



Contaminated Allograft Product: Maryland Cases

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Prevention and Health Promotion Administration

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

5/27/2021

5/31/2021

6/4/2021

6/9/2021

6/16/2021

Monthly

9/2022

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

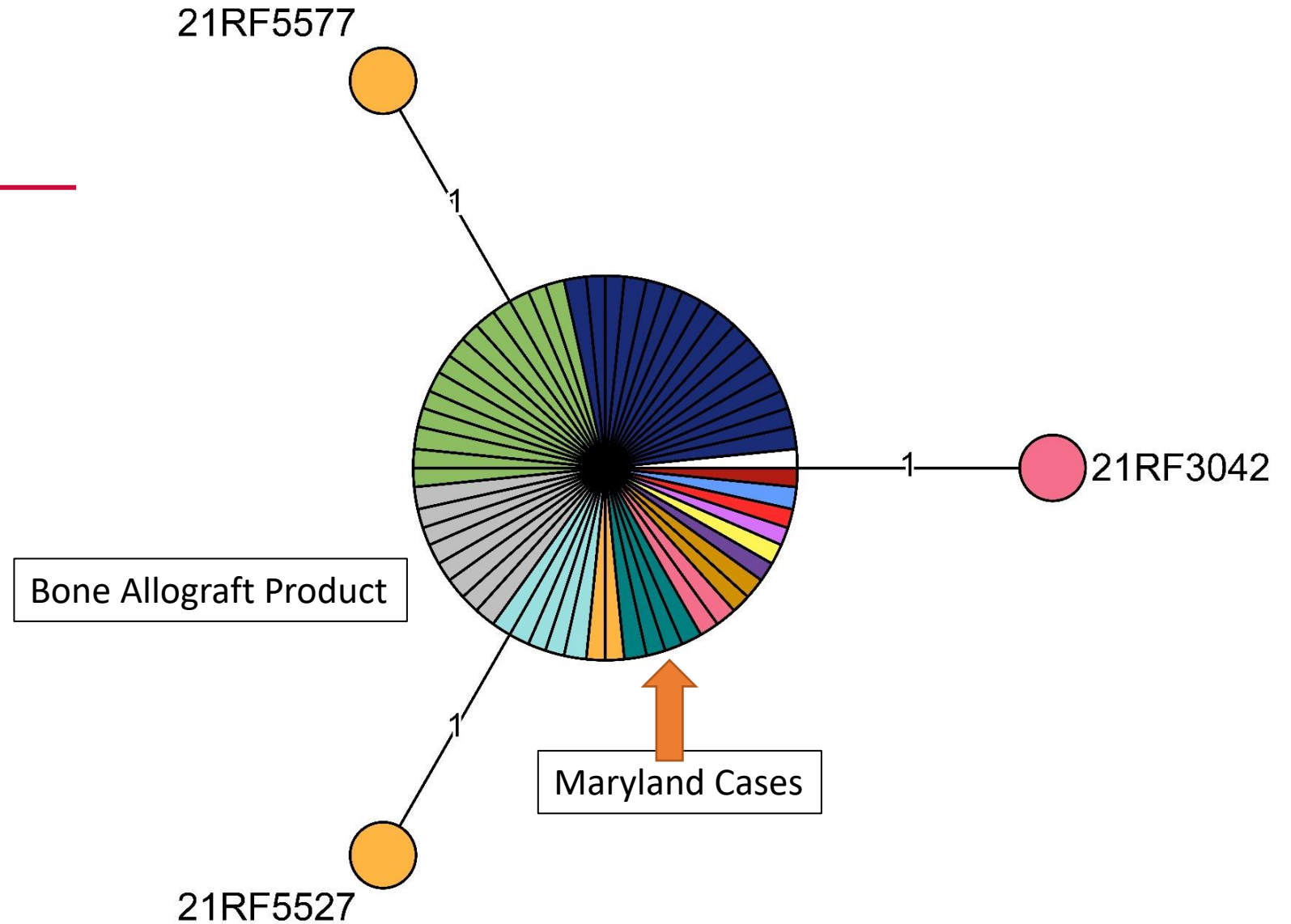
- 90% IGRA positive
- 50% GX positive tissue from surg site
- 40% culture positive
- 10% with abnormal chest imaging
- 90% abnormal imaging at surgical site
- 80% had additional surgery

Test	Positive	Negative	N/A
IGRA	9	1	0
AFB Smear and Culture			
Sputum x 3	0	9	1
Blood x 1	0	9	1
Urine x 1	0	9	1
GeneXpert			
Sputum x 2	0	9	1
Wound/Tissue			
Culture	4	4	2
GeneXpert	5	3	2
Imaging			
Chest	1	9	0
Surgical Site	9	1	0
Additional Surgery	8	0	2

