

The background features a light blue gradient with several faint, stylized illustrations of laboratory equipment and medical symbols. At the top, there are three Erlenmeyer flasks containing red liquid, held by hands. Below them, a hand holds a red shield with a white cross. In the lower left, a hand holds a clipboard with a checklist and a red cross. In the lower right, a hand holds a kidney. The overall theme is medical and laboratory-related.

Opportunistic infection in a post renal transplant patient

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CASE REPORT

- A 41-year-old male k/c/o post living donor kidney transplant recipient who presented in Nephro Opd with the chief complaints of fever which was intermittent in nature and cough with scanty mucoid expectoration which exacerbated on supination and 1 episode of hemoptysis.



Past History

- He was diagnosed with chronic glomerulonephritis 2 years ago and 6 months later dialysis was initiated and planned for renal transplant in due course.
- K/c/o HTN for 2 yrs under T. Nifedipine 20 mg



- Patient was put on T. Tacrolimus 1mg, 3 days prior transplant and Anti-Thymocyte globulin infusion on the day of surgery, underwent renal transplant on 4/4/22 and had a HLA 6/6 mismatch living related renal transplant; wife to husband in the month of April 2022.
- **Drug history** - Patient was on T. Mycophenolate mofetil 360mg and T. Prednisolone 12.8 mg as a maintenance dose.

On examination

- Conscious, well oriented
 - BP- 130/80mmhg
 - PR- 90 bpm
 - CVS,CNS- WNL
 - PA- soft, non tender
 - RS- **Crepitations+ left UL**



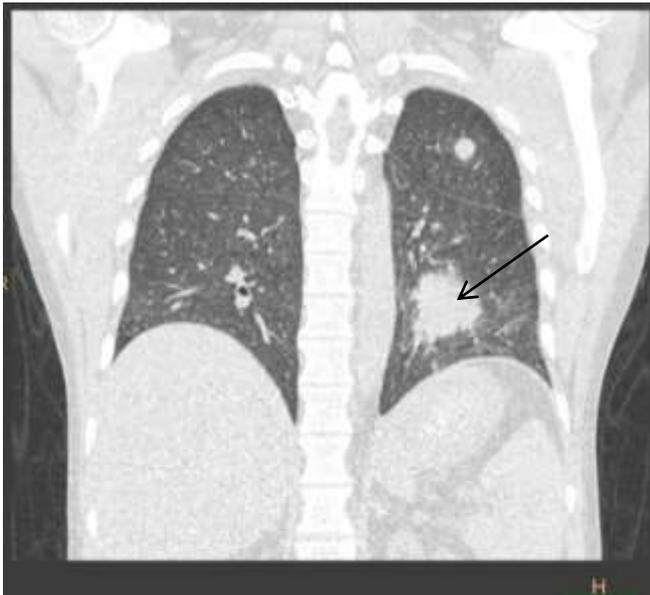
Lab Investigation

- CBC
 - Hb 14.70 g/dl
 - TLC **11500/uI**
 - Platelet count 251000/uI
- WBC Differential Count
 - Neutrophils **85%**
 - Eosinophil's **0**
 - Lymphocytes **11%**
 - Monocytes 4 %
- Urea – 40mg/dl
- Creatinine- 1.29mg/dl
- CRP- 1mg/dl
- LFT- wnl
- Na- **132** mmol/Lt
- K- **5.60** mmol/Lt
- Urine CST- No Growth



Radiological Investigation

- **CXR PA view-** Focal area of consolidation in left upper zone
- **USG Thorax-** suggestive of infective etiology (abscess needs consideration) and suggested HRCT Thorax for further evaluation.
- **HRCT-** Bilateral nodular consolidations which were progressive in nature.



- To evaluate the etiology, sputum and Broncho-alveolar lavage (BAL) sample collection was done and sent for microbiological investigation.



