Contaminated Allograft Product: Maryland Cases

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Center for Tuberculosis Control and Prevention

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Background and Timeline

Notified by State A

Notified by CDC that a MD facility rec’d product

Maryland Cases on tx

Most patients have completed treatment


Epi-X Notice  Epi-X update  Ongoing care

Notification to Hospital,
Surgeons notify patients, Sequestered remaining product,
Hospital and LHD collaborate with patient evaluation,
LHDs get all patients started on treatment
National level-Allograft Product

• Determined to be one lot number from one donor
• 154 Units sent to 37 health care facilities in 20 states
• 113 patients received product
• All unused product sequestered
  • Product tested positive for TB
• 105 started anti-TB treatment
  • 77% attack rate of disease
• 10 deaths
  • 8 prior to product recall
  • 2 after treatment started
  • 3 related to TB
Maryland-Allograft Product

- 1 health care facility received 15 units of allograft product
- 9 patients received product
- The remaining units were sequestered and sent to USDA for TB testing
  - All units tested positive for TB
- 1 patient received allograft product in another state
Demographic Information

• Live in 6 different Counties in Maryland
• 90% female
• 90% White
• 100% US-born
• Surgical site of product implantation
  • 2 Lumbar spine
  • 8 Cervical spine
• 40% with comorbidities associated with TB
  • Diabetes
  • Current treatment for cancer
  • Immunosuppressive medication
• 0 with prior history of TB or LTBI
Evaluation and Treatment

• CDC released recommendations for evaluation and treatment
  • Calls with CDC Partners
  • Start all patients who received allograft product on 4-drug treatment
    • Mitigate replicating TB

• Evaluation:
  • IGRA
  • Sputum x 3 for AFB smear and culture; GX x 2
  • Blood x 1 for AFB smear and culture
  • Urine x 1 for AFB smear and culture
  • Chest radiograph
  • Symptom screen
  • ESR and CRP
  • MRI of surgical site
Test Results

- 90% IGRA positive
- 50% GX positive tissue from surg site
- 40% culture positive
- 10% with abnormal chest imaging
- 90% abnormal imaging at surgical site
- 80% had additional surgery

<table>
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<tr>
<th>Test</th>
<th>Positive</th>
<th>Negative</th>
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<tr>
<td>IGRA</td>
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<td>AFB Smear and Culture</td>
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<tr>
<td>Blood x 1</td>
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<tr>
<td>Urine x 1</td>
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<tr>
<td>GeneXpert</td>
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<tr>
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<tr>
<td>Wound/Tissue</td>
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<td>Culture</td>
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<td>4</td>
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<tr>
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<td>3</td>
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<td>Chest</td>
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<td>9</td>
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<tr>
<td>Surgical Site</td>
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<tr>
<td>Additional Surgery</td>
<td>8</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>
Genotyping:

Unique genotype in the US

- 61 isolates genotyped
- 14 States
- 8 Bone allograft product
- 4 Maryland Cases
Transmission of Extra Pulmonary TB

J. Keijman · J. Tjhie · S. Olde Damink · M. Alink

Unusual Nosocomial Transmission of *Mycobacterium tuberculosis*

Nosocomial Transmission of Tuberculosis Associated with a Draining Abscess

Mary Devereaux Hutton, William W. Stead,
George M. Cauthen, Alan B. Bloch,
and William M. Ewing*

From the Division of Tuberculosis Control, Center for Prevention
Services, Centers for Disease Control, and Georgia Tech Research
Institute, Georgia Institute of Technology, Athens, and the Arkansas
Department of Health, Little Rock

Nine secondary cases of tuberculosis and 59 tuberculin skin test conversions occurred after
exposure to a hospitalized patient with a large tuberculous abscess of the hip and thigh. Among
442 tuberculin-negative hospital employees, the relative risk of skin test conversion associated
with recalled exposure to the patient was 14.0 (95% confidence interval, 6.8, 28.7). Four of 5 surgical
suite employees who assisted with incision and debridement of the abscess had skin test conver-
sions, as did 85% of 33 employees on a general medical floor who recalled exposure to the patient
and 30% of 20 intensive care unit employees who recalled exposure. The prevalence of tuberculin
reactivity in visitors and other patients on two floors also showed a strong association with ex-
posure to the patient. A high concentration of *Mycobacterium tuberculosis* in the abscessed tis-
see, disturbance of the surface of liquid drainage from the abscess by irrigations and by the agitated
behavior of the patient, and positive air pressure in the patient’s room are factors that appear
to have contributed to the high risk of tuberculosis transmission.

