

CONCISE COMMUNICATION

A Cluster of Methicillin-Susceptible *Staphylococcus aureus* Infections at a Rheumatology Practice, New York City, 2011

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A cluster of 5 methicillin-susceptible *Staphylococcus aureus* infections occurred after administration of methylprednisolone acetate injections in a rheumatology practice. A site visit was conducted to inspect examination rooms, observe techniques, and review charts. The investigation revealed a pervasive lack of aseptic technique that led to multiple opportunities for medication contamination.

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Improper use of multidose vials (MDVs) and inadequate infection control (IC) practices have led to numerous outbreaks of bacterial skin and soft-tissue infections (SSTIs) after parenteral injection.¹⁻⁴ During the period 2001-2011, 35 patient notification events occurred across the United States related to unsafe injection practices that potentially exposed 130,198 patients.⁵ To prevent these events, the Centers for Disease Control and Prevention (CDC) recommends that MDVs be used for only 1 patient when possible and that single-dose vials (SDVs) are never used for more than 1 patient and only for 1 procedure or injection.⁶

On December 5, 2011, the New York City Department of Health and Mental Hygiene (DOHMH) was notified by a hospital IC practitioner that 4 patients were recently admitted for surgical debridement of laboratory-confirmed methicillin-susceptible *Staphylococcus aureus* (MSSA) SSTIs after outpatient steroid injections. DOHMH initiated an investigation to determine whether the illnesses were related to common exposures, identify the source of the outbreak, and recommend IC improvements to prevent future outbreaks.

METHODS

DOHMH called 2 of the 4 patients and learned that they had been treated by the same rheumatologist. The rheumatologist reported that all 4 patients had received steroid injections on the same day as outpatients. DOHMH staff visited the rheumatologist's office to review medical charts of all patients seen on the same day as the 4 hospitalized patients; to ascertain whether there were other suspected or confirmed MSSA SSTIs; to interview staff; to observe IC practices; and

to inspect examination rooms. Antibiotic sensitivities were determined by the hospital's laboratory, and pulse-field gel electrophoresis (PFGE) patterns of the 2 available patient isolates were compared by the DOHMH laboratory.

RESULTS

During chart review by DOHMH investigators, a fifth patient with a MSSA SSTI was identified who was injected on the same day as the other 4 patients and subsequently treated in a hospital emergency department. Of the 5 patients, 3 were female (age range, 46-80 years). All 5 patients were scheduled between 10:15 AM and 1:30 PM. Four were administered intramuscular (IM) methylprednisolone acetate (MPA) injections, and a fifth received an intra-articular MPA injection to the wrist. This fifth patient was symptomatic within 24 hours and underwent incision and debridement of a wrist abscess in an emergency department 6 days after the injection. In comparison, the 4 patients with deltoid abscesses had longer incubation periods, leading to hospital admissions and surgical debridements 21-29 days afterward (mean time to debridement, 25 days); 2 patients required multiple procedures (Table 1). All 5 MSSA isolates were susceptible to methicillin, ciprofloxacin, clindamycin, erythromycin, tetracycline, trimethoprim-sulfa, and vancomycin as determined by the hospital microbiology laboratory. PFGE patterns for the 2 available isolates were indistinguishable and related to USA 1000 pattern, with 4 bands difference.⁷

The rheumatologist recalled evaluating at least 3 of the patients in the same examination room; however, this detail was not systematically documented in the office records. The office contained 3 examination rooms. Each had a sink, soap dispenser, medical cabinets above the sink, and a small countertop. A paper towel dispenser was located above the counter, and open MDVs and an SDV were kept on top of the dispenser (Figure 1). The steroid MDVs contained preservatives and were produced by a compounding pharmacy.

The rheumatologist reported completing the New York State-mandated IC training.⁸ However, there were no formal office IC policies or procedures. The rheumatologist was confident that syringes and needles were never reused or reinserted into MDVs but indicated that medical residents sometimes performed injections without supervision. SDVs also were used for multiple patients. A medical assistant tidied examination rooms daily, discarding open lidocaine vials and other MDVs if they were almost empty or if medication had changed color.

