A gap in patient tape storage and use practices puts patients at risk for cutaneous fungal infections

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Key Words:
- Mucor
- Skin infection
- Adhesive

We report a case of a cutaneous fungal infection in a 12-year-old oncology patient related to patient tape. Our facility had no established guidelines for patient tape. A survey conducted of multiple local healthcare facilities revealed no existing policies or standards of care related to tape storage or use. This reveals a gap in practice. We call for formal recommendations for tape storage and use to enhance patient safety.

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Cutaneous fungal infections can progress rapidly, especially in high-risk populations, including newborn infants, people with diabetes, and people with immunosuppression.\textsuperscript{1} Adhesive medical supplies, including patient tape, can act as a vehicle for fungal spores if not properly stored in a bag or covered container to protect them from the environment.\textsuperscript{2} Nosocomial cutaneous fungal infections warrant evaluation of the airflow and filtration on high-risk units and previous use of adhesive devices or surgical interventions at the site of infection. Our facility experienced tape-associated cutaneous infections resulting in significant morbidity. In response, we investigated proper use and storage of tape in medical facilities with intent to follow any established recommendations that were discovered.

CASE REPORT

During November 2013, a 12-year-old child with relapsed acute myeloid leukemia was admitted for chemotherapy treatment. Tape used to secure her central line was left in place for 1 week, in compliance with hospital standards. The patient complained of pain at the dressing site, and during a routine dressing change the nurse made note of areas blackened with erythema in the patient's medical record. Consultation by a member of the Infectious Disease Department resulted in suspected cutaneous fungal infection from tape exposure. Three surgical debridements were required, resulting in a simple mastectomy. Surgical cultures yielded mucor/rhizopus. The patient also received antifungal therapy due to immunosuppression. The patient experienced a relapse of her acute myeloid leukemia and underwent bone marrow transplantation. Due to ongoing immunosuppression, antifungal therapy was administered throughout the transplant period.

METHODS

This health care-associated infection prompted us to investigate patient tape storage and use at our facility, throughout the state, as recommended by the manufacturer, and as recommended by national organizations.

Our facility

The Infection Prevention team followed the path that tape takes from the warehouse to patient bedside. Site visits to the warehouse were completed, as were discussions about storage practices and use with equipment technicians and bedside nurses.

Throughout the state

This case was presented at the Michigan Society for Infection Prevention and Control 2014 Spring Conference, which is attended by infection control professionals, epidemiologists, and health care providers. Attendees were asked to complete a survey describing their facility's current practice regarding tape storage and use.
Table 1
Tape storage, use, and handling survey results

<table>
<thead>
<tr>
<th>Question</th>
<th>Proportion</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does your facility have a policy/standard of care on how tape is stored?</td>
<td>Yes 0/15</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>No 15/15</td>
<td>100</td>
</tr>
<tr>
<td>Is tape at your facility single-patient use?</td>
<td>Yes 5/14</td>
<td>35.7</td>
</tr>
<tr>
<td></td>
<td>No 9/14</td>
<td>64.3</td>
</tr>
<tr>
<td>Is tape discarded at discharge?</td>
<td>Yes 6/14</td>
<td>42.9</td>
</tr>
<tr>
<td></td>
<td>No 8/14</td>
<td>57.1</td>
</tr>
<tr>
<td>Does staff at your facility carry tape in their pockets or around their stethoscope?</td>
<td>Yes 8/13</td>
<td>61.5</td>
</tr>
<tr>
<td></td>
<td>No 5/13</td>
<td>38.5</td>
</tr>
<tr>
<td>How is tape transported from your supply warehouse to a given unit?</td>
<td>Carts 2/9</td>
<td>22.2</td>
</tr>
<tr>
<td></td>
<td>Boxes 7/9</td>
<td>77.8</td>
</tr>
<tr>
<td>How is tape stored on a given unit?</td>
<td>Bin 4/16</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Shipping box 1/16</td>
<td>6.3</td>
</tr>
<tr>
<td></td>
<td>Drawer, cupboard, cart 8/16</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Supply room 3/16</td>
<td>18.7</td>
</tr>
<tr>
<td>How is tape stored in a patient room?</td>
<td>Anywhere it can be found 1/13</td>
<td>7.7</td>
</tr>
<tr>
<td></td>
<td>Intravenous line pole 1/13</td>
<td>7.7</td>
</tr>
<tr>
<td></td>
<td>Patient cart/drawer in patient room 7/13</td>
<td>53.8</td>
</tr>
<tr>
<td></td>
<td>Wherever 1/13</td>
<td>7.7</td>
</tr>
<tr>
<td></td>
<td>Open on the counter 1/13</td>
<td>7.7</td>
</tr>
<tr>
<td></td>
<td>Disposable tray 1/13</td>
<td>7.7</td>
</tr>
<tr>
<td></td>
<td>No storage in patient room 1/13</td>
<td>7.7</td>
</tr>
</tbody>
</table>