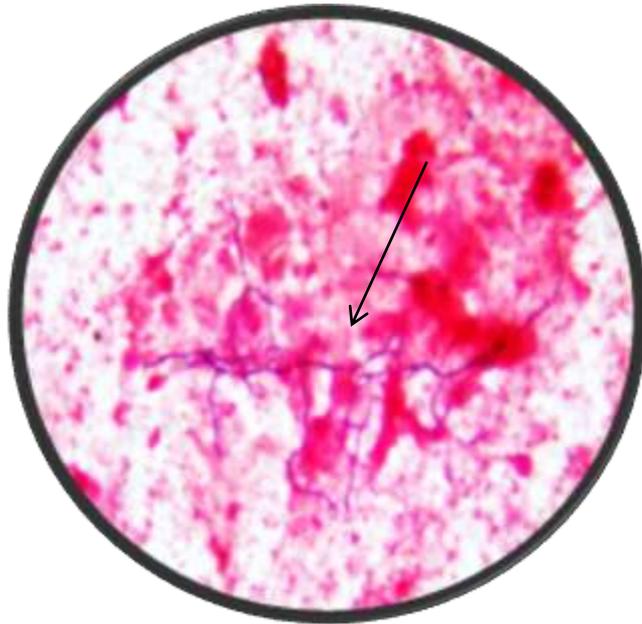
MICROBIOLOGICAL INVESTIGATIONS

- **BAL & SPUTUM c/s-** Significant growth was not seen
- **CBNAAT-** MTB not detected
- **COVID 19 RTPCR-** Negative
- **CMV-** Negative
- **KOH mount-** No Fungal elements seen
- **No Fungal growth**

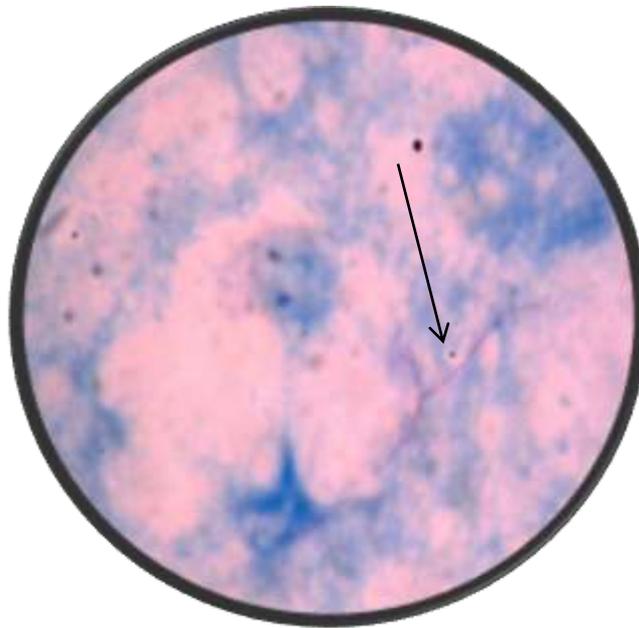


- **Lung biopsy**
- Gram staining-

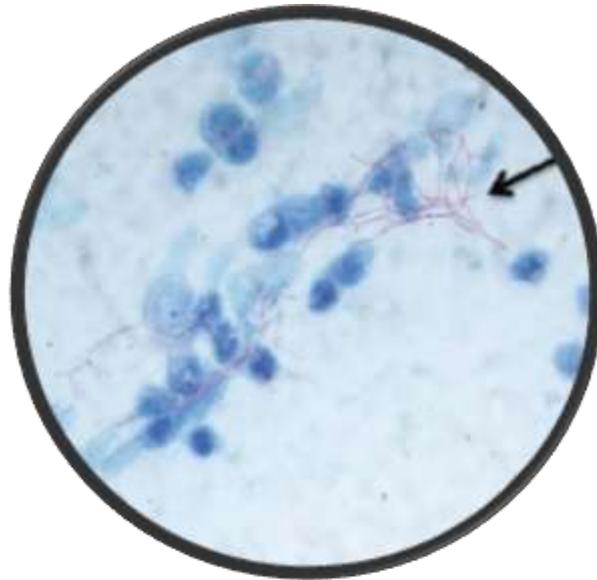
Gram positive branching filamentous bacilli seen



- **Lung biopsy**
 - ZN Staining-
- Weak Acid Fast Bacilli seen.