An Outbreak of Tuberculosis among Hospital Personnel Caring for a Patient with a Skin Ulcer

Mark W. Frampton, MD


Hospital personnel are at risk for acquiring tuberculosis through exposure to patients with active pulmonary disease (1). Although extrapulmonary disease is rarely considered contagious, an increasing proportion of cases of tuberculosis are extrapulmonary, and the diagnosis of patients in such cases is often delayed (2). Extrapulmonary tuberculosis can also pose a serious risk for hospital personnel.
Potential Sites for Exposure

• Graft Implantation/Explantation
  • Aerosolizing procedures
    • Initial and follow-up surgeries
    • Cleaning contaminated equipment

• Draining wounds
  • Wound care
  • Managing medical waste

• Pulmonary TB Exposures

• Other considerations
  • Re-use of N95 respirators
  • Other care activities
Isolation and Testing Guidance

CDC issued guidance

• Isolation of cases
• Risk assessment for Health Care Personnel (HCP)
  • PPE
  • Testing
• Call with Facility in Maryland
  • Guidance discussed and sent to Hospital Epidemiologist/IP staff
National HCP Contact Investigation Data

• Total of 5,985 HCP identified for testing
• 82% of these were evaluated
• 73 (1.5%) tested were diagnosed with LTBI
  • History of positive test excluded
  • Determined that this was from allograft exposure
National HCP Contact Investigation Data

• 5.5% Environmental Services personnel
• 2.3% Sterile processing personnel
• 2.1% Other areas
• 1.5% Post anesthesia care unit personnel
• 1.3% Inpatient personnel
• 1.0% Operating Room personnel
Maryland Contact Investigation Outcomes

- 100% household contact evaluated
  - 1 LTBI
- 60% health care personnel evaluated
  - 72% OR personnel evaluated
- 40% Sterile process personnel evaluated

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<tr>
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<th>Healthcare personnel contacts</th>
<th>Patient contacts</th>
<th>Household contacts</th>
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<tr>
<td>US-born*</td>
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<td>24</td>
</tr>
<tr>
<td>Non-US-born*</td>
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<tr>
<td>History of TB disease*</td>
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<td></td>
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</tr>
<tr>
<td>History of latent TB infection*</td>
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<td></td>
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</tr>
<tr>
<td>Number evaluated with TST or IGRA at least 8 weeks following last exposure</td>
<td>50</td>
<td>24</td>
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<tr>
<td>By TST*</td>
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<td>13</td>
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<tr>
<td>By IGRA*</td>
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<td>11</td>
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<tr>
<td>Number with TB disease</td>
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<tr>
<td>Number with latent TB infection (LTBI)</td>
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<td>Number started treatment for LTBI</td>
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<tr>
<td>Number completed treatment for LTBI</td>
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</tr>
<tr>
<td>Number stopped treatment for LTBI</td>
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</tbody>
</table>
Additional CDC Activities-Ongoing

• Donor traceback found source case with undiagnosed TB
• Testing of donor tissue needs to be improved for TB
• CDC DTBE providing recommendations
  • Defer tissue donation for patients with risk factors for TB
  • Direct testing is feasible
    • Culture
    • NAAT
• American Association of Tissue Banks

BULLETIN 22-2
Recommendation Issued to Tissue Banks
Regarding the Risk of Mtb Transmission
MARCH 22, 2022
Contaminated Allograft Cases
Case #1

• 68 y/o woman with degenerative joint disease of the cervical spine complicated by myelopathy, radiculopathy

• History of 8 previous anterior and posterior cervical spinal fixation surgeries

• 3/19/21: C3-4 anterior discectomy and fusion

• June 2021: Identified as recipient of contaminated allograft
Case #1

- June 2021:
  - IGRA positive
  - CXR normal
  - Sputum AFB smear/culture/GXP: negative
  - Urine and blood AFB collected (ultimately negative)

