

Cerebral Actinomycosis

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Section: Neuroradiology

Area of Interest: Neuroradiology brain

Procedure: Diagnostic procedure

Imaging Technique: MR

Special Focus: Infection Case Type: Clinical Cases

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Patient: 39 years, male

Clinical History:

37 years old male presented with complaints of severe left parietal headache, few episodes of unconsciousness, 2 episodes of seizure, low grade fever, speech difficulties and right upper limb weakness. No history of trauma. On examination right upper limb motor tone power is 2/5 and other focal neurological deficits.

Imaging Findings:

Neurologist suspects focal cerebral parenchymal pathology and advised MRI Brain with contrast.

MRI Brain shows Altered signal intensity lesion with irregular margins in left parafalcine high parietal cortex. It appears isointense on T1W images and Hypointense on T2W and FLAIR Images. Extensive perilesional T2W Hyperintense and T1W Hypointense vasogenic edema is noted causing mass effect on left ganglio-capsular region and left lateral ventricle with mild rightward mid line shift. Left Uncal herniation of parenchyma is also noted. Lesion shows homogenous and avid internal contrast enhancement with minimal adjacent dural enhancement. Lesion is intraaxial. Lesion does not show restricted diffusion within. No any areas of blooming on Gradient echo Images to suggest Hemorrhage or Calcifications.

Then CSF culture was done which is negative for Acid fast bacilli. Based on this decided to operate. Intraoperatively lesion was unencapsulated, excised and sent for histopathological and microbiological analysis.

Discussion:

Tissue analysis shows lymphocytes and macrophages infiltration with sulfure granules and branching filaments which is diagnostic for *Actinomyces israelii* organism. Whole Body PET-CT was also done and shows no any similar lesions or other pathology elsewhere in body. Actinomycosis is Noncontagious, suppurative bacterial infection [1]. *Actinomyces* is normal flora of oral cavity, esophagus and genitourinary tract [2]. Poor oral hygiene, dental procedures, aspiration of oral contents, abdomino-pelvic surgery, and acute intrabdominal inflammatory processes are the risk factors for Actinomycosis. [2] It is gram positive, non acid fast branching filamentous organisms. Cerebral Actinomycosis may presents with signs and symptoms of brain abscess, Meningitis or encephalitis. Infection generally comes through hematogenous spread from lungs, abdomen or direct extension from Cervicofacial region through connective tissue planes and skull base.[1] Typical Imaging findings include single or multiple altered signal intensity focal solid lesions in brain parenchyma. They appears iso or hypointense on T1W images and Hyper or hypointense on T2W and FLAIR Images. Intralesional Calcifications may present as blooming on Gradient echo images. Intralesional hemorrhage is very rare. Diffusion restriction is generally seen in pyogenic bacterial abscess because of pus and inflammatory cells (In our case no Intralesional restricted diffusion was observed). DWI can differentiate abscess from Cystic or necrotic brain tumours as cystic components don't show any restricted diffusion. In contrast study, homogeneous or heterogeneous internal enhancement or peripheral ring like enhancement are seen. Typical Spectroscopic MRI findings include Absence or low Choline, Creatine and N-

acetylaspartate (NAA) peaks and elevated peaks of amino acids, lactate, acetate and pyruvate.[1] CT scan is initial modality with MRI Brain with contrast is gold standard imaging Modality for diagnosis. MRI is more sensitive to detect extent of lesion and number of lesions as well as other complications like meningitis or encephalitis. Final Diagnosis is confirmed after tissue biopsy on Microbiological analysis only showing sulfur granules with branching filamentous organisms. Management includes conventional Antibiotics such as penicillins, erythromycins, doxycyclines. Surgical Debridement is necessary in case of brain abscess for symptomatic improvement and to reduce Intracranial tension. Recurrence rate after complete antibiotics course and surgical debridement is very low with good prognosis. [2] In our case, patient was put on intravenous antibiotics such as ampicillin and tetracycline for 5 days after surgical excision of lesion. symptomatic improvement has been observed after 5 days of antibiotics course.

'Written informed patient consent for publication has been obtained.'

Differential Diagnosis List: Left high Parietal Actinomyces Abscess, Tubercular Abscess, Metastasis, Primary neoplastic lesion.