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,
Georgé 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, Atlanta, 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 limits, 6.8, 28.7). Four of 5 surgical suite employees who assisted with incision and debridement of the abscess had skin test conversions, 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 exposure to the patient. A high concentration of *Mycobacterium tuberculosis* in the abscessed tissue, 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

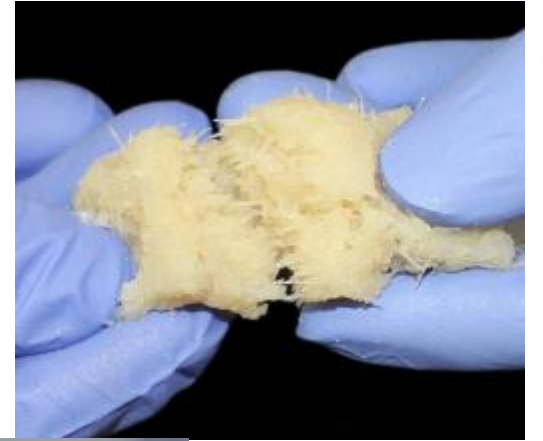
Mark W. Frampton, MD

Annals of Internal Medicine. 1992;117:312-313.

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

	<i>Healthcare personnel contacts</i>	<i>Patient contacts</i>	<i>Household contacts</i>
Number of contacts identified	83	N/A	24
US-born*			24
Non-US-born*			0
History of TB disease*			0
History of latent TB infection*			0
Number evaluated with TST or IGRA at least 8 weeks following last exposure	50		24
By TST*			13
By IGRA*			11
Number with TB disease	0		0
Number with latent TB infection (LTBI)	0		1
Number <i>started</i> treatment for LTBI			1
Number <i>completed</i> treatment for LTBI			0
Number <i>stopped</i> treatment for LTBI			0

