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Case Presentation

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Cerebral Listeriosis Presenting as Monolateral Ischemic Cerebral Attack: A Case Report

Rossi C[1], Rapino S[1], Pinelli L[2], Colangelo C[1], Gottardi F[1], Morucci F[1], Palumbo G[3,4] and Matteelli A[1]*

[1]Department of Clinical and Experimental Sciences, Clinic of Infectious and Tropical Diseases, University of Brescia, Italy

[2]Neuroradiology Department, Pediatric Neuroradiology Section, ASST Spedali Civili Brescia, Italy

[3]Department of Neuroradiology, Fondazione IRCCS San Gerardo dei Tintori, Italy

[4]School of Medicine and Surgery, Università degli Studi di Milano-Bicocca, Italy

***Corresponding author:** Matteelli A, Department of Clinical and Experimental Sciences, University of Brescia, Clinic of Infectious and Tropical Diseases, Piazza Spedali Civili, 1, 25123 Brescia, Italy, Tel: +39 030 3995802

Abstract

L. monocytogenes is a bacterium commonly found in the environment that causes, in non-pregnant hosts, a wide range of clinical manifestations, from self-limiting gastroenteritis to septicemia and meningoencephalitis. Brain abscesses are a rare event. We describe clinical presentation, neuroimaging, and microbiological analyses of one case of Listeria monocytogenes encephalitis and we discuss its pathogenesis. A 76-year-old man, alcohol abuser, presented with a 15-day history of headache, paresthesia, and weakness in the left side of the body, associated with functional limitation of the right lower limb. A brain MRI identified multiple abscesses in the right hemisphere, some of which with a unique tubular/serpiginous appearance, and Listeria monocytogenes was isolated from multiple blood cultures. A few days later the patient complained of pain in right neck and a CT scan revealed an abscess surrounding the right carotid bulb that was incised and drained. Intravenous ampicillin was started and a CT scan after four weeks of therapy showed significant improvement with only one persisting abscess, significantly reduced in size.

Ampicillin therapy was discontinued after eight weeks, with full recovery of the cerebral disease.

Listeria abscesses of the internal carotid are rarely reported. The primary infection justifies the ipsilateral localization of the cerebral abscesses. The tubular/serpiginous appearance of the brain abscesses at the MRI is reported as a neuroradiological sign suggestive of a limited number of pathogens that spread by the hematogenous route.

Keywords: Brain abscess; *Listeria monocytogenes*; Case report

Introduction

Listeria monocytogenes is a gram-positive, facultative anaerobic, non-sporulating bacterium that infects humans through the ingestion of contaminated raw or undercooked food, such as soft, low-aged cheese and unpasteurized milk [1]. The bacteria can grow at low temperatures (4-10°C) and is present in the soil [1]. In 2023, in ten U.S. states, 163 cases of listeriosis were reported, corresponding to a crude incidence of 0.3 per 100,000 population [2]. In immunocompetent individuals *Listeria* is mainly responsible for self-limiting gastroenteritis, while it causes meningitis, meningoencephalitis, and bacteremia in the elderly, pregnant women, neonates, and immunocompromised individuals [3]. Brain abscesses are observed in 10% of patients with Listeria-related brain infections [1,4]. Abscesses around the internal carotid artery, with or without pseudoaneurysms of the vessel, have been reported in one single case [5].

Case Presentation

We describe the case of a patient with multiple *L. monocytogenes* abscesses limited to the right cerebral hemisphere caused by a primary infection of the right carotid bulb, and we report the results of a review of the literature to discuss the radiological differential diagnoses and this atypical clinical presentation.

