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Disseminated *Mycobacterium abscessus* Infection Secondary to an Infected Vascular Stent: Case Report and Review of the Literature

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Mycobacterium abscessus is a rapidly growing, multidrug-resistant mycobacteria, commonly associated with pulmonary, skin, and soft tissue infections. We describe a rare case of *M abscessus* endovascular stent infection; only 3 cases of graft infections have previously been reported.

Keywords. endovascular stent infection; *Mycobacterium abscessus*; nontuberculous mycobacteria.

CASE REPORT

A 61-year-old man presented with fever, left knee swelling and pain, and petechial rash on his left leg for 2 months. He had a history of well controlled type 2 diabetes mellitus, peripheral artery disease with bare metal stenting of the left common iliac artery 2 years ago, right hallux and left first metatarsal osteomyelitis requiring amputation, and intravenous drug use (heroin mixed with tap water). On admission, his temperature was 101.6°F. There was a petechial rash on his left leg and left knee effusion with warmth and tenderness (Image 1A). Human immunodeficiency virus, hepatitis C, and interferon-gamma release assay tests were negative.

Blood cultures were positive for acid-fast bacilli on the sixth day of incubation and subsequently identified as *Mycobacterium abscessus*. Left leg skin biopsy and left knee synovial fluid culture also grew *M abscessus*. Transesophageal echocardiogram revealed a 0.3 × 0.3-cm mitral valve vegetation. Abdominal computed tomography (CT) angiogram showed a large pseudoaneurysm adjacent to the left external iliac artery (Figure 1). He continued to be persistently bacteremic, and he subsequently

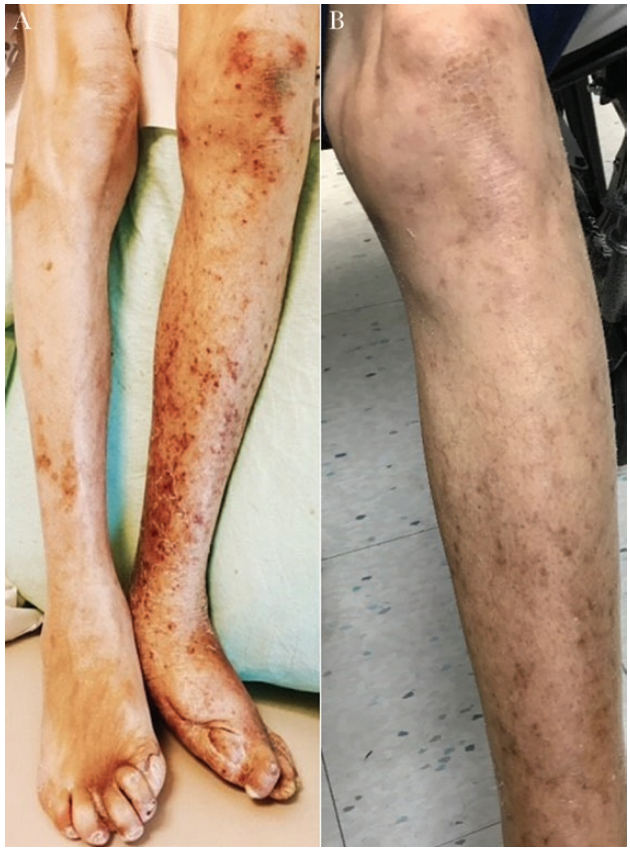

Image 1. Left lower extremity petechial rash before treatment (A) and at 8 weeks after stent removal (B).

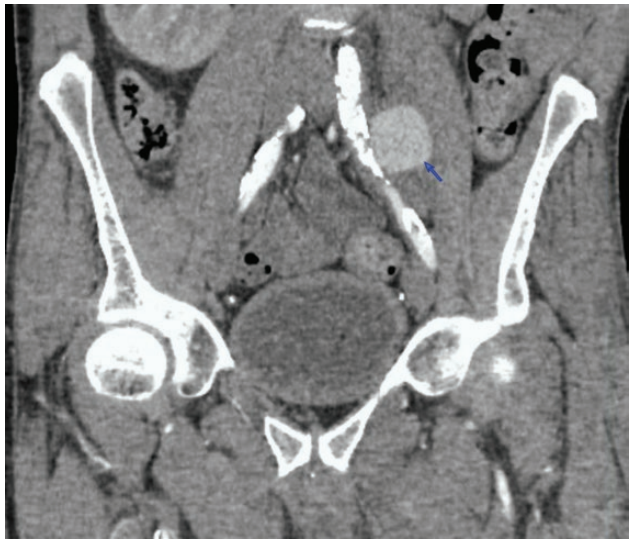

Figure 1. Computed tomography angiogram shows a 3.3 × 3.5 × 3.3-cm pseudoaneurysm (arrow) adjacent to the left external iliac artergy.

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underwent aortoiliac bypass with saphenous vein grafting and stent removal. Cultures from the explanted stent and pseudoaneurysm grew *M abscessus*.

Mycobacterium abscessus isolates revealed susceptibilities to amikacin (minimum inhibitory concentration [MIC], 16.0 μg/mL) and linezolid (2.0 μg/mL), intermediate resistance to cefoxitin (32.0 μg/mL), and resistance to clarithromycin (>16.0 μg/mL), ciprofloxacin (>4 μg/mL), doxycycline (>16.0 μg/mL), moxifloxacin (4.0 μg/mL), imipenem (32 μg/mL), and trimethoprim/sulfamethoxazole (8/125 μg/mL); tigecycline MIC was 0.12 μg/mL.

