococcus aureus* (MRSA) of phage type III-29 has become the MRSA strain most frequently introduced to Dutch hospitals from other European countries.[1] From July 1992 to July 1993, our 800-bed regional teaching hospital experienced the continual presence of an MRSA III-29 strain that colonized or infected 29 patients hospitalized on the intensive care units (ICUs; n=11) or, later, on two surgical wards (n=18). The index patient had brought the strain with her following repatriation from a German hospital. On the ICU, eight patients became infected (wound or respiratory tract); two of these patients also had positive blood cultures. On the surgical wards, six patients had postoperative wound infections. All patients had one or more known risk factors for acquisition of MRSA.[2] Despite vigorous efforts of the infection control department to contain the epidemic, new cases were detected regularly. Fast detection of new colonized patients was thus of the utmost importance, in order that strict isolation measures could be implemented as soon as possible. In this 1-year period, nearly 300 contact patients were screened for the presence of MRSA. Personnel of wards on which MRSA was present were screened weekly (nose only).

Various methods to detect MRSA among patients and healthcare personnel have been advocated.[2,3] Considering the relative yields of various culture sites (nose, perineal area, axilla, or wounds), detection of a MRSA-positive patient could be maximally increased (to >95%) by a combination of cultures from various anatomical sites.[4]

In addition, there are considerable variations in the culture techniques described for optimal detection of MRSA in clinical specimens, not only in the media employed[5,6] but also in the processing of specimens. The British Working Party on epidemic MRSA[3] mentions the use of a broth culture as an enrichment medium for enhancing the detection of MRSA, as it resulted in an improved recovery rate.[7,8] Furthermore, culture on a solid selective medium is said to increase MRSA detection significantly by inhibiting interfering or contaminating bacterial flora.[9] We chose to use a ceftazidime-containing agar plate because of the heavy colonization with *Pseudomonas aeruginosa* found in the index patient at admission.

For the first set of culture specimens in which MRSA was detected from each patient involved in this MRSA epidemic, we report our bacteriological results with reference to the yield from various body sites and the use of a noninhibitory enrichment broth, plated out on a solid selective agar medium, for the culture of swabs.

METHODS

Ward nursing staff and infection control nurses obtained swabs of nose, throat (along with other respiratory tract specimens, if clinically indicated), axilla, perineal area, and wounds, if present (including drain- and catheter-entry points), from patients and personnel (nose only) as an initial screening for the presence of MRSA. Specimens were processed by senior technicians in the Department of Medical Microbiology.

Swabs were streaked on Mueller-Hinton agar plates (Oxoid CM 337) and placed in a tryptone phosphate broth (Oxoid CM 283) for enrichment culture. Discs containing 5 μg methicillin and 10 μg gentamicin were placed on the first inoculation area of the agar plate for 48 hours at 30°C. The enrichment broth was incubated at 37°C and, after 24 hours, subcultured as above on a Columbia blood agar plate (Oxoid CM 331), supplemented with ceftazidime (50 mg/L). Identification as *S aureus* and determination of susceptibility was performed according to standard methods.[1,2,5,6] Determination of minimum inhibitory concentration (MIC) values for methicillin and phage typing were performed on the first isolate of each new MRSA patient by the National Institute of Public Health and Environmental Protection of The Netherlands.

RESULTS

Results of the first series of screening cultures from the 29 patients with MRSA III-29 are listed in the Table. MRSA was identified, based on culture of the nose alone, for 19 (65%); 22 (76%) could be identified by culture of the nose plus throat; culture of the nose plus wound would have identified 20 (69%); nose plus perineal area, 23 (79%); and nose plus perineal area plus wound, 24 (83%). Cultures from seven patients (24%) were positive only from the enrichment broth medium (nose, throat, and axilla once each; perineum, three times; and all four sites, once). In addition, a nose swab from a healthcare worker was positive for MRSA only in the enrichment broth. Phage typing indicated that all strains were phage type III-29. There were no zones of inhibition around the methicillin and gentamicin discs, and all MIC values for methicillin were >64 mg/L.