Materials and Methods

We present a case of cerebritis in whom the typical images at Magnetic Resonance Imaging (MRI) limited the differential diagnosis to a few microbiological pathogens. A diagnosis of *L. monocytogenes* infection was suspected on the bases of the MRI images and later confirmed by isolation of the pathogen from blood cultures. A review of the literature was conducted using PubMed to contextualize this case within existing knowledge on Listeria-related brain abscesses. Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Results

On February 15th, 2025, a 76-year-old male presented to the emergency department of the reference teaching hospital in Brescia, Italy, due to right-sided temporal headache radiating to the mandible, with paresthesia and weakness of the left side of the body of fifteen days duration. A brain Computed Tomography (CT) scan showed focal vasogenic edema in the right occipitotemporal region, possibly due to an expansile lesion. Dexamethasone was initiated at 4mg daily and he was admitted to the Neurology ward. On initial examination the patient was alert, oriented, collaborating, and autonomous in movements. His history revealed hypertension, liver steatosis, occult hepatitis B infection, partial gastrectomy and full splenectomy following gastric ulcer, cholecystectomy, and a recent herpes zoster episode. He had a rabbit farm, regularly consumed soft cheese and was an alcohol abuser. On day one of

admission the patient developed dysarthria, and ideomotor slowing that rapidly progressed to left-sided hemiparesis involving face, arm, and leg. A repeated brain CT scan showed new foci of vasogenic edema in the frontopolar and retro-rolandic regions of the right hemisphere and a small, faintly visible rounded lesion in the right lenticular nucleus. Further, an MRI revealed numerous intra-axial expansile lesions with ring-like enhancement and a core with restricted diffusion, exclusively located in the right cerebral hemisphere, involving all lobes **(Figure 1)**. Lesions ranged from few millimeters to a maximum of 2 cm in diameter. At the vertex, in the right parietal region, they assumed a 'tubular' morphology with a serpiginous course **(Figure 2).** Almost all of them showed perilesional vasogenic edema. The MRI findings were considered compatible with pyogenic abscesses and empiric treatment with ceftriaxone 2g daily and metronidazole 500mg four times daily was initiated.

