SAGE Open Medical Case Reports
Volume 12: 1–8

DOI: 10.1177/2050313X241233196
journals.sagepub.com/home/sco
Sage

Pacemaker infection at generator site by *Mycobacterium mageritense*: A case report and review of the literature

Housam Eddine Alhariri[1], Rola Kwayess[2] and Irmgard Behlau[3]

Abstract

We herein report an unusual case of *Mycobacterium mageritense* pacemaker infection at generator site in a 62-year old female with no pertinent past medical history. Pacemaker-related infections caused by nontuberculous mycobacteria are rare but can lead to significant morbidity and mortality. *Mycobacterium mageritense* is rarely reported in pacemaker infections and is challenging to treat due to resistance to many antimicrobial agents. In our case, the patient's pacemaker infection did not respond to standard treatment, leading to complete device removal. Our case highlights the challenges in treating *Mycobacterium Mageritense*, especially that our patient had a more resistant organism than those reported previously in literature. To our knowledge, such cases are infrequently reported in the literature.

Keywords

Pacemaker, NTM, mageritense, MOTT

Date received: 20 June 2023; accepted: 29 January 2024

Introduction

Cardiac implantable devices procedures can be associated with complications in about 2%–5% of cases. It includes hematomas, pericardial effusions, tamponade, and infection. Infection rates have been reported to be about 2% and can increase to 4% in patients older than 75 years, 5% in patients on direct oral anticoagulants, and even more than 11% in patients on warfarin.[1,2]

Cardiac implantable electronic device infection are mostly reported to be due to staphylococcal organisms. Mycobacteria were detected very rarely in cardiac implantable electronic device infections.

Non-tuberculous mycobacterium (NTM) are generally free-living organisms that have been recovered from water, soil, domestic and wild animals, milk, and food products. They can generally cause four distinct clinical syndromes including: pulmonary disease, superficial lymphadenitis, disseminated disease in immunocompromised patients or skin and soft tissue infection as a consequence of direct inoculation. *Mycobacterium mageritense* was first described in 1997 as a rapidly growing non-photochromogenic mycobacteria, isolated from human sputum.

The name was derived from Magerit, the old Arabic name of Madrid, where four of the five isolates had been recovered initially. It is closely related to *Mycobacterium fortuitum* and *Mycobacterium smegmatis* and was reported initially as a new species of the *M. fortuitum*. *M. mageritense* is a strongly acid-alcohol-fast rod.[3,4] It grows on common agar and on MacConkey agar. Colonies on Lowenstein–Jensen medium are smooth, mucoid, and non-photochromogenic. Visible growth requires 2–4 days and optimum growth occurs at 30 and 37°C.[5]

To our knowledge, only one case of implantable device *M. mageritense* infection have been reported in literature. It was a case of 59-year-old female from Japan, presenting with swelling at the site of implantable cardioverter-defibrillator (ICD), cultures grew *M. mageritense*, and it was confirmed by 16s sequencing. Patient had lead extraction and

[1]Department of Internal Medicine, Mount Auburn Hospital, Cambridge, MA, USA
[2]Division of Endocrinology, American University of Beirut Medical Center, Beirut, Lebanon
[3]Division of Infectious Diseases and Travel Medicine, Department of Medicine, Mount Auburn Hospital, Cambridge, MA, USA

Corresponding Author:
Rola Kwayess, Division of Endocrinology, American University of Beirut Medical Center, Hamra Street, Beirut 113-6044/C8, Lebanon.
Email: rk175@aub.edu.lb

reimplantation after 3 months of antibiotics. She treated with Levofloxacin, amikacin, and rifampin then switched to ciprofloxacin and clarithromycin due to thrombocytopenia for a total of 15 months. Patient had complete resolution of infection.[13]

Case report

A 62-year-old female patient presented initially because of palpitations in addition to swelling and pain at the site of the generator of her pacemaker. Her pacemaker was placed at another institution 3 years before her presentation after a reported episode of syncope. Her clinical course was complicated by pericarditis that occurred 2 months after the pacemaker insertion and received colchicine for a total duration of 6 months back then. She has no other active medical problems.