COMMENT

Patients colonized by this epidemic strain of MRSA would have been missed on initial screening had not multiple body sites been included in the sampling. The enrichment broth also played an important role in the detection of MRSA-positive patients and personnel carriers, as 7 (24%) of 29 and 1 of 2, respectively, were positive only by this method, and screening otherwise would have been reported falsely as negative. In such cases, the necessary hygienic measures would not have been implemented, and, consequently, dispersal of MRSA could have continued without hindrance. Indeed, four of the seven patients who initially were positive only via the enrichment broth subsequently became heavily colonized with MRSA (more than 50 colonies per agar plate) 3 to 7 days later. Fortunately, because of the positive results of the prior broth enrichment cultures, these patients already were in strict isolation. Others have reported[8] that 50% of colonized patients would not have been detected without enrichment broth culture. Finally, in our experience, this MRSA has excellent survival characteristics in the environment, and we consider environmental dispersal to have been responsible for at least one MRSA infection.[10]

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TABLE
RESULTS FROM DIFFERENT BODY AREAS OF THE INITIAL SET OF SCREENING CULTURES FOR METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* FROM 29 COLONIZED PATIENTS

Site Samples					
Nose	**Throat**	**Axilla**	**Perineal Area**	**Wound***	**Number of Patients**
+	−	−	−	−	4
+	+	−	−	−	2
+	−	+	−	−	1
+	−	−	+	−	1
+	−	−	−	+	1
+	+	+	−	−	1
+	+	−	−	+	1
+	−	+	+	−	2†
+	+	+	+	−	4
+	−	+	+	+	2
−	+	−	−	−	3
−	−	+	−	−	2
−	−	−	+	−	4
−	−	−	−	+	1

* If present.
† One of these two patients was the index case.

Ceftazidime proved an excellent selective antibiotic for this MRSA in subcultures from the enrichment medium; interference from contaminating flora was noted only sporadically. MRSA was clearly visible after 24 hours of incubation. Moreover, no MRSA could be detected after 48 hours of incubation if it was not already visible after 24 hours on this medium. Overall, MRSA colonies were larger with a brighter zone of hemolysis compared to the Mueller-Hinton medium without ceftazidime, following the same incubation period.

We conclude that our screening approach, consisting of obtaining cultures of all appropriate anatomical sites and the use of an enrichment broth plus a selective solid agar plate, yielded higher case-detection rates of this epidemic MRSA III-29 strain. However, it must be borne in mind that the optimal detection technique could be strain-dependent.

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Industry Has Not Eliminated Needlestick Injury: Is It Time for Personal or Federal Intervention, or Both?

To the Editor:

Ten years ago, any standard intravenous (IV) administration set afforded adequate access for IV drug administration (using hypodermic needles via latex Y-ports). Since the discovery of acquired immunodeficiency syndrome, a new multimillion dollar "needleless IV access" industry has developed. In spite of great expenditures for multiple types of "needleless" products, this technology has not had a significant impact on needlestick injury rates.[1] Needleless products typically are used in addition to hypodermic needles and standard latex ports, and one prospective study actually demonstrated an increased use of hypodermic needles when a needleless system was introduced.[2]

This development is particularly frustrating, as 10 years ago, my practice of anesthesia in West Germany was possible without needlestick injury dangers during IV injections. There, all IV cannulae had Luer-lock injection ports as integral components of the cannulae itself (Figure), and IV administration set tubings consistently lacked injection ports. Injections only were possible by directly attaching the syringe (*without hypodermic needle)* to the Luer port of the cannulae, or via an inserted stopcock. Needles only were used safely, during sterile conditions, and prior to patient contamination, while filling syringes with drugs. A second positive facet of these techniques resulted: syringes were used to inject drugs into only a single patient, as the syringe tip directly contacted the port and at a location very near the patient's bloodstream. In American anesthetic practice, common syringe utilization on multiple patients throughout the day was, and remains, commonplace, as many anesthetists feel syringe contamination is excluded when latex ports are injected using needles.[3,4]

The Food and Drug Administration (FDA) prohibited entry of Venflon "injection cannulae" into the US market in the late 1960s, because there were fears of port contamination and patient infection (apparently

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