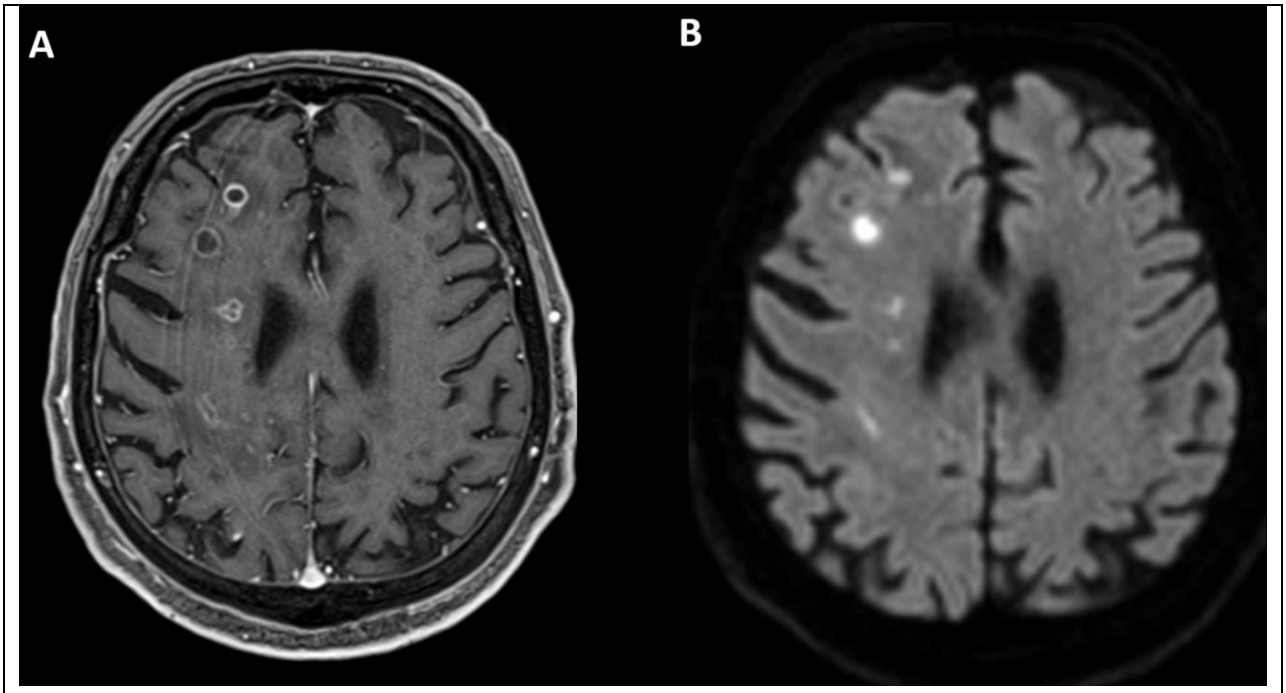

Figure 1: Brain MRI, axial contrast-enhanced T1 weighted image (A) and diffusion-weighted image, DWI (B). Multiple small intra-axial ring-enhancing lesions in the right cerebral hemisphere, localized both at the cortico-subcortical junction and in the deep white matter in the frontal and parietal lobes (A). All the lesions show hyperintensity at DWI (confirmed at ADC map, not shown).

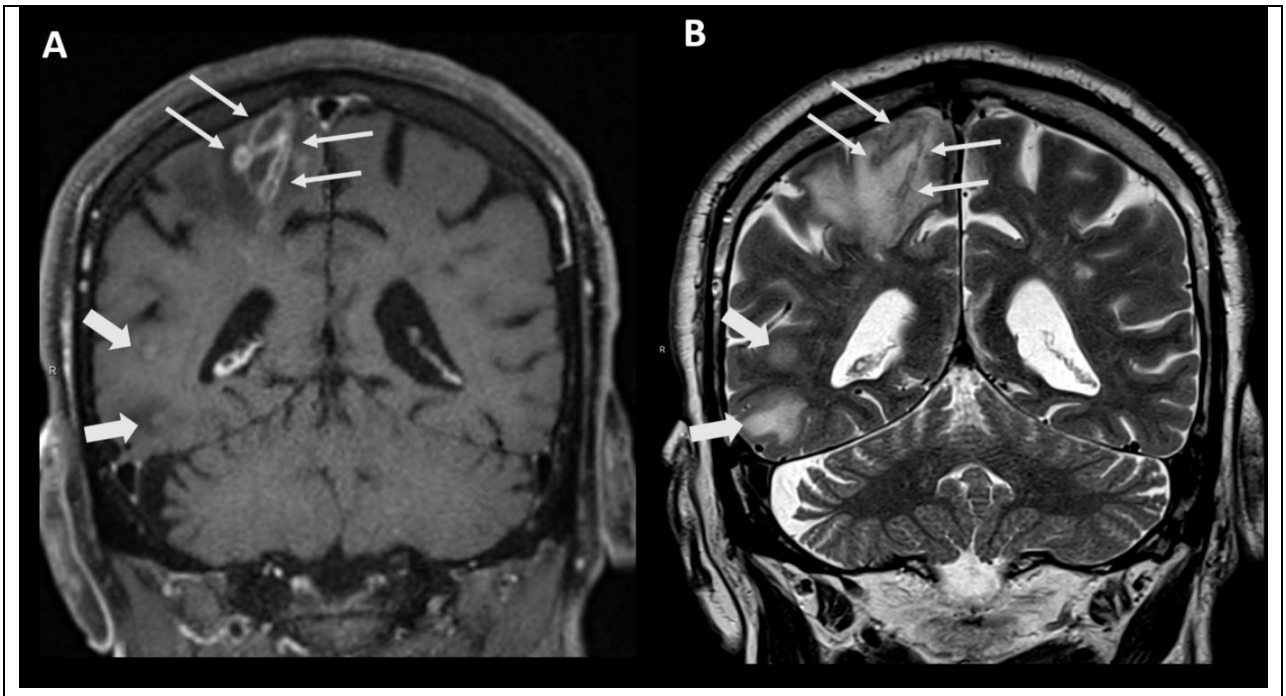

Figure 2: Brain MRI, coronal contrast-enhanced T1-weighted image (**A**) and coronal T2 TSE image (**B**). Some of the parietal lesions show a unique tubular ("worm-like") appearance (thin arrows in A and B). Other infective lesions with faint nodular contrast enhancement in the temporal lobe of the same hemisphere (thick arrows). All the lesions show vasogenic edema in the adjacent white matter.