One year after the pacemaker insertion, she noticed a painless swelling at the generator site which turned out to be an abscess. Her initial laboratory workup revealed elevated inflammatory markers with an Erythrocyte Sedimentation Rate (ESR) was 55 (normal range: 0–39 mm/h), C-reactive protein (CRP) was 105 (normal range <3 mg/dL), and she had a leukocyte count of 9,400 cells/μL (normal range: 4,500–11,000 cells/μL) with 45% neutrophils (normal range: 40%–60%) and the culture retrieved from the collection at the generator site grew *M. mageritense*. The abscess was drained initially, but she noted that it recurred 3 months later. There was no evidence of an infection involving any other organ including pulmonary involvement upon the workup done initially at another center.

She did not receive any medical attention until she presented to our clinic 1 year after the drainage. She was clinically and hemodynamically stable and her physical exam was only pertinent for tenderness, erythema and swelling at the site of the pacemaker generator with pus draining from the generator site. An electrocardiogram was performed showing a regular paced rhythm.

Blood cultures and swab cultures in addition to gram stain and acid-fast bacilli stain and mycobacterial culture were obtained from the generator site. Acid-fast bacilli stain at our institution was positive and the mycobacterial culture showed NTM, so she was started on doxycycline 100 mg twice daily, clarithromycin 500 mg twice daily, and levofloxacin 750 mg daily. Speciation and susceptibility testing was requested as a referred test, and it was sent to Mayo Clinic labs in Rochester, Minnesota. In addition, the patient was referred for pacemaker removal. Susceptibility testing confirmed the infection with *M. mageritense* and testing showed sensitivity only to imipenem, ciprofloxacin, and moxifloxacin (Table 1).

She was switched to moxifloxacin 400 mg daily; clarithromycin, doxycycline, and levofloxacin were discontinued given the fact that susceptibility testing revealed resistance to both clarithromycin and doxycycline. The patient was not able to afford hospital admission and intravenous antibiotics initially.

Table 1. Sensitivity testing of *Mycobacterium mageritense* cultured from pacemaker generator site abscess.

Antibiotic	Minimum inhibitory capacity (mcg/mL)	Interpretation
Cefoxitin	32	Intermediate
Imipenem	⩽2	Sensitive
Ciprofloxacin	0.25	Sensitive
Moxifloxacin	⩽0.25	Sensitive
Clarithromycin	>16	Resistant
Amikacin	64	Resistant
Tobramycin	>16	Resistant
Doxycycline	>16	Resistant
Minocycline	>8	Resistant
Tigecycline	0.03	Resistant
Trimethoprim/ sulfamethoxazole	>8/152	Resistant
Linezolid	>32	Resistant

Two years and 8 months after her initial diagnosis (8 months after her presentation to our clinic), she underwent pacemaker generator removal, with lead extraction, and received intravenous imipenem 500 mg every 6 h for 1 week. Afterward, a new pacemaker generator with new leads were inserted. She had a smooth post-procedure course and was discharged the next day off antibiotics. On follow-up with the patient 2 years after the generator removal and the insertion of a new one, she was feeling well with no signs of infection at the generator site and with non-elevated inflammatory markers.

In this case, we had to refer the patient for generator removal as she had a more resistant organism than those reported in the literature, and she needed source control for her infection.

Discussion

Mycobacteria are aerobic, nonmotile bacteria that are widespread in nature and range from soil-dwelling saprophytes to pathogens of humans and animals.[5]

NTM organisms are common organisms in the environment. The rapid-growing mycobacteria contain *Mycobacterium abscessus, M. fortuitum, Mycobacteroides chelonae*, and *M. mageritense.* The most common sites of infection with these mycobacteria are pulmonary tissues, skin, bone, and soft tissue.[6]

With the availability of new techniques over the past years, the number of new species of NTM has risen dramatically. Over 180 species have been recognized in the genus *Mycobacterium*.[7]

It is apparent from the reported cases that the diagnosis of *M. mageritense* is not a straightforward one and is frequently mistaken for *M. fortuitum*. The treatment is usually guided by the antibiogram; however, it is generally resistant to macrolides and sensitive to quinolones.

Table 2. Reported cases of *Mycobacterium mageritense* infections.