Final Diagnosis: Left high Parietal Actinomyces Abscess

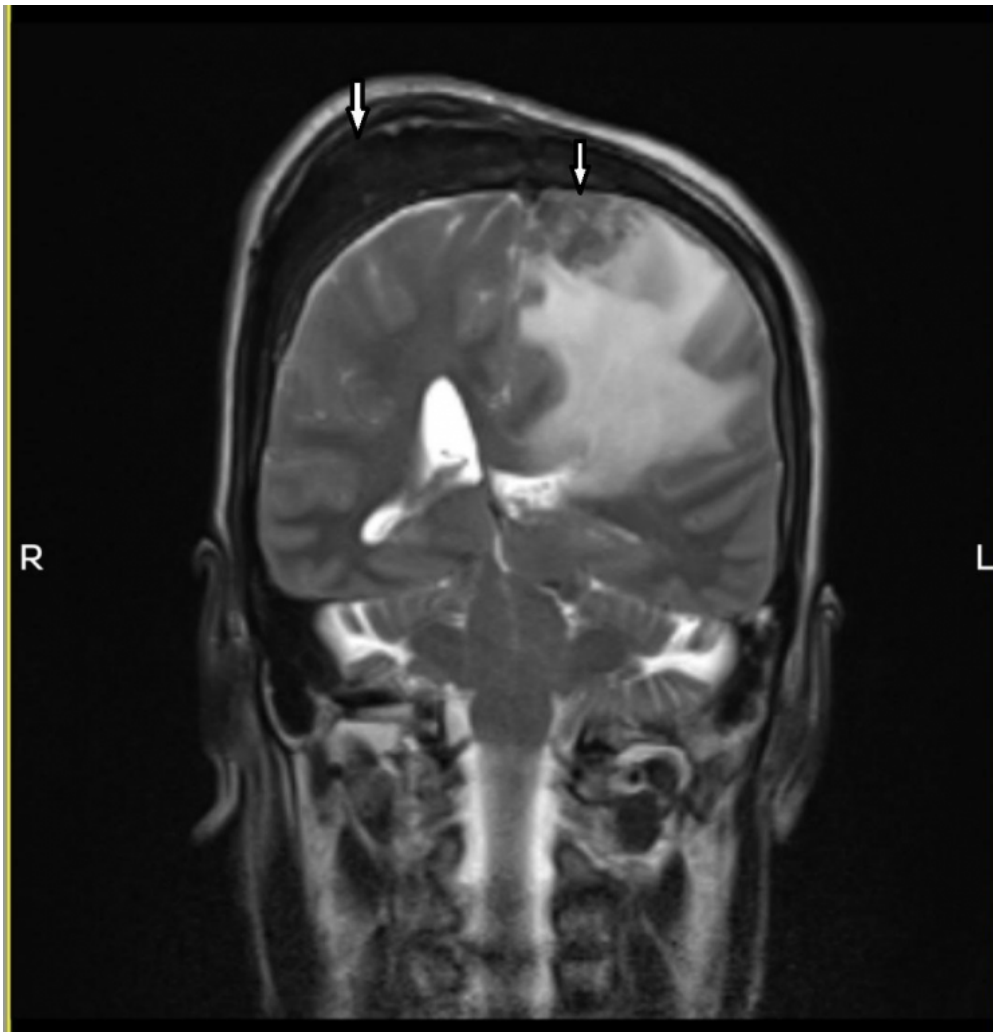
References:

Hyung-Yong Ham, Shin Jung, Tae-Young Jung and Suk-Hee Heo. (2011) Cerebral Actinomyces : Unusual Clinical and Radiological Findings of an Abscess. NCBI , <https://dx.doi.org/10.3340%2Fjkns.2011.50.2.147> 50(2): 147–150. (PMID: [22053238](#))

Laia Jimena Vazquez Guillamet,a,? Maricar F. Malinis,b and Jaimie P. Meyerc (2017) Emerging role of Actinomyces meyeri in brain abscesses: A case report and literature review. NCBI, 10.1016/j.idcr.2017.07.007 10: 26–29. (PMID: [28831384](#))