At MRI reevaluation, the selective involvement of one cerebral hemisphere and the tubular/serpiginous appearance of some lesions suggested a causative role for *Listeria monocytogenes*, or *Nocardia* and blood cultures were collected though the patient was afebrile. On day four, the patient developed worsening of the right temporal-parietal headache followed by severe left-sided hemiparesis (4AS, 3AI), and a deficit of the seventh cranial nerve with involvement of the orbicularis oculi. Transthoracic echocardiogram did not reveal signs of endocarditis, and a neurosurgical evaluation found no surgical indication. Development of submandibular lymphadenopathy was noted.

On day five *Listeria monocytogenes* was isolated from multiple blood cultures, ceftriaxone and metronidazole were discontinued, and ampicillin 4g four times daily and gentamicin 80 mg three times daily were initiated. The patient remained sleepy but arousable, with right ocular deviation. He developed dysphagia for liquids and total enteral nutrition was initiated.

Later that day, a brain CT scan showed increased vasogenic edema causing mass effect on the right lateral ventricle and leftward shift of the septum pellucidum and the dexamethasone dose was increased to 8 mg twice daily. On day ten, right neck swelling developed and a neck ultrasound identified a hypoechoic, non-vascularized area around the right carotid bifurcation (13 mm thick, 25 mm long). A CT scan revealed an abscess surrounding the carotid bulb extending 29.5 mm craniocaudally, with a diameter of 22x21 mm and a peripheral ring measuring 4 mm in thickness. An emergency vascular surgery

procedure was performed to drain the abscess and bypass the right internal carotid artery using a saphenous vein graft. Surgical specimens (the vessel wall) were sent for microbiological examination, which resulted negative. The day after surgery, the patient was transferred to the Infectious Diseases ward. He was alert, oriented, and could obey simple commands, although left-sided hemiplegia persisted. Therapy was simplified to 3g of intravenous ampicillin four times daily. Hematological and biochemical parameters progressively improved. Physiotherapy and speech therapy were initiated, allowing subsequent weaning from the nasogastric tube with oral feeding through a semi-solid diet. A follow-up brain CT scan after four weeks of appropriate antibiotic therapy, only identified one abscess lesion in the right lenticular nucleus, markedly reduced in size. On day forty-eight the patient developed aspiration pneumonia managed by emergency bronchoscopy, non-invasive oxygen ventilation and antibiotics. After six weeks of therapy dexamethasone was discontinued and the patient completed uneventfully eight weeks of ampicillin therapy, and he was discharged to a rehabilitation facility in good clinical conditions.

Discussion

Neuro-listeriosis is not a notifiable infection, hence it is difficult to assess the true burden of the disease. Angelo et al. estimated as 11 days the mean incubation time for invasive listeriosis, with 90% occurring within 28 days from exposure **[6]**. Carneiro et al. **[7]** performed a systematic review of cases of brain abscesses caused by *L. monocytogenes* published from 1968 to 2023 and described 96 cases. The average age was 54 years, 54% of the patients were male, the mortality rate was 22% and most had risk factors for the development of neuro-listeriosis. Blood cultures and cerebrospinal fluid were positive in 79.2% and 54.6% of cases respectively **[7]**. A pathognomonic radiological sign that should prompt the suspicion of listeria infection is the tubular/serpiginous appearance on MRI **[8,9]**. How *Listeria* disseminates to the central nervous system is still uncertain. Our patient had an abscess surrounding the carotid bulb at the proximal third of the right internal carotid artery wall, suggesting that this was the source of metastatic dissemination limited to the right brain. We speculate that the infection started following ingestion of contaminated cheese, then the bacteria crossed the mucosal barrier, entered the bloodstream, adhered and proliferated in the vasal wall of the right carotid bifurcation, to later disseminate to the brain. Only one other case of a pseudoaneurysm surrounding the left carotid sinus with a thick and irregular capsule and contrast enhancement had been reported in the literature, treated by the same procedure we have described **[5]**. In both cases, initial symptoms mimicked a stroke. The involvement of all four cerebral lobes simultaneously has not been previously reported.