- **Lung biopsy**
- **Modified ZN Staining (1%)**-
Acid Fast Filamentous Bacilli seen.



CULTURE

- The inoculation of the tissue sample was done on Blood agar, Chocolate agar, MacConkey's agar and RCM.
- **Blood and Chocolate agar-** Dry chalky white medium sized colonies were observed.



- **MacConkey's agar-** no colonies were observed

Robertson's cooked meat broth (RCM)



**Large chalky white
pellicles were found**



Modified ZN staining

INITIAL REPORT – *Nocardia spp*

- The colonies were also inoculated on Mueller-Hinton agar by lawn technique to check for drug susceptibility as a method to determine the possible group of *Nocardia* causing the condition.
- Drugs used for differentiation by susceptibility were Amikacin, Gentamicin, Tobramycin and Erythromycin
- The cultured isolate was found to be susceptible to amikacin, gentamicin and tobramycin but was resistant to erythromycin.



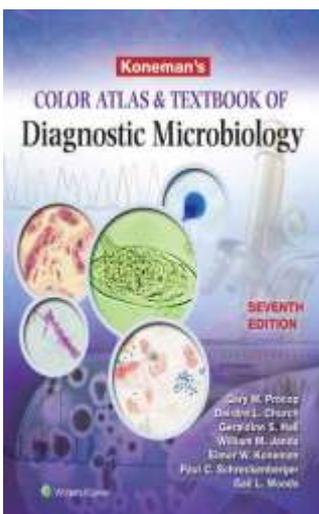
TABLE 15-6 In Vitro Susceptibility Profiles of *Nocardia* spp.

Drug Pattern (DP)/Species	Amk	Amp	A/C	Carb	CTX	CFTR	Cipro	Clari	Eryth	Gent	IMI	Kana	Linez	Mino	Sulfa	Tobra
N. ASTEROIDS COMPLEX																
DP I	S	S	S	S	S	S	R	R	R	—	R/S	—	S	S/I	S	—
DP II	S	S	—	S	—	S	S	—	—	R	S	S	S	S/I	S	S
DP III	S	R	R	R	S	S	R	S	S	—	S	—	S	S/I	S	—
DP IV	R	R	S/R	—	S	S	S	R	R	R	S	R	S	S/I	S	R
DP V	S	R	S	—	R	R	S	R	R	R	S	R	S	S/I	R/S	R
DP VI	S	R	R	—	S	S	R	R	R	—	S	S	S	S/I	S	S
<i>N. brasiliensis</i>	S	R	S	S	S/R	S/R	R	R	R	S	R	R	S	S/I	S	S
<i>N. pseudobrasiliensis</i>	S	R	R	S	S/R	S/R	S	S	—	S	R	R	S	S/I	S	S
<i>N. otitidiscavarium</i>	S	R	R	R	R	R	S	—	—	—	R	R	S	—	S	—

DP I, *N. abscessus*; DP II, *N. brevicatena/paucivorans* complex and unnamed group; DP III, *N. nova* complex, which includes *N. nova/N. veterana/N. africanum/N. krucziakiae*; DP IV, *N. transvalensis* (which includes *N. wallacei*); DP V, *N. farcinica*; DP VI, *N. asteroides* sensu stricto or *N. asteroides* complex and *N. cyriaciageorgica* and unnamed group.

Amk, Amikacin; Amp, Ampicillin; A/C, Amoxicillin-Clavulanate; Carb, Carbenicillin; CTX, Cefotaxime; CFTR, Ceftriaxone; Cipro, Ciprofloxacin; Clari, Clarithromycin; Eryth, Erythromycin; Gent, Gentamycin; IMI, Imipenem; I, Intermediate; Kana, Kanamycin; Linez, Linezolid; Mino, Minocycline; R, Resistant; Sulfa, Sulfamethoxazole; Tobra, Tobramycin; —, Not Determined or Not Commonly Used.