Figure 1

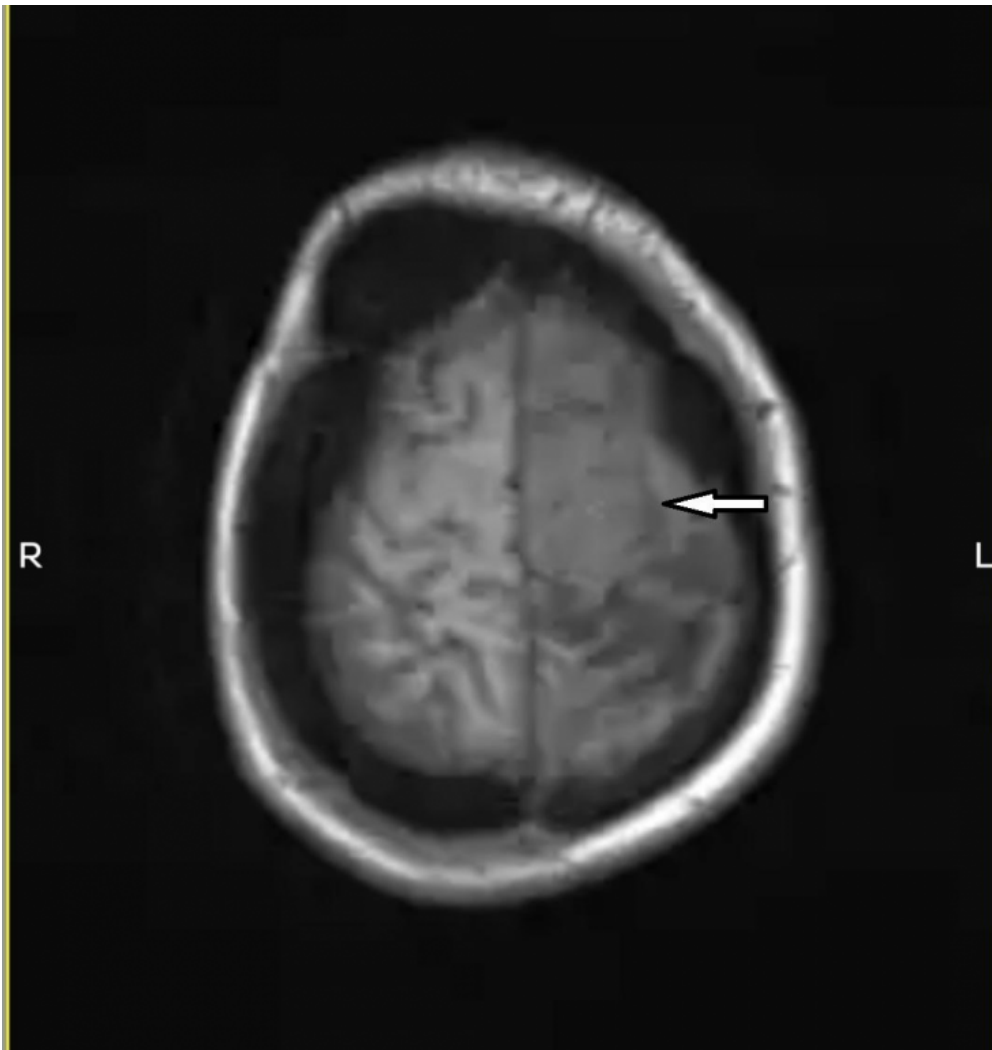
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Description: Coronal T2W image shows hypointense left parietal parafalcine lesion. Incidentally noted right parietal bone fibrous Dysplasia. **Origin:** Shalby Hospital, Ahmedabad, India.