- 6/15/21: started RIPE

- MR c/spine:
  - C3-4 vertebral body enhancement and marrow edema
  - Well-circumscribed 2.8 x 1.8 x 2.8 cm cystic fluid collection in the prevertebral soft tissues at C3-4
  - Extrinsic soft tissue enhancement
Case #1

• 6/25/21: debridement of C3-4 fluid collection
  • Tissue culture (4/4): AFB smear neg; GXP pos (RIF-S); MTB: pan-susceptible

• Postoperative complications:
  • Phlegmon not completely drained
  • Worsening prevertebral swelling impinging on hypopharynx
  • Persistent requirement for airway support
Case #1

- 6/30/21: debridement of retropharyngeal and R submandibular abscess

- Drug-induced liver injury: linezolid/levofloxacin/meropenem-clavulanate

- 7/12/21: tracheostomy/PEG

- Rechallenged with RIF, INH, EMB; kept levofloxacin
Case #1

• Discharged 8/23/21; trach decannulated; transitioned to oral diet

• Therapeutic drug monitoring: INH, Lfx levels therapeutic;

• RIF low at 1.21: increased to 1200 mg daily

• October 2021: continuation phase started
Case #1

• 5/10/22 MR c/spine: post-surgical changes, no fluid collections

• Completed therapy 6/24/22

• Follow up plan: symptom check and labs every 3 months x 1 year then every 6 months
Case #2

• 57 y/o woman with rheumatoid arthritis, colon CA in remission, spinal stenosis
  • RA previously treated with tocilizumab
    • On prednisone 5 mg daily, leflunomide

• 3/29/21: anterior C7/T1 fusion

• May 2021: Identified as recipient of contaminated allograft
Case #2

- June 2021:
  - IGRA positive
  - CXR RML infiltrate: maintained on airborne isolation for 2 weeks
  - Sputum AFB smear/culture/GXP: negative
  - Urine and blood AFB collected (ultimately negative)

- 6/2/21: started RIPE; sputum AFB smears at 2 weeks: negative
- Chest CT: RML nodule; no lymphadenopathy or cavities
- MR c/spine: C7/T1 vertebral bodies with marrow edema; intervertebral disc hyperintensity: post-surgical vs. discitis/osteomyelitis
Case #2

• Therapeutic Drug Monitoring: INH and RIF levels therapeutic

• Concern for extensive TB disease due to immunosuppression
  • Leflunomide stopped; prednisone 5 mg daily continued

• 9/2/21: MR c/spine: ring-enhancing soft tissue signal C7-T1 with heterogeneous marrow enhancement of vertebral bodies and mild compression of epidural space

• 9/16/21: anterior/posterior cervical discectomy and fusion with removal of hardware
Case #2

• Surgical cultures: AFB smear 1+/2+; no growth on culture
  • Paradoxical reaction?

• November 2021: continuation phase

• April 2022: Chest CT demonstrated decrease in size of RML nodule
  • Rheumatoid nodules vs TB
  • CT spine: no evidence of infection

• Completed treatment June 2022
Unique Considerations and Challenges

Patient Perspective:
• Addressing and validating patients’ concerns
• Processing news of receipt of infected allograft
• Need for multidrug therapy for a prolonged period
• Potential adverse reactions and drug-drug interactions
• Potential for multiple surgical revisions
• Interactions with multiple providers: surgeon, ID, health department, infection control
Unique Considerations and Challenges

Logistics:

• Coordination of care with hospitals, community providers, surgeons, infection control, local health departments
• Expediting initial diagnostic testing and imaging studies
• Agreement on and coordination of infection control measures with healthcare settings
• Contact tracing in healthcare settings
Unique Considerations and Challenges

Clinical Management:

• Defining intensive and continuation phases
• Ensuring adequate bone penetration, therapeutic drug monitoring
• Managing drug-drug interactions and drug intolerance
• Need for revision surgery due to failure vs paradoxical reaction
• Follow up, including imaging
TB Allograft Outbreak

With Gratitude To:

Patients and their Families
Community Providers
Local Health Departments
CDC
Center for TB Control and Prevention

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