Modified from personal communication with Barbara Brown-Elliott and Dr. Richard Wallace. These are "usual patterns and subject to variations, as resistance may appear in isolated strains."



Based on this pattern of susceptibility, it was suspected that the organism was among the following i.e. *Nocardia brasiliensis*, *N. pseudobrasiliensis*, *N. asteroides* I/VI and *N. otitidiscaviarum*.



- For complete identification of the species, a **MALDI-TOF ID (MALDI Biotyper SIRIUS-Bruker)** test was performed on the sample.
- The isolate was identified as

Nocardia cyriacigeorgica



TREATMENT

- The patient was started on Inj. Meropenem 1gm BD for 10 days and oral **Co-trimoxazole** OD (sulfamethoxazole 800mg/ trimethoprim 160mg) for 25 days.
- Conservative treatment – Inj Pan 40
 - Cap Tacroren 1mg BD
 - T. Mycofenolate mofetil 360 mg
 - Inj Omnacortil 20mg OD
 - T. Nicardia 10mg OD
 - Inj Hydrocort 100mg
 - Neb Duolin and Neb Budecort
- The patient has responded well to the treatment regimen.
- Follow up of the patient was uneventful and subsequent lung biopsy revealed no similar bacterial culture.

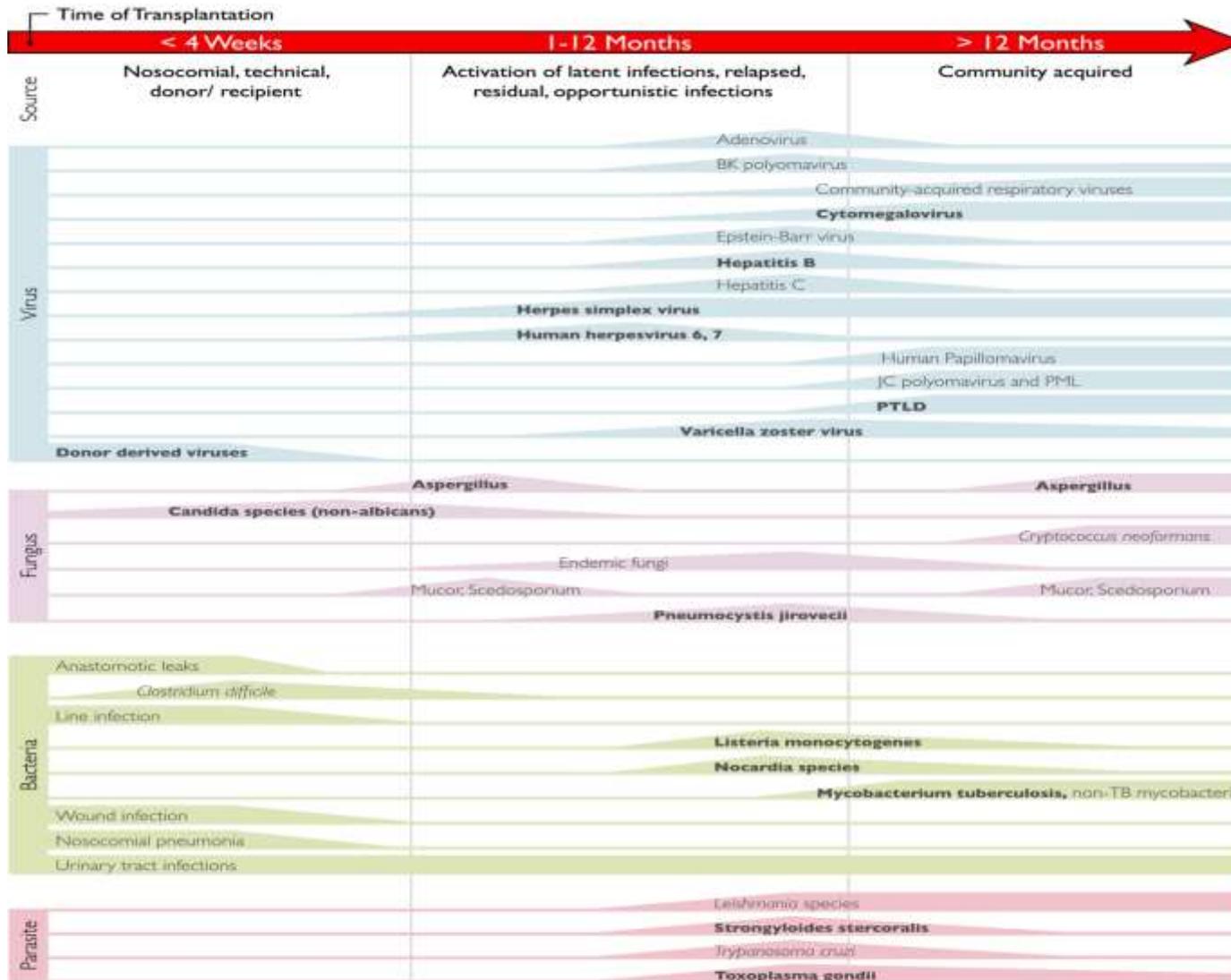
DISCUSSION

- *Nocardia* species are a group of filamentous, branching, Gram-positive, modified-acid-fast bacilli that normally exist as soil saprophytes but can cause disease in immunosuppressed and healthy individuals .
- Most infections involve inhalation of fragments of filaments, resulting in pulmonary nocardiosis and pneumonia, which can be followed by dissemination to the heart, skin, subcutaneous tissue, and central nervous system
- Incidence of *Nocardia* infections in solid organ transplant 0.04% to 3.5% and according to a recent study Nocardiosis in renal transplant by *Maya gibson et al* incidence in renal transplant is 0.32% to 1.2%.

