

# Cerebral Ring Enhancing Lesions in Autoimmune Hepatitis Complicated by Invasive Listeriosis

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**Abstract:** *listeria monocytogenes* is an opportunistic gram - positive, anaerobic, facultative intracellular bacterium that imposes great variety of complications in immunocompromised patient. Its effects ranges from liver abscess, acute gastroenteritis, septic arthritis to the neurological complications like rhombencephalitis, meningitis. Brain abscesses caused by *listeria monocytogenes* is extremely rare, where it mimic like circling disease of animals. We report a case of invasive case of listeriosis causing multiple brain lesions in cerebral cortex, presenting with no signs of fever with sudden unilateral hemiparesis mimicking cerebral palsy. We encourage early diagnosis by CSF and blood culture, and its correlation with MRI ring enhancing lesion findings. Furthermore prompt treatment by gentamycin, vancomycin can settles down complications and saves patient life. We put emphasis on timely diagnosis and treatment to avoid any further complication in already an immunocompromised patient

**Keywords:** Cerebral Ring - Enhancing lesions, Autoimmune Hepatitis, Invasive Listeriosis

## 1. Introductions

*Listeria monocytogenes* is a gram - positive, anaerobic, facultative intracellular bacterium, acquired primarily by ingestion of contaminated food. Infection with this pathogen manifests primarily as self - limited gastroenteritis in immunocompetent hosts. Individuals at highest risk for invasive disease, manifesting as neurological involvement or sepsis, include those at the extremes of age, pregnant women, and the immunocompromised. Neurological manifestations occur because of hematogenous seeding of brain parenchyma by passage through either capillary or arterial endothelial cells<sup>1,2</sup>. This way meningoencephalitis is being the most common<sup>3</sup> but also including isolated meningitis as well as rhombencephalitis. Brain abscesses owing to *Listeria* are extremely rare, making up only around 10% of all reported CNS infections due to the pathogen<sup>4</sup>, with almost all cases having been reported in the immunocompromised, including those with liver cirrhosis<sup>5</sup>, post - transplant patients<sup>6</sup>, multiple myeloma<sup>7</sup>, and patients on prolonged steroid therapy<sup>8</sup>. We report here a case of brain abscess caused by *Listeria monocytogenes*, and review the

relevant pathogenesis, diagnosis and treatment, with the aim to engender greater awareness about this highly fatal yet avoidable manifestation, if catered to timely.

## 2. Case report

We present a case of 72 years old female, a diagnosed case of hypertension and autoimmune hepatitis presented to emergency on 7<sup>th</sup> October 2022 with complaints of right sided hemiparesis and slurring of speech and difficulty in swallowing (Aphasia) since 4<sup>th</sup> of October 2022, it was sudden in onset. There was NO association with fever, neck stiffness, cough, vomiting, seizures, fecal and urinary symptoms. There was no history of fall or syncope. Physical examination was normal. Oxygen saturation was 97 percent. She was breathing spontaneously via the room air. GCS was 15/15. Capillary refilling time was 2 - 3 seconds. No swelling and tenderness were noticed during examination. The patient was admitted, IV line was maintained and patient received Rocephin and vancomycin as empirical therapy.

**Table 1:** Complete Blood Picture (CBC) time record

CBC	Results 7 - OCT - 2022	13 - OCT - 2022	20 - OCT - 2022	Reference Range
WBC total	10010	11830	11360	(4000 - 10500) / $\mu$ L
RBC Total	4.18	3.85	4.40	(3.8 - 5.8) m/mL
Hemoglobin	12.9	12.3	13.7	(12.5 - 16) g/dL
HCT	39.8	35.5	40.1	(37 - 47) %
MCV	95.2	92.2	91.1	(78 - 100) fL
MCH	30.9	31.9	31.1	(27 - 31) pg
MCHC	32.4	34.6	34.2	(32 - 36) g/dL
Platelet count	184000	141000	246000	(150000 - 400000) $\mu$ L
Neutrophils	70	62	56	(54 - 62) %
Lymphocytes	19	29	32	(25 - 33) %
Eosinophils	2	1	5	(1 - 3) %
Basophils	1	1	0	(0 - 0.75) %
RDW	13.6	13.1	13.2	(11.5 - 14) %
MPV	13.7	12.2	10.8	(6.8 - 10.2) fL