Seven other cases of brain abscesses exclusively localized in one cerebral hemisphere and no arterial damage had been reported until 2014 **[10,11]**. In these patients a different pathogenetic mechanism has been hypothesized to explain the unilaterality of the CNS infection, that is an intra-axonal spread of *Listeria* through the trigeminal nerve to the Gasser ganglion and afterwards to the brainstem, causing retrograde axonal spread and leading to rhombencephalitis **[11]**.The involvement of other cranial nerves was also hypothesized, including VII, IX, and X nerves **[11]**. Indeed, animal studies have demonstrated involvement of the cranial nerves,

particularly the facial, hypoglossal, and trigeminal nuclei, and in a limited number of cases, the vagal nuclei [12]. Another hypothesis suggests that Ly-6C^{high} monocytes infected by *L. monocytogenes* are the preferred vectors for subsequent cerebral localization: they adhere to cerebral capillaries and cross the subarachnoid space. The spread may be cell-to-cell or via microglia, through phagocytosis [13].

Diagnosis is based on a combination of blood cultures, neuroimaging, clinical findings, and epidemiology, possibly supplemented by molecular biology techniques [1]. The neuro-radiological manifestation of *Listeria* abscesses resembles that of neuromelioidosis caused by *Burkholderia pseudomallei* and sparganosis caused by *Spirometra*. Neuromelioidosis is characterized by tubular microabscesses with peripheral enhancement, affecting the white matter, cranial nerves and their nuclei. The spread is often through the trigeminal nerve, which frequently shows thickening and enhancement of the cisternal and intra-axial segments [14]. In sparganosis, the typical finding on MRI is a "tunnel sign" on post-contrast images, with a live worm/string-knots sign, edema and degeneration of the white matter [15]. *Listeria* abscesses appear as multiple elongated lesions with peripheral enhancement, arranged in a characteristic “worm-like” or “railroad track” pattern along white matter fiber tracts [9,16]. Cases with ring-shaped conglomerate enhancement and tract-like structures visible on MRI, which are typical findings of tuberculomas and parasitic infections, are increasingly described in *Listeria* abscesses as well [17]. The prognosis of neurolisteriosis is bleak: mortality rates may reach 50%, and survivors of the acute phase often experience severe long-term sequelae [3,18].

Conclusion

In conclusion, cerebral abscesses caused by *Listeria* are rare and have a high mortality rate, therefore, early diagnosis and prompt treatment are critical for improving prognosis. The tubular/serpiginous appearance on MRI could suggest the diagnosis even before the results of blood cultures or cerebrospinal fluid analysis and could allow for the immediate addition of ampicillin to the empirical treatment of pyogenic cerebral abscesses. The distribution of the abscesses in a single hemisphere should suggest a focus around the right internal carotid artery that should therefore be investigated.

References

1. Matle I, Mbatha KR, Madoroba E. A review of Listeria monocytogenes from meat and meat products: Epidemiology, virulence factors, antimicrobial resistance and diagnosis. Onderstepoort J Vet Res. 2020;87(1):e1–20.
2. Shah HJ, Jervis RH, Wymore K, Rissman T, LaClair B, Boyle MM, et al. Reported Incidence of Infections Caused by Pathogens Transmitted Commonly Through Food: Impact of Increased Use of Culture-Independent Diagnostic Tests - Foodborne Diseases Active Surveillance Network, 1996-2023. MMWR Morb Mortal Wkly Rep. 2024;73(26):584–93.
3. Silk BJ, Mahon BE, Griffin PM, Gould LH, Tauxe RV, Crim SM, et al. Vital Signs: Listeria Illnesses, Deaths, and Outbreaks —

United States, 2009–2011. Morb Mortal Wkly Rep. 2013;62(22):448–52.

