
MRSA throat carriage in two healthcare workers

SHORT CASE REPORT

BERIT EVENSTAD

berit.evenstad@unn.no

Infection Control Unit

University Hospital of North Norway, Tromsø

Berit Evenstad, MSc in the field of infection, infection control nurse.

The author has completed the ICMJE form and declares no conflicts of interest.

DAG S. HALVORSEN

Geriatric Unit

University Hospital of North Norway, Tromsø and

Department of Clinical Medicine

UiT The Arctic University of Norway

Dag S. Halvorsen, PhD, specialist in medical microbiology, general internal medicine and infectious diseases, and is an associate professor.

The author has completed the ICMJE form and declares no conflicts of interest.

TORNI MYRBAKK

Infection Control Unit

University Hospital of North Norway, Tromsø

Torni Myrbakk, specialist in medical microbiology and senior consultant in infection.

The author has completed the ICMJE form and declares no conflicts of interest.

Background

Healthcare workers colonised with methicillin-resistant *Staphylococcus aureus* (MRSA) experience negative consequences due to work restrictions, long-term sick leave, stigmatisation, eradication failures and psychosocial stress. Throat colonisation is associated with prolonged carriage and non-successful treatment.

Case presentation

We describe two Norwegian healthcare students with persistent MRSA throat carriage. After several eradication failures, MRSA eradication was successful only after tonsillectomy.

Interpretation

Tonsillectomy is not the solution for persistent MRSA throat carriage in healthcare workers. However, their stories illustrate the challenges they faced during repeated eradication attempts. They suffered considerable psychological stress due to the risk of study disruption and limited career options. The impact of laws and strict guidelines for MRSA-colonised healthcare workers, needs to be re-assessed in order to reduce transmission. We argue that healthcare workers without individual risk factors should be able to work in units considered to pose no risk as long as they undergo individual training in basic infection control measures.

Healthcare workers with confirmed methicillin-resistant *Staphylococcus aureus* (MRSA) carriage often experience negative consequences, such as work restrictions, long-term sick leave, repeated failed attempts at eradication, stigmatisation and psychosocial stress. We describe two students who, after several unsuccessful attempts at eradication, underwent tonsillectomy to rid themselves of throat carriage.

Methicillin-resistant *Staphylococcus aureus* (MRSA) was found in the throat swabs of one medical student and one nursing student. Screening samples from skin lesions, the nose and perineum were negative. Both students were tested after travel abroad, in line with the regulation on medical testing prior to clinical practice in healthcare institutions (1). MRSA was confirmed in PCR analyses, and the bacterial isolates were sensitive to all antibiotics tested, except benzylpenicillin and oxacillin. Both students were healthy with no risk factors for prolonged carriage, and they were highly motivated in relation to eradication. The students had studied different subjects in different time periods and had no knowledge of each other.

The household members in both families were tested several times. All tested negative for MRSA, except for one close contact who tested positive for MRSA in the nose and perineum with the same antibiogram. The first attempt at

eradication in this close contact was successful, and in subsequent checks, all cultures were negative.

The students received follow-up at the Outpatient Clinic for Infectious Diseases in collaboration with the hospital's senior consultant in infection control. Eradication was performed using mupirocin nasal ointment three times daily, daily chlorhexidine whole body wash and a series of measures in the home, including the daily changing of towels and bed linen for 7–10 days. To address the throat carriage, two different oral antibiotics were prescribed in accordance with susceptibility testing. Multiple attempts were made at eradication, but these failed to eliminate MRSA carriage.

Student no. 1 had four attempts at eradication, using three different combinations of oral antibiotics over a total of two years and 11 months: doxycycline 100 mg × 2 and rifampicin 450 mg × 2, followed by ciprofloxacin 750 mg × 2 and rifampicin 450 mg × 2. The third attempt was with trimethoprim-sulfamethoxazole in tablet form 2 + 2 and rifampicin 450 mg × 2, and the fourth attempt with ciprofloxacin 750 mg × 2 and rifampicin 450 mg × 2. Throat swabs detected recurrent MRSA after 8, 51, 5 and 4 weeks, respectively.

Student no. 2 had two attempts at eradication with two different combinations of oral antibiotics over two months: ciprofloxacin 750 mg × 2 and rifampicin 450 mg × 2 in tablet form as the first course of treatment, followed by doxycycline 100 mg × 2 and rifampicin 450 mg × 2. Recurrent MRSA was found in the throat swabs after two and three weeks, respectively. No further attempts at eradication were made due to adverse effects of medication and rapid relapses.