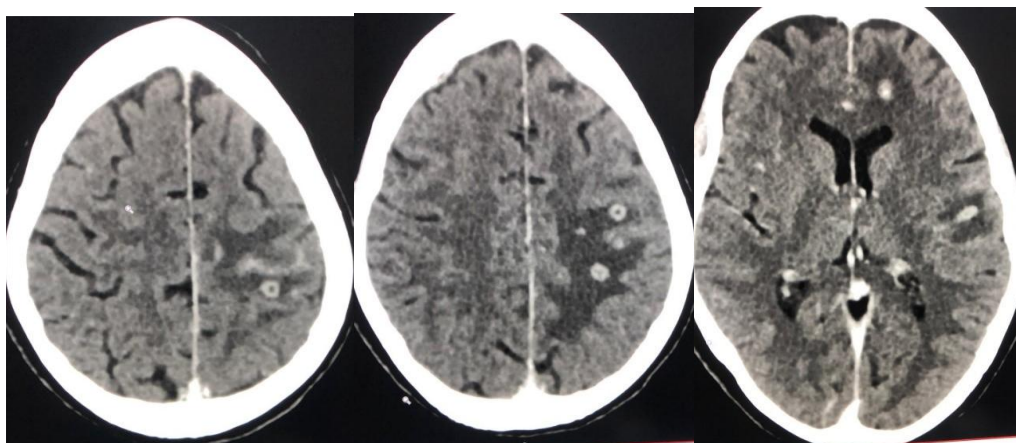
CBC records was maintain, Table no 1. CSF routine analysis showed clear, colorless with negative coalgum, negative xanthochromia, No RBCs and WBC were < 5cells/uL, glucose 67.50mg/dL, proteins 34.6mg/dL. CSF cytology smears were hypocellular with occasional lymphocyte and neutrophils. CSF was tested for Fungus KOH preparation, india ink preparation, Con. Acid fast bacilli smear, Fast AFB smear, AFB culture, Direct AFB smear. All these tests were negative. Since the patient is diagnosed with Autoimmune hepatitis, liver enzymes were carried out results. Refer to Table no: 2

Workup of MRI revealed ring enhancing lesions in left cerebral hemisphere. CT brain with contrast showed multiple ring enhancing renoted along with perilesional vasogenic edema and mild subarachnoid hemorrhage localized to precentral sulcus and accentuated meningeal enhancements were also seen in this region, as shown in figure 1 - 3. Brain biopsy was planned by neurology department, but it was deferred due to the blood culture revealing listeria bacteremia. The infectious Disease control department recommended IV ampicillin and gentamycin for 10 days (about 1 and a half weeks). During the stay at hospital her regular brain CT with contrast revealed decrease in ring enhancing lesions in left cerebral hemisphere, both in size and number, surrounding vasogenic edema was also decreased during that interval, as shown in figure 4, 5.

**Table 2:** Liver functioning test and other diagnostic tests

Liver Enzymes	Results 7 – OCT - 2022	Reference Range
SGOT (AST)	43	Up to 32 U/L
SGPT (ALT)	41	Up to 33 U/L
ALP	107	Adults 40 - 130 U/L
Total Bilirubin	0.70	Adults up to 1.2 mg/dL
Direct Bilirubin	0.24	Up to 0.30 mg/dL
Gamma G. T	170	Up to 40 U/L
Markers and Diagnostic tests		
Toxo - IgG	<0.13	<1.0 IU/mL
Toxo - IgM	0.25	Intermediate 0.50 - 0.60
HIV (Ag/Ab combo)	Nonreactive (0.19)	Nonreactive < 0.90 S/Co
Alpha Fetoprotein	6.1	<7.0ng/mL
CRP high sensitivity	5.93	Up to 5.0mg/L
HbA1c	6.2	<5.7%

Continuation of IV gentamycin 60mg TD for 3 weeks and IV Ampicillin 4g OQ was planned. She was discharged on family request. At the time of discharge she was afebrile, hemodynamically stable and clinically better at that time. The family was counselled about home medications, speech therapy in detail and advise for follow up.