References	Location	Age	Gender	Diagnosis	Infection site	Sample	Susceptibility	Treatment plan and duration	Intervention/ source control	Outcome
Gira et al.[8]	USA	43 year	F	Skin infection	Right leg	Pus drain culture	Amikacin S Imipenem S TMP-SMX S Fluoroquinolones S Linezolid S Clarithromycin R	TMP-SMX and levofloxacin for 3 month	None	Cured
Gira et al.[8]	USA	56 year	F	Skin infection	Pretibial region	Punch biopsy	Amikacin S Imipenem S TMP-SMX S Fluoroquinolones S Linezolid S Clarithromycin R	Gatifloxacin for 2 month	None	Cured
Ali et al.[9]	USA	26 year	F	CLABSI	Tunneled central venous catheter	Blood cultures	Ciprofloxacin S TMP-SMX S Amikacin R Clarithromycin R	IV TMP-SMX for 2w	Removal of catheter	Cured
Miki et al.[10]	Japan	36 year	F	Pneumonia	Pneumonia	Sputum	N/A	N/A	None	N/A
Munoz-Sanz et al.[11]	Spain	39 year	F	Meningitis	Intrathecal catheter	CSF culture	Amikacin S Norfloxacin S Ofloxacin S Ciprofloxacin S Imipenem S Linezolid S TMP-SMX S Capreomycin S Doxycycline S Clarithromycin S Amoxicillin-clavulanic S Tobramycin S	Linezolid, doxycycline, and moxifloxacin then linezolid was switched to TMP-SMX for a total duration of 12 month	Removal of catheter	Cured
McMullen et al.[12]	USA	47 year	F	Prosthetic valve endocarditis	Prosthetic valve	Blood cultures	Amikacin S Cefoxitin S Ciprofloxacin S Doxycycline S Imipenem S Linezolid S TMP-SMX S Moxifloxacin S Clarithromycin R Tobramycin R	Amikacin, moxifloxacin and imipenem then doxycycline, moxifloxacin, and imipenem	Valve replacement	N/A
Fukunaga et al.[13]	Japan	59 year	F	ICD infection	Subcutaneous ICD insertion site	Blood culture/ Wound tissue	Levofloxacin S Amikacin S Clarithromycin R Rifampicin R Isoniazid R	Levofloxacin, amikacin, and rifampin then switched to ciprofloxacin and clarithromycin due to thrombocytopenia for a total of 15 month	Extraction of leads and re-implantation after 3 month of antibiotics	Cured

(Continued)

Table 2. (Continued)

References	Location	Age	Gender	Diagnosis	Infection site	Sample	Susceptibility	Treatment plan and duration	Intervention/ source control	Outcome
Okabe et al.[14]	India	40 year	M	Parotitis	Left parotid	Needle aspiration	Imipenem/cilastatin S Ciprofloxacin S Levofloxacin S Linezolid S TMP-SMX S Kanamycin R Rifampicin R Amikacin R	Oral levofloxacin for 7 month followed by TMP-SMX and levofloxacin for 8 month	Resection of skin over the abscess	Cured
Oiwa et al.[15]	Japan	70 year	M	Subcutaneous abscess	Periumbilical region	Skin swab	Levofloxacin S Minocycline S Clarithromycin R	Levofloxacin and minocycline for 9 month	None	Cured
Hirabayashi et al.[6]	Japan	68 year	F	Pneumonia and empyema	Lungs	BAL and pleural fluid aspiration	N/A	IV imipenem/cilastatin with oral minocycline and levofloxacin for 2m followed by oral minocycline and levofloxacin alone for 4 month	None	Cured
Tutzer et al.[16]	Argentina	40 year	F	Endocarditis	Pericardial patch and a pressure catheter in the left auricle	Blood culture	Ciprofloxacin S TMP-SMX S Linezolid S Meropenem S Amikacin R Tobramycin R Clarithromycin R Cefotaxime R Cefoxitin R Doxycycline R	IV ciprofloxacin and meropenem for 10 week followed by oral TMP-SMX and ciprofloxacin for an unspecified duration	N/A	Cured
Singhal et al.[17]	India	38 year	M	Skin infection	Sinuses in abdominal wall post cholecystectomy	Fluid analysis	Levofloxacin S Moxifloxacin S Cefoxitin S Amikacin S Doxycycline S Tigecycline S Linezolid S Imipenem S Minocycline S Clarithromycin R Ceftriaxone R Cefepime R	Amikacin, levofloxacin, linezolid, and TMP-SMX for 6 month	Surgical excision of sinuses	Not cured

(Continued)

Table 2. (Continued)