Several IC breaches were observed or reported during the site visit. Undated, open MDVs and SDVs were kept in patient areas. Aseptic technique was not followed when the rheumatologist demonstrated how injections were prepared. The rheumatologist did not wash hands or simulate washing and

TABLE 1. Patient Characteristics, Clinical Course, and Disposition of Patients in Methicillin-Susceptible *Staphylococcus aureus* Skin and Soft-Tissue Infection Cluster

Patient	Sex	Age, years	Date seen	Time scheduled	Indication for injection	Days to hospital evaluation	Diagnosis	Treatment	Admitted	Length of hospitalization, days
1	F	72	11/1/11	10:15 AM	Sarcoid arthropathy	29	Deltoid abscess	I & D; antibiotics	Yes	2
2	M	80	11/1/11	11:15 AM	Gout	5	Wrist abscess	I & D; antibiotics	No	0
3	M	46	11/1/11	11:15 AM	Polyarticular gout	22	Deltoid abscess	I & D; antibiotics	Yes	1
4	F	75	11/1/11	1:00 PM	Lupus	21	Deltoid abscess, cellulitis	I & D (twice); antibiotics	Yes	6
5	F	63	11/1/11	1:30 PM	Polyarthrititis	28	Deltoid abscess	I & D (twice); antibiotics	Yes	8

NOTE. I & D, incision and debridement.

touched a sterile needle with an ungloved hand. Of note, the provider did not disinfect the vial's rubber septum with alcohol before inserting a needle and stated that MDV rubber septums were disinfected before patients were seen every morning but not necessarily for each use. Examination room refrigerators had no thermometers, and the shelves were disorganized and overfilled. An ice block covered the entire freezer, making it inaccessible.

DISCUSSION

Based on epidemiologic and molecular findings, the likely cause of these 5 healthcare-associated infections was inadvertent contamination of an MPA MDV and subsequent parenteral administration of the medication. The medical record did not include the dose of MPA that was administered to each patient. However, there was sufficient MPA in a full MDV to inject the 5 infected patients. Because the product was prepared in a compounding pharmacy, it is possible that the preservative used was inadequate or faulty. This would have facilitated growth of a bacterial contaminant that had been introduced within the MDV earlier that morning or the previous day. The general lack of aseptic technique and IC procedures coupled with the unsafe placement of medications allowed for several possible contamination mechanisms. Medication vials were vulnerable to splashes, spills, and handling by potentially soiled hands, particularly if hand washing was not routinized throughout care and if vial septums were not disinfected before needle insertion.

Contamination of a single MDV rather than a contaminated product lot was suspected, because all 5 patients were seen over a 3-hour and 15-minute period, at least 3 appeared to have been in the same examination room, all were injected with MPA, all antibiograms matched, and the available isolates were indistinguishable by PFGE. If the medication had been intrinsically contaminated, other MSSA infections would have occurred in patients seen in different rooms within the practice and in other clinical locations. During case finding, DOHMH did not systematically contact all patients seen at the practice, assuming that symptomatic patients would have contacted the provider and that this would

have been noted in their charts. The clinical impacts of this SSTI cluster were not trivial. Half of those admitted required multiple surgical procedures, and the mean hospital stay was 4 and one-quarter days.

DOHMH recommended both engineering and administrative controls to improve IC and injection safety. DOHMH recommended that injectable medications and infusions should be stored and prepared in a dedicated location separate from patient care areas and disinfected daily.^{6,9,10} This room would be the preferred location for a well-organized refrigerator, monitored and maintained at an appropriate temperature. The practice was asked to develop a formal IC program that would use current injection safety and bloodborne pathogen standards and guidance documents published by the CDC and the Occupational Safety and Health Association to ensure that aseptic technique always be maintained.^{6,9,10}

Similar incidents may occur more commonly than recognized in outpatient settings, which typically have access to



FIGURE 1. Multidose vials of methylprednisolone acetate (10 mL; 80 mg/mL), triamcinolone acetonide (10 mL; 40 mg/mL), dexamethasone phosphate (30 mL; 4 mg/mL), cyanocobalamin (10 mL; 1,000 mcg/mL), and lidocaine (20 mL; 20 mg/mL) and a single-dose vial of methotrexate (2 mL; 25 mg/mL) were located on top of the paper towel dispenser in an examination room.

fewer IC resources than do inpatient facilities. Although some states, including New York, mandate IC training for clinicians, there are insufficient resources to monitor implementation.⁸ An alternative approach could require outpatient practices to undergo periodic inspections by practitioners certified in IC, thereby identifying inadequate practices and providing technical assistance to meet guidelines. This outbreak and the growing number of documented bacterial and viral infection outbreaks linked to unsafe injection practices suggest that new strategies are needed to more effectively assess and monitor IC practices in outpatient settings to improve patient and provider safety.

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