**Figure 1 – 3:** Brain CT scan at the time of admission to the hospital

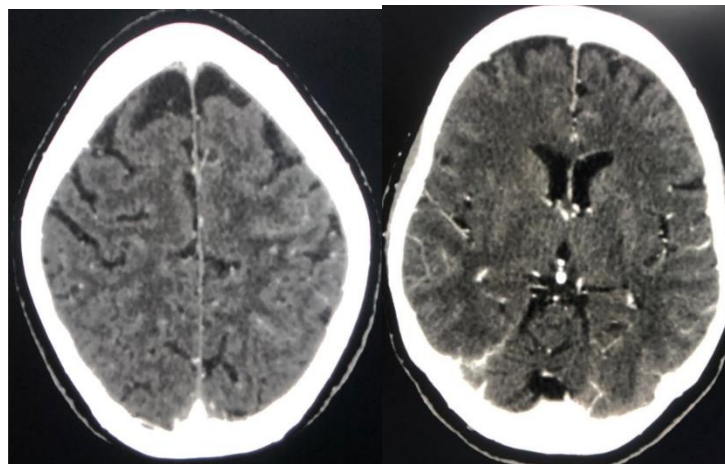


Figure 4-5: Brian CT at the time of discharge

### 3. Discussion

Listeria is a foodborne pathogen. It is routinely termed as opportunistic pathogen which generally effects pregnant women, immunocompromised patients, and neonates. Adults are less likely to get infection and so its effects differ in adults as compared to immunodeficient patients. Different immunosuppressive conditions in elderly patients explain the high incidence of listeriosis. It gains access to peripheral blood system via digestive tract and then it crosses the blood brain barrier and cause CNS symptoms. Intact gastrointestinal mucosa, effective macrophages function in liver and spleen highly resists its early infection<sup>9</sup>. Any disease, malignancy as in our case, autoimmune hepatitis and usage immunosuppressive drugs such as cyclosporine A corticosteroids greatly hinder the cell mediated immunity thus hinder the protective barrier and predispose the patient to early infections invasive listeria monocytogenes shows variety of clinical symptoms ranging from neonatal meningitis, meningoencephalitis, rhombencephalitis, Spontaneous bacterial peritonitis, septic arthritis, Hepatitis, liver abscess endophthalmitis and febrile gastroenteritis.

CNS presentation of invasive listeriosis majorly present in two form first as subacute bacterial meningitis characterized by fever, headache, neck stiffness<sup>10</sup>. The onset takes several days while the second form is rhombencephalitis that has the feature of circling disease<sup>11</sup>. Signs of meningeal irritation are less likely to be present but patients develop multiple cranial abnormalities, associated with cerebellar dysfunction, ataxia, hemiparesis. Fever may not be present in 15% of the cases which can miss lead physician towards noninfectious cause. This can lead to the formation of multiple abscess in supratentorial area, cerebellum and diencephalon<sup>12</sup>. MRI and blood or CSF culture is considered to be the best diagnosing tool for this pathogen. Studies have been done on the direct detection of PCR products such the L. monocytogenes HlyA in CSF and other fluids. Although it seems modest, sensitivity may be helpful in individuals who are already receiving therapy for listeriosis when cultures are negative<sup>13</sup>.<sup>14</sup>. Combination of ampicillin and gentamicin is considered current therapy for listeriosis<sup>15</sup>. Tri methoprim - sulfamethoxazole is a potential drug in listeriosis in the case of penicillin resistant L. monocytogen<sup>16</sup>

### 4. Conclusion

This case of invasive listeriosis mimicking as cerebral palsy, hemiparesis and aphasia showed that this disease can easily be missed in the elderly immunocompromised patients. Additionally multiple rings enhancing lesions on CT contrast and blood culture proved to be effective in diagnosing this case furthermore pathogen sensitive antibody therapy appear to be effective treatment without any surgical intervention, thus we emphasize on importance of accurate diagnosis and microbiological confirmation and appropriate treatment of listeriosis.

Lack of regular surveillance for this pathogen makes it difficult to evaluate its changing epidemiology. However, we believe that proper awareness among healthcare professionals about the clinical features and severe consequences of listeriosis will help to minimize casualties associated with this

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