References	Location	Age	Gender	Diagnosis	Infection site	Sample	Susceptibility	Treatment plan and duration	Intervention/ source control	Outcome
Caravedo Martinez and Blanton[18]	USA	66 year	M	Knee prosthetic joint infection	Left knee	Fluid aspirate	Amikacin S Ciprofloxacin S Imipenem S Linezolid S Minocycline S Moxifloxacin S TMP-SMX S Clarithromycin R Doxycycline R Cefoxitin R	IV amikacin and imipenem for 2m, followed by oral ciprofloxacin and TMP-SMX for 1 year	Explant of prosthetic joint	Cured
Park et al.[19]	USA	48 year	M	Skin infection	Left arm	Punch biopsy	Minocycline S Moxifloxacin S	Oral minocycline and moxifloxacin for 3 month	None	Cured
Joya et al.[20]	USA	40 year	F	Skin infection	Bilateral breast infection	Fluid analysis	Amikacin S Cefoxitin S Ciprofloxacin S Imipenem S Linezolid S Clarithromycin R TMP-SMX R	IV imipenem/cilastatin for 24 week, cefoxitin for 3 week, IV amikacin for 10 week, ciprofloxacin for 10 week, linezolid for 20 week	Surgical debridement	Cured
Yamaguchi et al.[21]	Canada	5 year	F	Skin infection	Right ankle	Blood culture and fluid analysis	Moxifloxacin S Ciprofloxacin S Imipenem S Linezolid S Clarithromycin R TMP-SMX R Doxycycline R Amikacin R	Oral tosufloxacin and linezolid then switched to IV imipenem/cilastatin and ciprofloxacin as patient developed pancreatitis and could not tolerate oral intake for a total of 6m	Incision and drainage	Cured
Turuk et al.[22]	India	66 year	F	Skin infection	Sinus in the abdomen post cholecystectomy	Culture of excised sinuses	Doxycycline S Ofloxacin S Moxifloxacin S Amikacin S	Ofloxacin and doxycycline for 2 month	Excision of sinuses	Cured
Koyama et al.[23]	Japan	44 year	F	CLABSI	Central venous access port	Blood cultures	Amikacin S Fluoroquinolone S TMP-SMX S Imipenem S Linezolid S	IV Amikacin and ciprofloxacin for 4 week	Surgical debridement and removal of cap	Refractory until stopping anti PD-1 therapy, then patient improved

(Continued)

Table 2. (Continued)

References	Location	Age	Gender	Diagnosis	Infection site	Sample	Susceptibility	Treatment plan and duration	Intervention/ source control	Outcome
Garcia-Boyano et al.[24]	Spain	2 year 9 month	M	Lymphadenitis	Right submandibular	Fine needle aspirate	Linezolid S Moxifloxacin R Imipenem R Cefoxitin R TMP-SMX R Ciprofloxacin R Amikacin R Clarithromycin R Doxycycline R Tobramycin R	Oral Clarithromycin and ciprofloxacin for 11 week	Excision of the lymph node	Cured
Sando et al.[25]	Japan	69 year	F	Skin infection	Left cheek	Skin biopsy	Levofloxacin S Clarithromycin S	Levofloxacin and clarithromycin for 3 month	None	Cured
Maheshwari et al.[26]	India	42 year	F	Choroiditis	Right eye	Peritoneal fluid culture	Amikacin S Imipenem S Ciprofloxacin S TMP-SMX S Clarithromycin R	IV amikacin for 1 month followed by oral meropenem, ciprofloxacin and TMP-SMX for 2 month	None	Cured
Our case, 2023	Lebanon	62 year	F	Pacemaker infection	Left chest wall	Fluid aspirate culture	Imipenem S Ciprofloxacin S Moxifloxacin S Clarithromycin R Amikacin R Tobramycin R Doxycycline R Minocycline R Tigecycline R TMP-SMX R Linezolid R Cefoxitin R	Oral moxifloxacin for 8 month	Pacemaker generator removal and lead extraction	Cured

BAL: bronchoalveolar lavage; CLABSI: central line associated blood stream infection; CSF: cerebrospinal fluid; F: female; CD: implantable cardioverter-defibrillator; IV: intravenous; M: male; N/A: not available; R: resistant; S: sensitive; TMP-SMX: trimethoprim-sulfamethoxazole.

The literature review of the previously published cases of *M. mageritense* infection (Table 2) revealed that previous cases have been reported in the United States, Japan, India, Spain, Argentina, Canada, and this is the first reported case in Lebanon.

The reported cases include nine cases of skin and soft tissue infections, three cardiac-related infections (endocarditis implantable cardiac-defibrillator infection) and two cases of central line associated blood stream infection, two cases of pneumonia, two cases of gland and lymph node infection, one case of meningitis, choroiditis, and joint infection each.

