

## Commentary

# Ethics roundtable debate: A patient dies from an ICU-acquired infection related to methicillin-resistant *Staphylococcus aureus* – how do you defend your case and your team?

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## Abstract

An elderly patient dies from septic shock in the intensive care unit. This is perhaps not an unusual scenario, but in this case the sepsis happens to have been due to methicillin-resistant *Staphylococcus aureus*, possibly related to a catheter, and possibly transmitted from a patient in a neighbouring room by less than adequate compliance with infection control procedures. The family decides to sue. We present how experts from four different countries assess the medicolegal issues involved in this case.

**Keywords** infection control procedures, medicolegal, MRSA, transmission

## Introduction

Nosocomial infections are a common problem in hospitals, particularly in the intensive care unit (ICU) [1]. They are associated with increased morbidity and mortality, and are responsible for considerable costs. Infections with organisms that are resistant to antimicrobial agents, such as methicillin-resistant *Staphylococcus aureus* (MRSA), are a particular problem because of the reduced therapeutic options associated with such infections. Development of any nosocomial infection, but perhaps particularly those caused by resistant organisms such as MRSA, may have medicolegal implications because many are transmitted by staff from one patient to another.

Data strongly suggest that infection control measures such as hand hygiene and patient isolation can prevent the spread of MRSA [2]. Could failure to adhere to such protocols be interpreted as medical negligence? Perhaps but, in defence, it is well accepted that controlling the spread of nosocomial infections is rarely dependent on any one factor but rather on a 'package' of surveillance and preventative measures [3]. Pointing the finger of blame at any single individual or infection control strategy, or even groups of them, is unrealistic. Poor catheter insertion practices may contribute to the development of a nosocomial infection, but many other factors influence a patient's likelihood of developing an infection, including their

severity of illness, duration of ICU stay, previous medications and comorbid diseases, among others.

There are still many unanswered questions, partly because of inadequate surveillance and reporting in the past and the poor methodological quality of many of the studies conducted in this field [2]. Why does one patient develop MRSA sepsis but not the next? If staff and patients were routinely screened for MRSA, then would this make a difference to infection rates? Would prophylactic antibiotic therapy in high-risk patients

make any difference to infection rates? Establishing causality is difficult; certainly nobody is perfect, but how 'perfect' or 'imperfect' can physicians and other staff be expected, or allowed, to be? Everyone misses the occasional opportunity to wash his or her hands when leaving a patient, perhaps when they have to run to the next emergency, but how many missed occasions can be considered acceptable? These complex issues are explored here as experts from four countries provide us with their views on a hypothetical, but increasingly common, clinical scenario.

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## The Case

An elderly patient dies from septic shock on the ICU at your hospital. He had been admitted for subarachnoid haemorrhage 2 weeks earlier and had never woken up, although nobody had raised the issue of withdrawal of life support. The patient's children overhear that the fatal infection had been due to a multiresistant staphylococcus called MRSA and may have been catheter-related. They now say that they remember having seen a nurse leaving the next patient, who was infected with that pathogen (it was written in red on the door), and then entering their father's room

without washing her hands. They remember having seen another nurse briefly enter the next patient's room without wearing a gown, although this was clearly stated as a requirement in the infection control procedure noted on the door. They also wonder whether their father really needed the catheter that caused the infection. Accordingly, the children decide that the ICU-acquired infection that took their father is your mistake and decide to sue you! What would you do to defend your case and your team?

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## An American opinion

Michael Neiderman

In defending the ICU team and in explaining the situation to the family in this scenario, several considerations are important. First, the possibility that staff transmitted MRSA to the family member is real, but the benefit of barrier and contact precautions to prevent this problem is quite unclear [4]. In addition, the major determinant of acquisition of line infection is the meticulousness of the procedure used for insertion of the line itself [5]. Thus, we would need to know (and reassure the family, depending on the answers) whether the physician inserting the line used a sterile gown and mask, whether the catheter used was antibiotic coated, what site the line was placed in and how easily the line was inserted. It would also be important to explain to the family why central lines are so commonly used in ICUs and why this patient required one.

The most important issue that the family needs to understand is that the development of a nosocomial infection is often a reflection of the severity of a patient's illness, which relates to impaired host defences. The use of 'barrier precautions' such as gowns and gloves, although valuable, may not always be effective. This is especially true in an ICU with a high background rate of resistant pathogens, or in one that is plagued by the importation of community-acquired MRSA, brought in by staff, visitors and the patient themselves, in some instances making infection control ineffective [4].