Manufacturer

Our facility receives tape rolls from a single manufacturer whom we contacted via e-mail. Discussions included storing tape and single versus multiple patient use.

National organizations

We looked to the Centers for Disease Control and Prevention Healthcare Infection Control Practices Advisory Committee and Association for Professionals in Infection Control and Epidemiology for recommendations on storage and use of patient tape. Thorough searches of their databases online were conducted.

RESULTS

Our facility

Loose rolls of tape were sent from the warehouse to individual units in uncovered bins. Within the units, tape was stored in open bins in clean supply rooms. Neither of these bins was regularly cleaned. Health care workers carried tape rolls in pockets and on stethoscopes. Tape was stored in common areas and used for multiple patients.

Throughout the state

Surveys were completed by 16 participants from at least 9 institutions (Table 1). One hundred percent of facilities had no policy or standard of care related to tape use and storage. More than half (61.5%) confirmed that staff members carry rolls of tape in pockets or on stethoscopes. Considering tape a single-patient-use product was reported by 35.7%. Fewer than half (42.9%) discard unused tape when a patient is discharged.

Manufacturer

Personal communication with the tape manufacturer revealed recommendations that patient tape be stored in a clean, dry, and covered bin, box, or bag that is routinely disinfected or replaced. The product should be single-patient-use. We were not previously aware of these recommendations.

National organizations

Neither the Centers for Disease Control and Prevention Healthcare Infection Control Practices Advisory Committee nor the Association for Professionals in Infection Control and Epidemiology have guidelines for storage and use of tape.

PRACTICE CHANGE

At the recommendation from the tape manufacturer, a hospital-wide initiative established safe guidelines for tape storage and use. A standard of care was distributed via a mandatory computer-based education module. This guideline establishes:

- All tape rolls are single-patient-use for inpatients,
- Tape is not to be kept in pockets or on stethoscopes,
- Tape is sent from the warehouse in a transport bin in manufacturer’s packaging to shield it from the environment,
- Cleaning schedules are established for warehouse transport bins,
- Tape is stored in clean utility rooms in manufacturer’s packaging,
- Tape rolls are individually bagged when taken to a patient room and labeled with a patient identifier,
- Tape remains bagged for the duration of the patient’s stay, and
- All unused tape is discarded at patient discharge.

DISCUSSION

Our search for recommendations for tape storage and use found inconsistent practices throughout the state. Although our tape manufacturer does provide recommendations, these are not reiterated by national organizations. Some facilities surveyed follow recommended practices, but none report specific policies.

A 1977 outbreak of cutaneous mucor traced to contaminated adhesive dressings was reported in the literature.3-6 There have been sporadic reports of cutaneous mucor associated with adhesive devices that were recently summarized in a review article.1 There are recommendations in the medical literature for clean tape storage or use of sterile tape on high-risk units.7

Despite these publications, the risk of cutaneous fungal infections from tape in immunocompromised and other high-risk patients is underappreciated. Tape is a common patient item without specific practice standard. Although at least one tape manufacturer has guidelines for storage, these are not widely appreciated or available. Individually wrapped sterile tape is available, but once opened this tape is susceptible to environmental contamination. The recent, highly publicized mucormycosis outbreak8 attributed to contaminated linens further demonstrates the need for attention to the risk of fungal infections.

A limitation of our study is the small sample size from a single state. These findings may not be generalizable to the entire country.
CONCLUSIONS

The absence of a tape policy or standard from any of the institutions we surveyed, along with the lack of national guidelines, suggests a widespread lack of knowledge and underappreciation of the risk posed by adhesive tape used on patients. The potential for significant patient harm magnifies the gap in practice and points to the need for formal national recommendations or guidelines for tape storage and use.

Acknowledgment

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References