The treatment regimen and duration varied between the cases reported. About 10% (2/20 cases) reported the use of monotherapy, 60% (12/20) reported the use of dual therapy, 20% (4/20) received triple therapy, 10% (2/20) received quadruple therapy, and one study did not provide its treatment regimen. In our case, antibiogram showed sensitivity to carbapenems and quinolones only and she could not afford IV antibiotics initially so we treated her with monotherapy for 8 months.

The route of administration of antibiotics and duration also varied between the cases reported. *M. mageritense* requires a high level of suspicion (specific diagnostic test and culture media) and lacks treatment guidelines. Several studies started with intravenous therapy followed by oral therapy, whereby others reported the use of oral regimens.

Treatment duration ranged between 2 weeks and 24 months and 60% of the cases required an intervention and source control including explant of prosthetic joint, surgical resection of sinuses, skin or lymph nodes, valve replacement, lead extraction, or catheter removal. The reported treatment was curative in 94.7% of the cases (18/19) (two cases did not specify).

Regarding sensitivity testing, sensitivity to quinolones (moxifloxacin, ciprofloxacin, levofloxacin) was reported in 95.2% (20/21) of the cases. Carbapenem sensitivity was reported in 92.3% (12/13) of the cases. This was consistent with our reported case. Linezolid was sensitive in 92.3% (12/13), minocycline in 80% (4/5), TMP-SMX in 71.4% (10/14), amikacin in 64.7 % (11/17), cefoxitin in 42.8% (3/7), doxycycline 44.4% (4/9), clarithromycin in 5.8% (1/17), and rifampin in 0% (0/2) of the reported cases.

In our case, the approach was limited by the patient's financial status and lack of regular follow-up. As detailed above, started her on oral clarithromycin, levofloxacin and doxycycline, and then switched her to oral moxifloxacin for a total of 8 months after sensitivities came back, and until she underwent pacemaker generator replacement. She was not able to afford a hospital admission for intravenous antibiotics, lead extraction, and new pacemaker implantation initially although this was recommended for source control, especially after the antibiogram showed a highly resistant organism. However, despite the delay and the suboptimal management, the patient is doing well with the absence of any signs of recurrence of infection after more than 2 years since the initial infection.

Conclusion

Based on the previous case reports, we suggest suspecting NTM infections, especially *M. mageritense* in culture-negative infections. Source control helps with the resolution of infection, both oral and intravenous antibiotics are reasonable choices, preferably dual antibiotics approach and using quinolones, carbapenems, linezolid, minocycline, or TMP-SMX. Duration of antibiotic should be determined based on the patient's clinical improvement.

Acknowledgements

The authors would like to thank all the microbiology lab personnel at the American University of Beirut Medical Center.

Author contributions

H.E.A. and R.K. contributed to writing and reviewing the manuscript, and I.B. contributed to reviewing the manuscript.

Declaration of conflicting interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

Ethical approval

Our institution does not require ethical approval for reporting individual cases or case series.

Informed consent

Written informed consent was obtained from the patient(s) for their anonymized information to be published in this article.

ORCID iD

Rola Kwayess https://orcid.org/0000-0003-4943-5497

References

1. Demir M, Özbek M, Polat N, et al. A comparison of postoperative complications following cardiac implantable electronic device procedures in patients treated with antithrombotic drugs. *Pacing Clin Electrophysiol* 2022; 45(6): 733–741.
2. Güzel T, Aktan A, Kılıç R, et al. Aging and cardiac implantable electronic device complications: is the procedure safe in older patients? *Aging Clin Exp Res* 2023; 35(11): 2445–2452.
3. Croce O, Robert C, Raoult D, et al. Draft genome sequence of *Mycobacterium mageritense* DSM 44476T. *Genome Announc* 2014; 2(2): e00354-14.
4. Wallace RJ Jr., Brown-Elliott BA, Hall L, et al. Clinical and laboratory features of *Mycobacterium mageritense*. *J Clin Microbiol* 2002; 40(8): 2930–2935.
5. Domenech P, Jimenez MS, Menendez MC, et al. *Mycobacterium mageritense* sp. nov. *Int J Syst Bacteriol* 1997; 47(2): 535–540.