He was treated with 15 mg/kg amikacin per day and 600 mg of linezolid twice daily for 6 months. His rash resolved (Image 1B). After stent removal, all blood cultures remained negative. Repeat transthoracic echocardiogram showed a normal mitral valve. Fifteen months after diagnosis, he remains clinically stable without any signs of recurrence.

Patient Consent and Confidentiality

The patient's written consent was obtained prior to the inclusion of photographs and radiographic images. These illustrations have been anonymized.

DISCUSSION

Disseminated *M abscessus* disease is rare [1–3] and carries a high mortality rate [4–7]. *Mycobacterium abscessus* has been associated with various foreign body infections, including central venous catheters [4], prosthetic heart valves [8], and implanted pacemakers [9]. We highlight a unique case of disseminated disease from an infected endovascular stent. Becasuse *M abscessus* is ubiquitous in soil and water, our patient's infection was likely seeded by intravenous drug use involving tap water injection.

A review of reported endovascular graft-associated *M abscessus* cases [1–3] shows similar clinical characteristics (Table 1), including a localizing rash or erythema ipsilateral to the infected vessel. Most cases presented 1 year or later after graft or stent placement. Bacteremia was evident within 7 to 10 days of presentation, which is typical of rapidly growing mycobacteria. Positron emission tomography-CT proved useful in confirming graft or stent infection in instances in which CT or Doppler ultrasonography did not.

Widespread resistance to most antimicrobials is characteristic of *M abscessus*, making these infections challenging to treat [6, 10–12]. Amikacin appears to be the most active antimicrobial agent against *M abscessus*, with overall resistance rates of 7.7%, followed by clarithromycin (13.9%) and cefoxitin (15.1%) [10]. Intrinsic mechanisms of resistance include efflux pumps, antibiotic-inactivating enzymes, and genetic polymorphisms of antibiotic target genes [11]. Some *M abscessus* subspecies (particularly subspecies *abscessus*) have an active inducible macrolide resistance (*erm*) gene, leading to in vivo resistance to macrolides despite initial in vitro susceptibility [7, 12], and have been associated with a higher mortality rate [7]. Thus, all clinically significant *M abscessus* isolates should undergo inducible macrolide resistance testing.

Optimal treatment for disseminated *M abscessus* infections is not well defined. Most experts recommend initial combination antimicrobial therapy with 2–3 active agents, preferably including amikacin [6, 10, 13, 14]. Some experts recommend transitioning initial combination therapy to oral active agents after 8–12 weeks, depending on susceptibilities, extent of disease, and antibiotic tolerability [14]. Treatment duration for disseminated disease is generally recommended for at least 6–12 months [8, 14]. Close monitoring for antibiotic-associated toxicities is required, presenting another challenge in treating these infections.

Surgical removal of foreign bodies, such as endovascular grafts, and debridement of infected foci are essential for cure [6, 9, 10]. *Mycobacterium abscessus*, more than any other rapidly growing mycobacteria, readily adheres to catheter surfaces via biofilm formation [5]. As our case and others have demonstrated (Table 1), successful clearance of *M abscessus* bacteremia occurred after graft or stent removal and prolonged antibiotics [1–3].

Table 1. Clinical Characteristics of Patients With Reported Mycobacterium *abscessus* Endovascular Infection

Reference	Age/Sex	Comorbidities	Symptoms	Site of Infection	Time to Presentation	Imaging Modality	Surgical Treatment	Abx	Duration of Therapy	Bacteremia Clearance	Outcome
Marion et al [1]	75/F	DM, CKD	Fever, LLE rash	Left fem-pop	5 months	PET-CT	Y	C/M	12 months	Y	Improved
Kang et al [2]	79/M	DM, CKD, dementia	RUE erythema/swelling	Right brach-ax	1 year	DUS	Y	C/I	8 weeks	Y	Death
Umer et al [3]	69/M	CAD, MS	Fever, RLE rash	Right-left fem-fem	2.5 years	PET-CT	Y	A/I/T	14 weeks	Y	Improved
Present case	61/M	DM, IVDU	Fever, LLE rash	Left CIA stent	2 years	CT	Y	A/L	6 months	Y	Improved

Abbreviations: A, amikacin; Abx, antibiotics; brach-ax, brachial-axillary arteriovenous graft; C, clarithromycin; CAD, coronary artery disease; CIA, common iliac artery; CKD, chronic kidney disease; CT, computed tomography; DM, diabetes mellitus; DUS, doppler ultrasonography; fem-fem, femoral-femoral graft; fem-pop, femoral-popliteal graft; I, imipenem; IVDU, intravenous drug use; L, linezolid; LLE, left lower extremity; M, minocycline; MS, multiple sclerosis; PET, positron emission tomography; RLE, right lower extremity; RUE, right upper extremity; T, tigecycline; Y, yes.

CONCLUSIONS

Although it is a rare cause of endovascular infection, *Mycobacterium abscessus* can be a highly virulent mycobacteria with the potential to cause life-threatening, disseminated disease. This multidrug-resistant pathogen requires aggressive management, including prompt surgical intervention and prolonged combination antimicrobial therapy.

Acknowledgments

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