The value of barrier precautions has been proven for MRSA, but not all of the data are clearly positive. The recommended

policies for prevention have changed over the years, and even with the use of private rooms, gowns, gloves, masks and hand washing (after removing gloves and leaving the room), which became a formal recommendation of the US Centers for Disease Control and Prevention in 1996, the proportion of ICU infections due to MRSA increased from 36% to 57% between 1996 and 2002 [4]. The failure of such 'contact precautions' may be due to multiple factors. As mentioned above, if the background rate of resistance in the ICU is already high, then the efficacy of these measures may be limited. In one study the use of a multifaceted programme did work, but the incidence of MRSA was still relatively high, at 0.24/100 admissions, as compared with a rate of 0.6/100 admissions before the use of these measures [6]. Contact precautions may also fail when there are high rates of community MRSA entering the ICU, regardless of precautions.

The behaviour of the staff in the care of the patient in our case scenario is not unusual. In fact, in 34 published studies the average adherence of health care workers to hand washing was 40%, with a range of 5–81% [4].

Because the risks for developing MRSA infection from a central venous catheter are often dependent on patient factors as well as on the behaviour of health care workers, underlying comorbidities such as diabetes can increase the risk, as can the presence of more severe illness (i.e. a high Acute Physiology and Chronic Health Evaluation II score).

However, the impact these conditions have can be minimized if efforts are made to insert the line under carefully controlled and sterile conditions [7]. If these procedures were followed in our hypothetical case, then the impact of breaches in contact precautions by the nursing staff may have been minimal.

In summary, nosocomial infections can be serious and often devastating complications of critical illness, but their

presence does not always indicate poor medical care. Many factors other than breaches in infection control and 'contact precautions' might have been important here, and if other factors are considered then the role played by these breaches in causing infection might have been negligible. Prevention of infection requires a combination of good care at many stages, a patient who has an underlying illness that responds quickly to therapy, minimizing exposure to invasive devices, and the hospital environment.

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## A French opinion

Christian Brun-Buisson

There are at least two questions raised by this case history within the context of legal action against the unit. The first question is a juridical one; can the death of this patient be ascribed to the MRSA infection? Second, were infection control procedures adequate and could this event have been avoided? A further question that one could add is how could this legal action have been avoided?

The first question seems to be a relatively easy one to answer. Although we are not told the patient's age, cerebral computed tomography, or magnetic resonance imaging findings, let us assume that the subarachnoidal haemorrhage had caused irreversible lesions that were responsible for prolonged coma and lack of arousal. In this setting, it is unlikely that a judicial review would conclude that the infection was responsible for the death of the patient, or that the infection altered substantially the natural course of events in this patient. It is therefore unlikely that the plaintiffs would be granted an action based on a (involuntary) homicide.

Whether adequate organization for infection control was in place also appears clear because patients carrying MRSA were subject to isolation procedures. The ICU must provide evidence that isolation procedures were implemented in accordance with guidelines and with the recommendations of infection control committees [8]. The literature indicates that absolute compliance with isolation precautions is not the rule. What would be useful is to have data available that

show that compliance in the unit (e.g. with hand washing) was at least as good (and preferably higher) than the 50% rate reported in the literature [9]. It might be useful to remind the judge that compliance in busy units might decrease with increased workload, and there are times when the workload is so high that breaches in control measures inevitably occur. Data regarding the actual nurse/patient ratio during the patient's stay might be useful, because absolute compliance can be expected when this ratio is close to 1. Caring for two or more patients in emergency situations cannot be expected to be associated with absolute compliance with hand washing precautions. The patient's family refer to an incident in which a member of the nursing staff failed to wash their hands after attending to a patient with MRSA, but was this an emergency situation?

As with infection itself, it is probably better to prevent complaints than treat them. Explaining to families that nosocomial infections do occur in ICUs, why they occur (especially in long-term ventilated patients), and all that is done to control and contain these infections (in accordance with published and local guidelines) is probably one way to avoid complaints. In this regard, it is somewhat surprising that therapeutic plans and the possibility of withdrawal of life support had not been discussed beforehand with the patient's family [10]. This discussion would also have been an opportunity to discuss the potential risks associated with a prolonged ICU stay.

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## A Swiss opinion

Christian Haenni, Stephan Harbarth and Dominique Sprumont

Under Swiss law, if one wishes to demonstrate liability of the hospital or the health care providers, then several elements must be proven [11]. First, one must demonstrate the existence of damage, in this case the death of the patient. Second, there must be evidence of an act of negligence based on a departure from 'state of the art' practice. The negligence could manifest as the act of an individual member of the hospital personnel (e.g. systematic lack of hand hygiene) or as a failure in the organization of the hospital system (e.g. absence of infection control policies). Third, a causal link must be established between the alleged damage

and the act of negligence. According to real life experience, there should be a high degree of certainty that the act of negligence was indeed the origin of the damage. Swiss law makes it rather difficult for patients to sue physicians or nurses (and the hospital where they work) for suspected negligence, as long as they adhere to at least a minimum standard of professional behaviour [12].