6. Hirabayashi R, Nakagawa A, Takegawa H, et al. A case of pleural effusion caused by *Mycobacterium fortuitum* and *Mycobacterium mageritense* coinfection. *BMC Infect Dis* 2019; 19(1): 720.
7. Brown-Elliott BA, Griffith DE and Wallace RJ Jr. Newly described or emerging human species of nontuberculous mycobacteria. *Infect Dis Clin North Am* 2002; 16(1): 187–220.
8. Gira AK, Reisenauer AH, Hammock L, et al. Furunculosis due to *Mycobacterium mageritense* associated with footbaths at a nail salon. *J Clin Microbiol* 2004; 42(4): 1813–1817.
9. Ali S, Khan FA and Fisher M. Catheter-related bloodstream infection caused by *Mycobacterium mageritense. J Clin Microbiol* 2007; 45(1): 273.
10. Miki M, Shimizukawa M, Okayama H, et al. [Case of pulmonary *Mycobacterium mageritense* infection: the difficulty of differential diagnosis of granulomatous lung diseases]. *Kekkaku* 2007; 82(3): 189–194.
11. Munoz-Sanz A, Rodriguez-Vidigal FF, Vera-Tome A, et al. *Mycobacterium mageritense* meningitis in an immunocompetent patient with an intrathecal catheter. *Enferm Infecc Microbiol Clin* 2013; 31(1): 59–60.
12. McMullen AR, Mattar C, Kirmani N, et al. Brown-pigmented *Mycobacterium mageritense* as a cause of prosthetic valve endocarditis and bloodstream infection. *J Clin Microbiol* 2015; 53(8): 2777–2780.
13. Fukunaga M, Goya M, Ogawa M, et al. Implantable cardioverter defibrillator infection due to *Mycobacterium mageritense*. *J Infect Chemother* 2016; 22(3): 180–183.
14. Okabe T, Sasahara T, Suzuki J, et al. *Mycobacterium mageritense* Parotitis in an Immunocompetent Adult. *Ind J Microbiol* 2018; 58(1): 28–32.
15. Oiwa T, Murata T, Honda T, et al. A case of subcutaneous infection with *Mycobacterium mageritense* identified by matrix-assisted laser desorption/ionization-time of flight mass spectrometry. *Acta Derm Venereol* 2018; 98(10): 987–988.
16. Tutzer S, Posse T, Paul R, et al. [Electronic cardiovascular device-associated to infective endocarditis caused by *Mycobacterium mageritense*]. *Rev Argent Microbiol* 2019; 51(1): 22–25.
17. Singhal L, Bhagat A, Gupta M, et al. Multiple recalcitrant draining sinuses caused by *Mycobacterium mageritense* following laparoscopic cholecystectomy: a case report and brief review of literature. *Jpn J Infect Dis* 2020; 73(3): 256–258.
18. Caravedo Martinez MA and Blanton LS. *Mycobacterium mageritense* Prosthetic Joint Infection. *Case Rep Infect Dis* 2020; 2020: 8845430.
19. Park AM, Hathaway NE and Wright KT. *Mycobacterium mageritense* tattoo infection: a known complication with a novel species. *Dermatol Online J* 2020; 26(4): 13030.
20. Joya CA, Deegan C and Gleeson TD. *Mycobacterium mageritense* infection following mastectomy and breast reconstruction requiring triple antibiotic therapy and surgical debridement. *BMJ Case Rep* 2021; 14(2): e237618.
21. Yamaguchi Y, Kitano T, Onishi T, et al. A case of pediatric subcutaneous abscess caused by *Mycobacterium mageritense* infection. *Jpn J Infect Dis* 2021; 74(4): 377–380.
22. Turuk J, Das D, Rout SS, et al. *Mycobacterium mageritense* causing surgical site infection: Case report from Odisha, India. *Ind J Med Microbiol* 2021; 39(3): 389–391.
23. Koyama T, Funakoshi Y, Imamura Y, et al. Device-related *Mycobacterium mageritense* infection in a patient treated with nivolumab for metastatic breast cancer. *Intern Med* 2021; 60(21): 3485–3488.
24. Garcia-Boyano M, Baquero-Artigao F, Toro C, et al. *Mycobacterium mageritense* lymphadenitis in child. *Emerg Infect Dis* 2022; 28(3): 752–753.
25. Sando Y, Morioka H, Sugawara K, et al. A case of facial skin ulcer caused by *Mycolicibacterium mageritense* after tennis ball bruising. *Int J Infect Dis* 2022; 114: 55–57.
26. Maheshwari S, Parakh S, Das SM, et al. Multifocal serpiginoid choroiditis due to *Mycobacterium Mageritense* following laparoscopic hysterectomy in an immunocompetent host. *Ocul Immunol Inflamm* 2023; 31(1): 236–241.