Figure 2

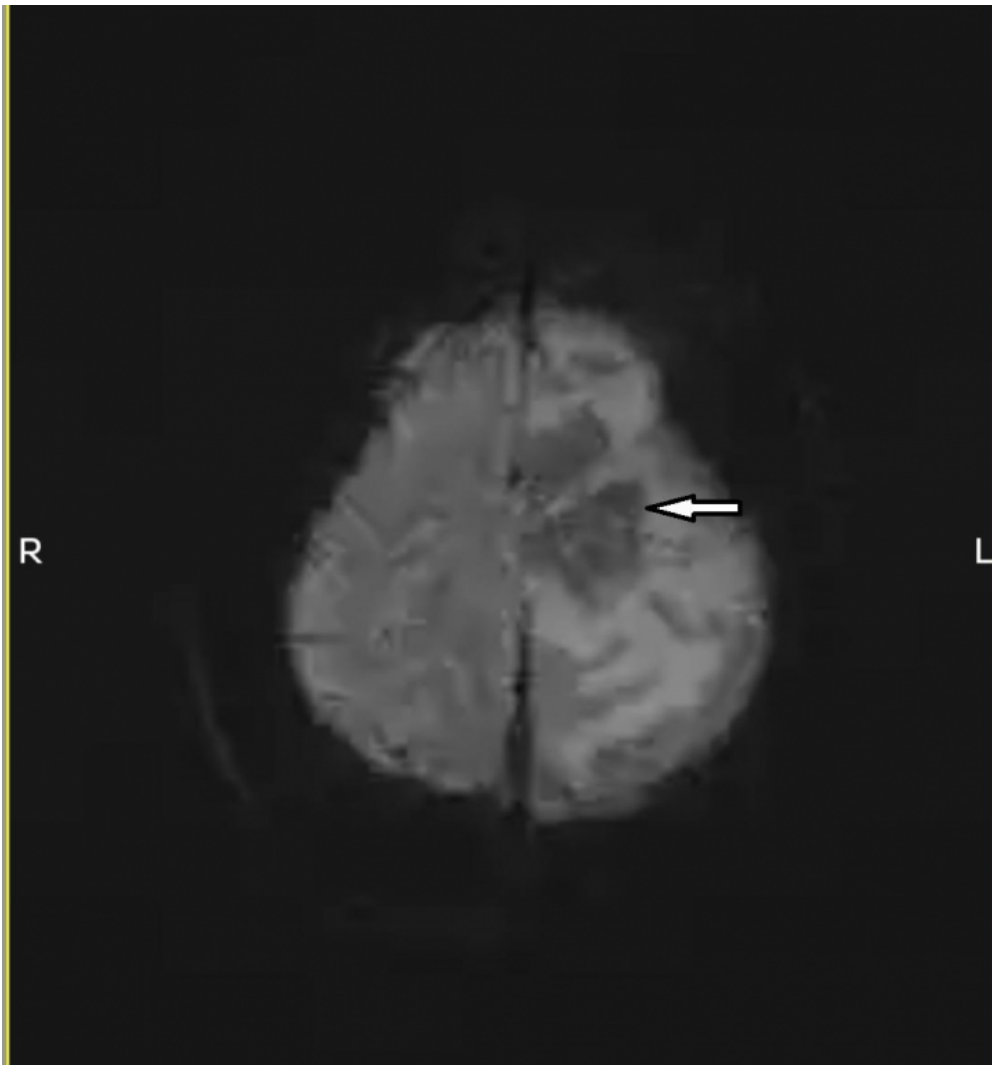
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Description: Axial T1W Image shows Lesion is Isointense with brain parenchyma with surrounding hypointense edema. **Origin:** Shalby Hospital, Ahmedabad, India.