➤ Singh N, Limaye AP. Infections in Solid-Organ Transplant Recipients. Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases. 2015:3440–52. doi: 10.1016/B978-1-4557-4801-3.00313-1. Epub 2014 Oct 31. PMID: PMC7151835.

➤ Gibson M, Yang N, Waller JL, Young L, Bollag WB, Kheda M, Mohammed A, Baer SL. Nocardiosis in renal transplant patients. J Investig Med. 2022 Jan;70(1):36-45. doi: 10.1136/jim-2021-001783. Epub 2021 Aug 23. PMID: 34426458.

Timeline of Common Post-Transplant Infections



Key

Thickness of line indicates relative risk.

Bold type indicates infections potentially preventable by prophylaxis. May be delayed until prophylaxis is discontinued.

- A study by *san juan et al*, the most common infectious cause of death in kidney transplant patients is pneumonia (25% to 30%).
- A study by *Hashemi-Shahraki et al*, **the susceptibility patterns vary with different species of *Nocardia*** and all isolates of *N. cyriacigeorgica*, *N. asteroides*, *N. abscessus* and *N. otitidiscaviarum* susceptible to trimethoprim-sulfamethoxazole, **while 8% of *N. farcinica* isolates were resistant to this drug.** All *N. otitidiscaviarum* isolates were highly resistant to imipenem, but *N. cyriacigeorgica*, *N. asteroides*, *N. farcinica* and *N. abscessus* were only **moderate resistant.**

Conclusion

- **Nocardiosis** is a known opportunistic infection among solid organ transplant patients.
- Prompt investigation should be carried out when there is high degree of suspicion among these patients and immediate diagnosis and treatment is warranted to avoid transplant related complications.

TAKE HOME MESSAGE

- Invasive diagnostics helped the patient out with an early diagnosis of Nocardiosis and prevents dissemination.
- Advanced diagnostic techniques such as **MALDI-TOF** should be sought for an early and reliable diagnosis to avoid treatment failure.



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*Thank you for
your attention*