All antibiotic courses covered a ten-day period, except for the first course in student no. 1, which was seven days.

The students found the period with repeated unsuccessful attempts at eradication to be very stressful, and they had concerns about their social life, their studies/clinical placements, the reduced opportunities to work alongside their studies, and future career options. Effective communication with both the clinical placement institution and the study programme coordinator facilitated the students' adaptation of their studies and clinical placements, ensuring completion within the standard time frame.

Tonsillectomy has been proposed as a possible treatment strategy for persistent MRSA throat carriage (2–4). The Department of Otolaryngology was consulted, and after several well-informed discussions about potential complications, such as bleeding and infection, the decision was made to perform tonsillectomy on both students approximately four years and one year after the initial positive MRSA test.

The procedures were performed according to the standard protocol for general anaesthesia with intubation, with no complications. Cultures of excised tonsil tissue confirmed the presence of MRSA in both students. Multiple follow-up samples from the nose, oropharynx and both tonsil beds were negative in

repeated culture checks, with the last one approximately 12 months postoperatively. Throat carriage is now considered to have successfully been eradicated in both students.

Discussion

In 2021, 1751 people were diagnosed with MRSA in Norway. Of these, 1060 (60 %) were registered with MRSA colonisation (5). There is no record of the proportion of healthcare workers with MRSA infection, but in 2015, 81 cases (3.6 %) were reported (6). Colonised healthcare workers often experience negative consequences in the form of work restrictions, long-term sick leave, repeated failed attempts at eradication, stigmatisation and psychosocial stress (7).

MRSA carriage is most common in the anterior nares, followed by the perineum and throat (8). Colonisation of the anterior nares alone is considered uncomplicated carriage, and eradication is normally easy. Colonisation of other sites, or the presence of skin lesions is considered more complicated, and represents a risk of persistent carriage (8). Success rates of 41–88 % after eradication are reported in some studies (9, 10), with throat carriage being the most difficult to eradicate (11). Adjunctive treatment with mouthwash has been shown to have no additional benefit (11, 12).

The risk of MRSA transmission from healthcare workers to patients is an under-researched area, particularly in relation to isolated throat carriage (12). Nevertheless, there are claims in the medical community that throat carriage entails little risk of transmission. Results from an extensive Norwegian study show very little cross-contamination between patients with unexpected MRSA findings and healthcare workers, and between colleagues in the same unit (13). Reports from Sweden and Denmark indicate a consistently low incidence of occupational transmission of MRSA (14, 15).

The MRSA recommendations for healthcare workers employed in nursing homes and hospitals are almost equally stringent in the Netherlands and Norway, and include reassignment or sick leave from patient-facing work until eradication is completed (16, 17). In Sweden, MRSA-positive healthcare workers are followed up by regional infection control coordinators, and in some regions, healthcare workers with no individual risk factors can continue working in patient-facing roles in units considered to pose no risk (18). In Denmark, MRSA-positive healthcare workers with no signs of infection can remain in their post during the eradication process. In cases of unsuccessful eradication, reassignment to areas with less sensitivity to infection may be considered (19), but according to Danish colleagues, reassignment is very rare. In Norway, the MRSA guidelines allow for individual assessments if healthcare workers remain positive for MRSA (16). However, the regulations stipulate that healthcare workers infected with antibiotic-resistant pathogenic bacteria should be prohibited from performing work that may pose a risk of transmission (1).

In our experience, MRSA eradication is a complex field that should be coordinated by dedicated personnel. Consequently, the University Hospital of North Norway established a service for MRSA-positive healthcare workers at the Outpatient Clinic for Infectious Diseases in 2017. The service was eventually expanded to include medical and healthcare students at UiT The Arctic University of Norway.

The main message of this case study is that tonsillectomy should *not* be presented as a solution for persistent MRSA throat carriage. In our opinion, the procedure is too high-risk as an eradication method. However, the narratives illustrate the challenges that MRSA-positive healthcare workers face in terms of stringent restrictions that can limit further education and employment opportunities. This particularly applies to students who do not benefit from the same protective legislation as that of employees.

The purpose of the national MRSA guidelines from 2009 and the regulation on medical testing of healthcare workers is to reduce the risk of transmission. We believe that the benefit and effect of the stringent work restrictions for MRSA-positive healthcare workers need to be re-evaluated. In our opinion, healthcare workers with no individual risk factors can work in patient-facing roles in units considered to pose no risk, preferably with a requirement for approved, individual training in basic infection control procedures.

The students have consented to publication of this article.

The article has been peer-reviewed.

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