Figure 3

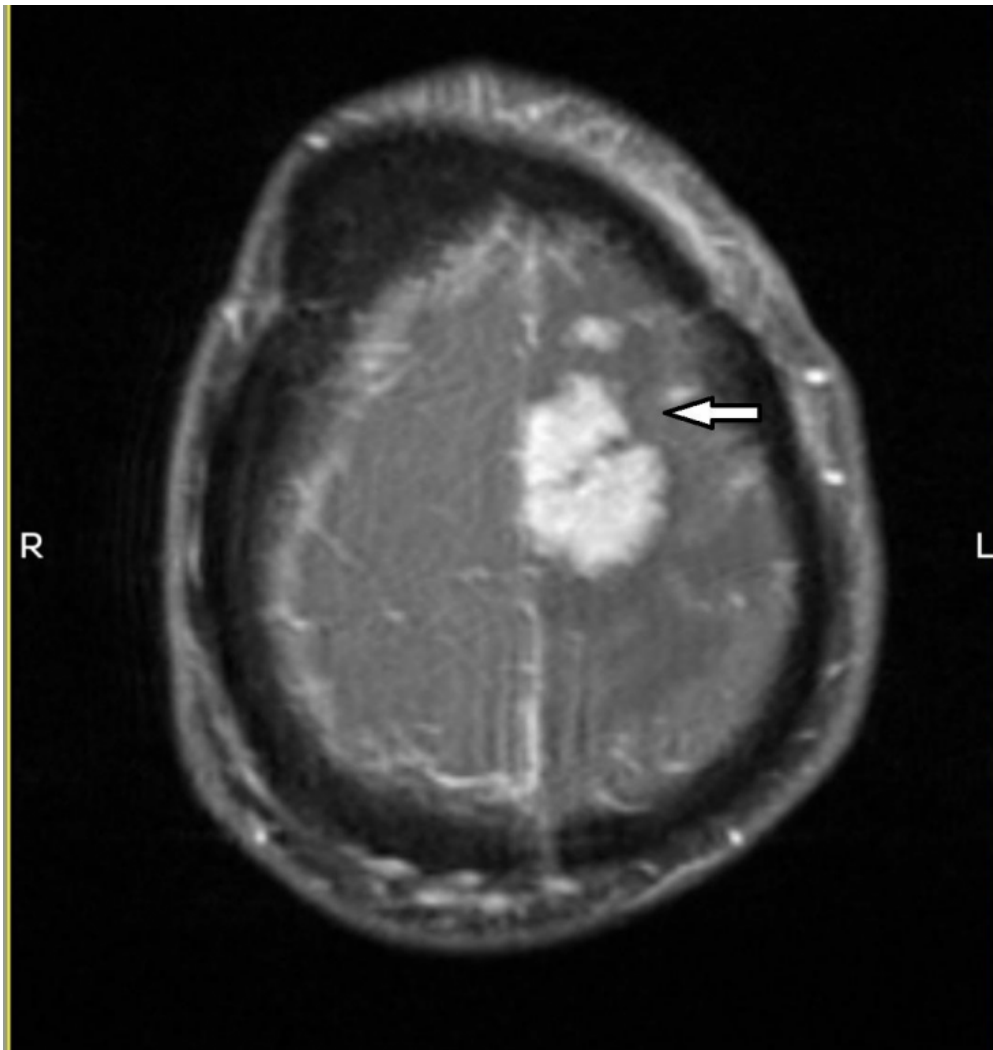
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Description: Axial DWI Image shows no any intralesional restricted diffusion. **Origin:** Shalby Hospital, Ahmedabad, India.

Figure 4

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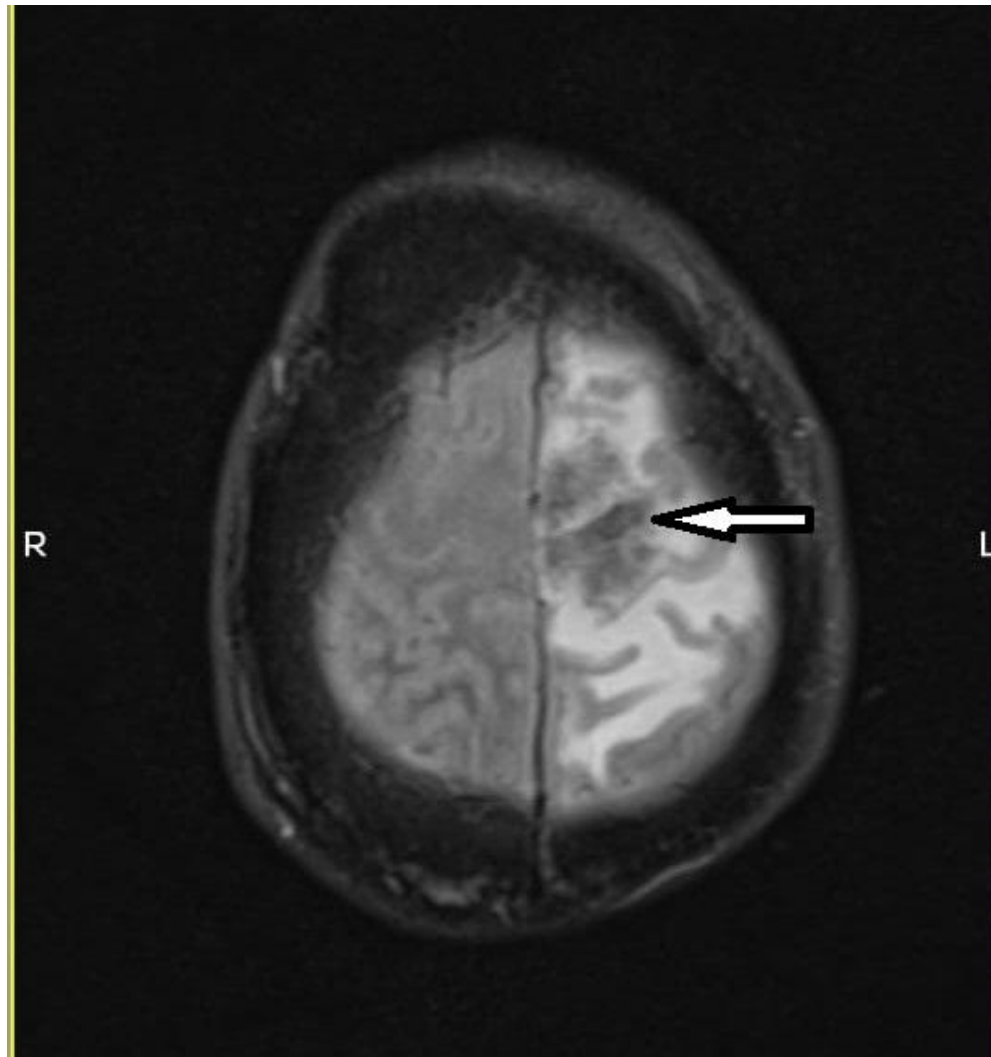