4. Charlier C, Perrodeau É, Leclercq A, Cazenave B, Pilmis B, Henry B, et al, MONALISA study group. Clinical features and prognostic factors of listeriosis: the MONALISA national prospective cohort study. Lancet Infect Dis. 2017;17(5):510–9.
5. Boulloche N, Slaoui T, Viguier A, Glock Y, Chabanon G, Rigal M, et al. Ischemic cerebral attacks due to a pseudo-aneurysm of the internal carotid artery with Listeria monocytogenes. J Neurol. 2007;254(1):122–3.
6. Angelo KM, Jackson KA, Wong KK, Hoekstra RM, Jackson BR. Assessment of the Incubation Period for Invasive Listeriosis. Clin Infect Dis Off Publ Infect Dis Soc Am. 2016;63(11):1487–9.
7. Carneiro BH, de Melo TG, da Silva AFF, Lopes JT, Ducci RDP, Carraro Junior H, et al. Brain abscesses caused by Listeria monocytogenes in a patient with myasthenia gravis - Case report and systematic review. Infez Med. 2023;31(4):570–4.
8. Kim DD, Sadic M, Yarabe B, Loftus JR, Lieberman E, Young MG, et al. Listeria monocytogenes brain abscesses presenting as contiguous, tubular rim-enhancing lesions on Magnetic Resonance Imaging: Case series and literature review. Neuroradiol J. 2025;38(1):115–20.
9. Slezák O, Žižka J, Kvasnička T, Dvořáková R, Česák T, Ryšková L, et al. Worm-like appearance of Listeria monocytogenes brain abscess: presentation of three cases. Neuroradiology. 2020;62(9):1189–93.
10. Bojanowski MW, Seizeur R, Effendi K, Bourgouin P, Magro E, Letourneau-Guillon L. Spreading of multiple Listeria monocytogenes abscesses via central nervous system fiber tracts: case report. J Neurosurg. 2015;123(6):1593–9.
11. Karlsson WK, Harboe ZB, Roed C, Monrad JB, Lindelof M, Larsen VA, et al. Early trigeminal nerve involvement in Listeria monocytogenes rhombencephalitis: case series and systematic review. J Neurol. 2017;264(9):1875–84.
12. Oevermann A, Di Palma S, Doherr MG, Abril C, Zurbriggen A, Vandevelde M. Neuropathogenesis of naturally occurring encephalitis caused by Listeria monocytogenes in ruminants. Brain Pathol. 2010;20(2):378–90.
13. Drevets DA, Bronze MS. Listeria monocytogenes: epidemiology, human disease, and mechanisms of brain invasion. FEMS Immunol Med Microbiol. 2008;53(2):151–65.
14. Hsu CC, Singh D, Kwan G, Deuble M, Aquilina C, Korah I, et al. Neuromelioidosis: Craniospinal MRI Findings in Burkholderia pseudomallei Infection. J Neuroimaging Off J Am Soc Neuroimaging. 2016;26(1):75–82.
15. Chu S, Lu X, Wang Y, Gao G, Xv F, Zee CS, et al. Magnetic resonance imaging features of pathologically proven cerebral sparganosis. J Int Med Res. 2013;41(3):867–77.
16. Simonsen AL, Shekhrajka N, Hertz FB, Helweg-Larsen J, Bengård Andersen Å, Lebech AM. Listeria Monocytogenes Brain

Abscesses in a Patient with Disseminated Non-Small Cellular Lung Cancer: MRI Findings. Diagnostics. 2021;11(6):1115.

17. Thiankhaw K, Wantaneeyawong C, Madla C. Conglomerate ring and tract-like enhancement lesions: Neuroimaging in Listeria monocytogenes brain abscess. Radiol Case Rep. 2022;17(3):676–9.
18. Li J, Zhang Y, Zhang Q, Lu S, Huang F, Wang J. Application of metagenomic next-generation sequencing for the diagnosis of intracranial infection of Listeria monocytogenes. Ann Transl Med. 2022;10(12):672.

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