Liability could also be concluded if there was a lack of informed consent [13]. However, because this appears to have been a true emergency situation, the physicians were

entitled to believe that the patient would have agreed to be treated, despite the potential risk for nosocomial infection. This may be considered 'hypothetical consent'. Even if the patient had been conscious and the situation had not been life threatening, it remains to be proven that, being informed of the risk for nosocomial infection, he would have refused treatment. This is rather unlikely in view of the risks to the patient.

One last and difficult issue is the right of the children to be informed of their father's cause of death. One could argue that they are entitled to know whether it was a microbiologically proven, hospital-acquired MRSA infection or another fatal infection that caused the death of their father. One precondition would be that it is a common policy of the hospital to provide general information on nosocomial infections and to make the patients aware of the potential risks [13]. It is our understanding that a clear policy on this issue is useful both for hospital personnel and patients because it encourages transparency [14]. In the present case it could have helped to prevent legal action.

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## A Spanish opinion

Mauricio Valencia and Antoni Torres

We must address several key issues with respect to this clinical case. First, did this patient need a central venous catheter? The patient's diagnosis was a subarachnoid haemorrhage. Because he did not regain consciousness during the 2-week period he was in the ICU, it may be that the haemorrhage was rather severe [15]. In current clinical practice, angiographic and symptomatic cerebral vasospasm is recognized as the main cause of substantial disability and death in patients with subarachnoid haemorrhage. Cerebral vasospasm kills 7% of patients and causes severe deficit in a further 7% [16]. Management of this complication, alongside nimodipine, is the so-called 'triple H' therapy, which consists of hypervolaemia, induced arterial hypertension and haemodilution. Monitoring during this therapy with a central venous catheter (or even a pulmonary artery catheter) is mandatory [17].

With respect to the catheter-related bloodstream infection with MRSA, several points must be considered. Although another patient in the ICU was infected with MRSA, this does not render it irrefutable that our patient was infected from this source. Patients can be colonized with MRSA on admission to the ICU. In one study [18] 6.8% of patients were colonized on ICU admission. In addition, in a case-control study as many as 58% of 170 MRSA isolates in a hospital were from community cases [19]. MRSA colonization greatly increases the risk for *S aureus* infection (hazard ratio 3.84;  $P = 0.0003$ ) [20], but the scenario presented above does not state whether our

Certainly, if we are to defend the hospital and the ICU personnel, then we must take seriously the observations of the children about the way in which their father was cared for. The main issue is to clarify the facts. This will prove useful when discussing the situation with the plaintiffs but also when assessing the legal merits of the case. In this context, we would ask the ICU personnel about their own perception of the case and ask for the patient's medical record. We would also organize a meeting with the children to give them an opportunity to express their feelings and provide them with as much information as possible. Many complaints are based on misconceptions and poor communication between the parties involved. It is therefore worth being open to criticism and complaint from the relatives in order to prevent further legal action. In the present case, however, it appears difficult to concede liability of the ICU personnel, especially if there was a clear policy on the information provided to the patients about the risks of hospital-acquired infection.

patient was colonized with the strain from the infected patient. The strains from both patients should be characterized by pulsed field gel electrophoresis of whole cell DNA, and that information would confirm the origin of the strain [19].

This patient had several important risk factors for nosocomial MRSA infection in the acute care setting. These risk factors are prolonged hospital stay, exposure to broad-spectrum antibiotics, lengthy duration of antimicrobial therapy, prolonged stay in intensive care unit, presence of a surgical wound and proximity to another patient with MRSA [21].

The noncompliance of the staff with isolation measures in the ICU is a further risk factor for spread of MRSA. The US Centers for Disease Control and Prevention advocate contact isolation precautions to prevent spread of MRSA [22], although some investigators claim that contact isolation precautions alone did not control nosocomial spread of MRSA in their institutions [23]. There are many reports of successful control of MRSA spread with the use of contact or barrier precautions [24,25], and this practice must be reinforced.

In conclusion, the ICU staff made important mistakes in their implementation of isolation precautions. The noncompliant behaviour is itself a risk factor for MRSA spread. However, we cannot conclude that there is a causal link between the faults of the staff and the patient's death.

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## Competing interests

8 The author(s) declare that they have no competing interests.

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