Description: Axial Post-contrast T1W image shows homogeneous avid intralesional enhancement.

Origin: Shalby hospital, Ahmedabad, India.

Figure 5

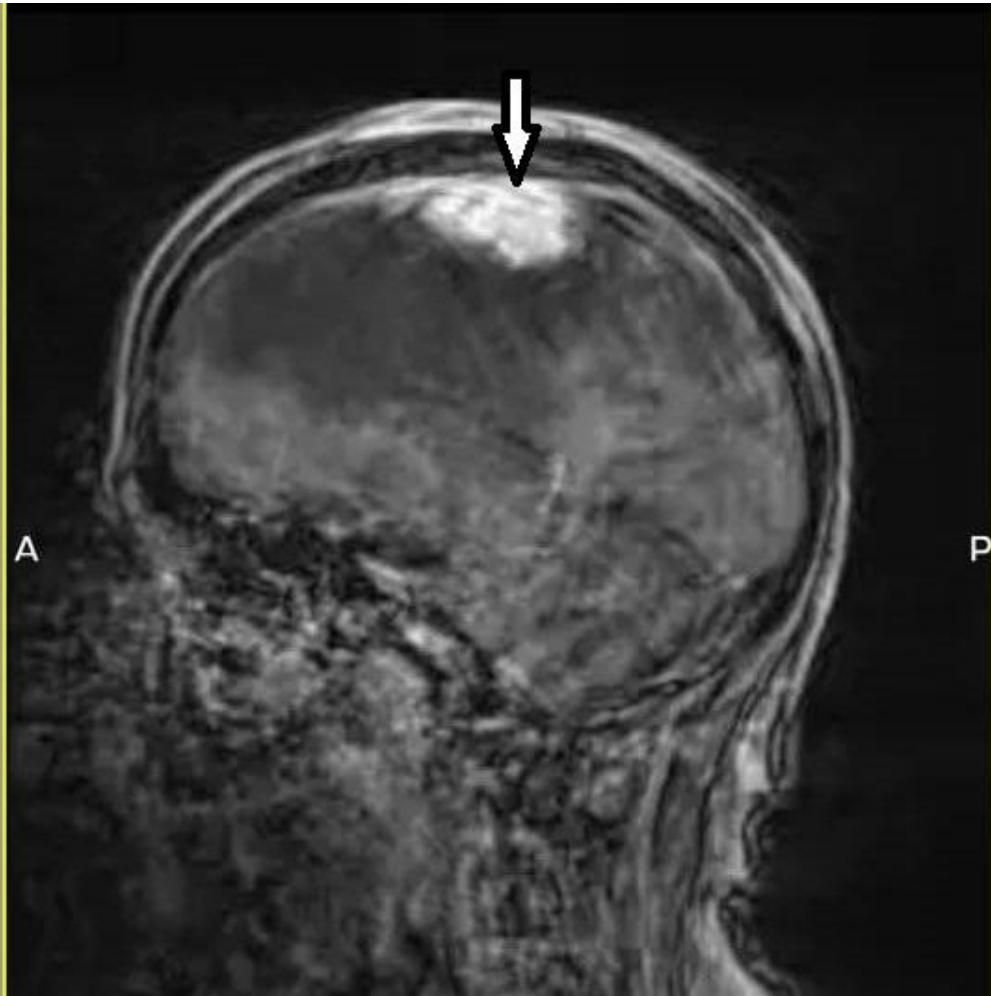
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Description: Axial FLAIR Image shows irregular hypointense solid lesion in left high parietal region surrounded by hyperintense edema. **Origin:** Shalby hospital, Ahmedabad, India.