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

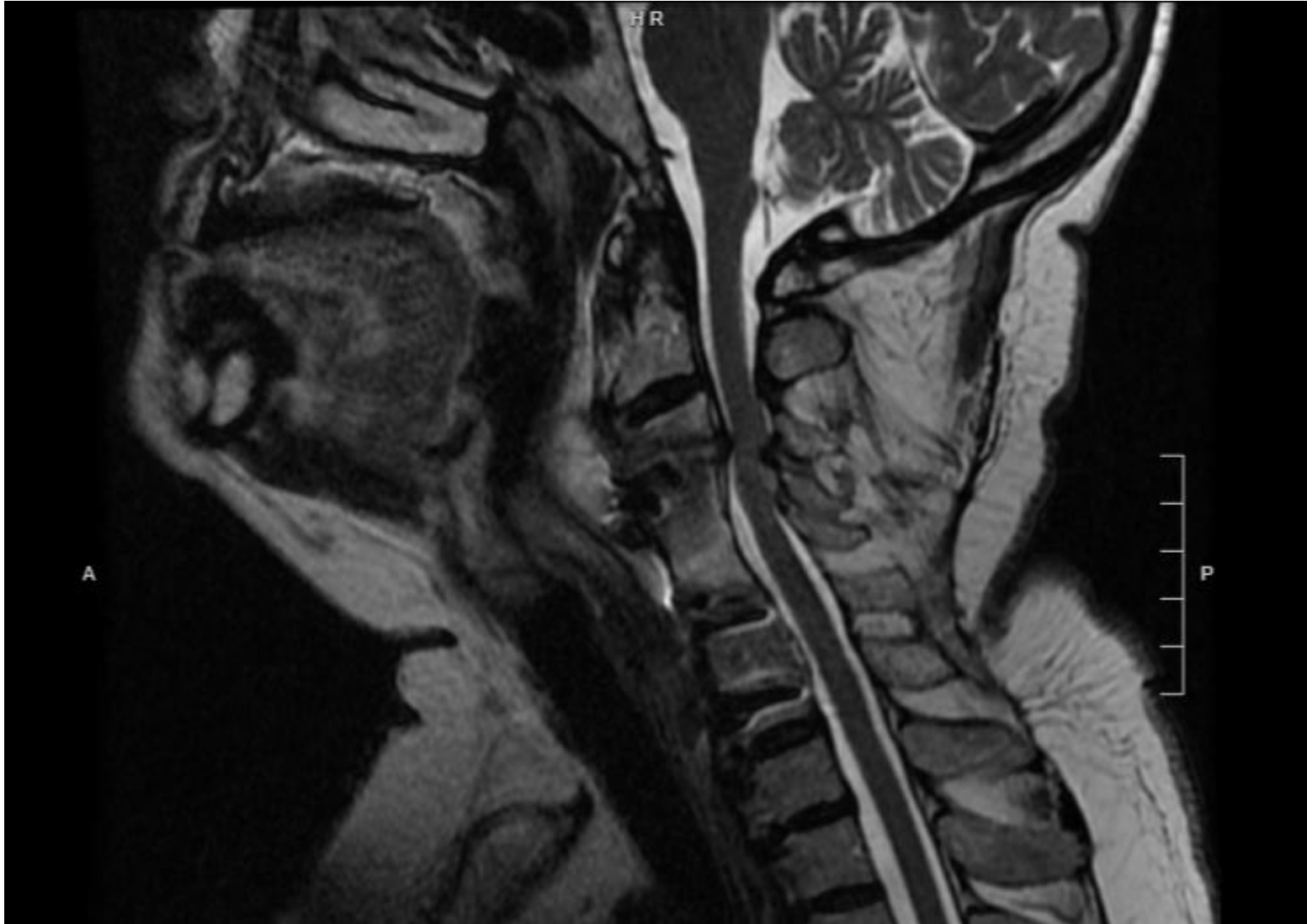
Contaminated Allograft Cases

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

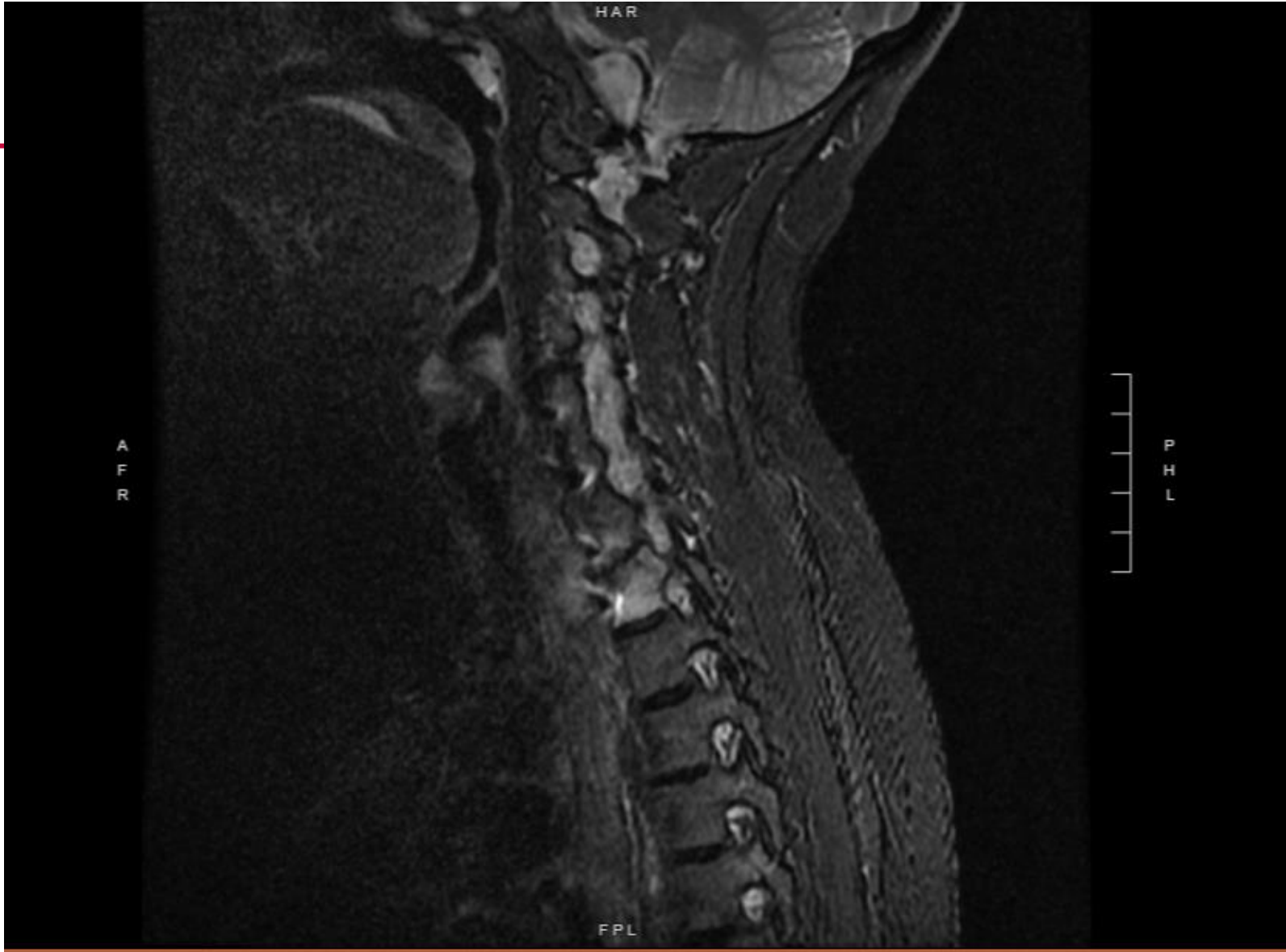
Case #2

- 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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