Figure 6

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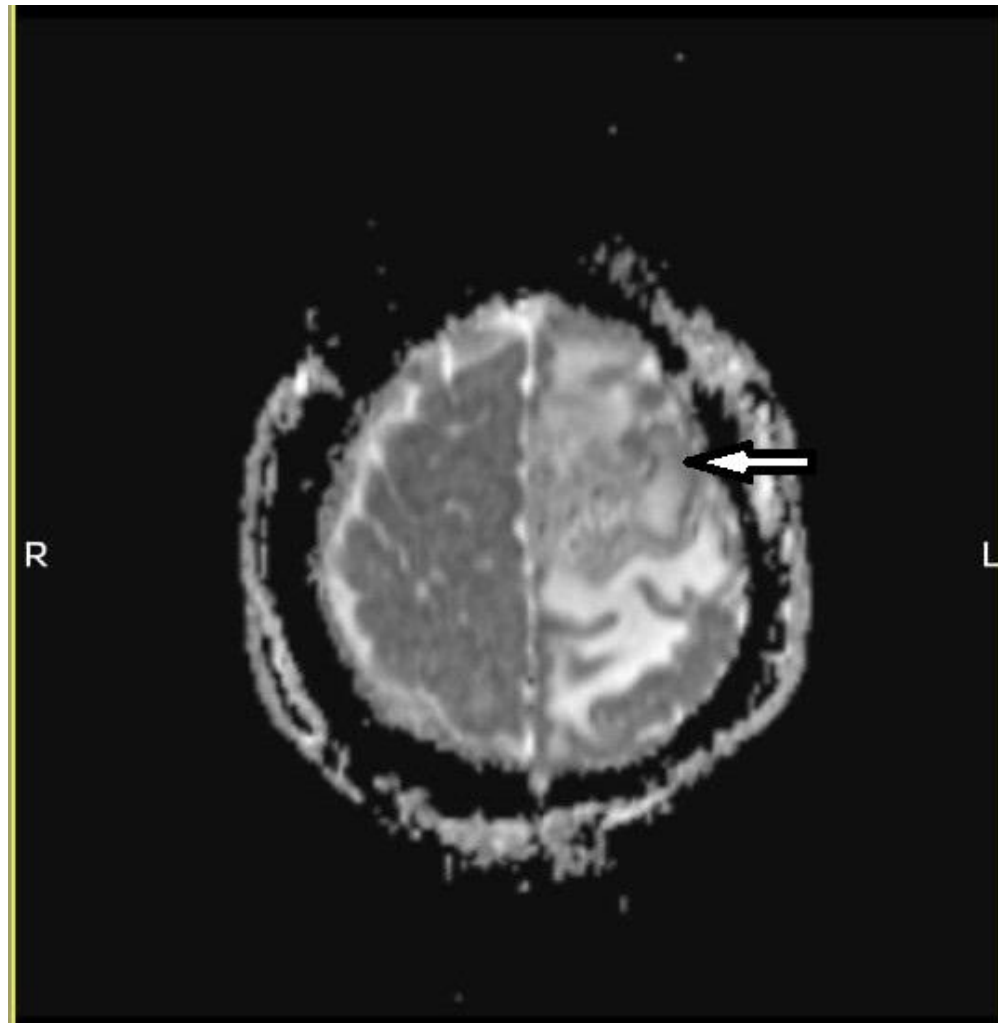


Description: Post contrast Sagittal T1W image shows homogeneous intralesional enhancement.

Origin: Shalby Hospital, Ahmedabad, India.

Figure 7

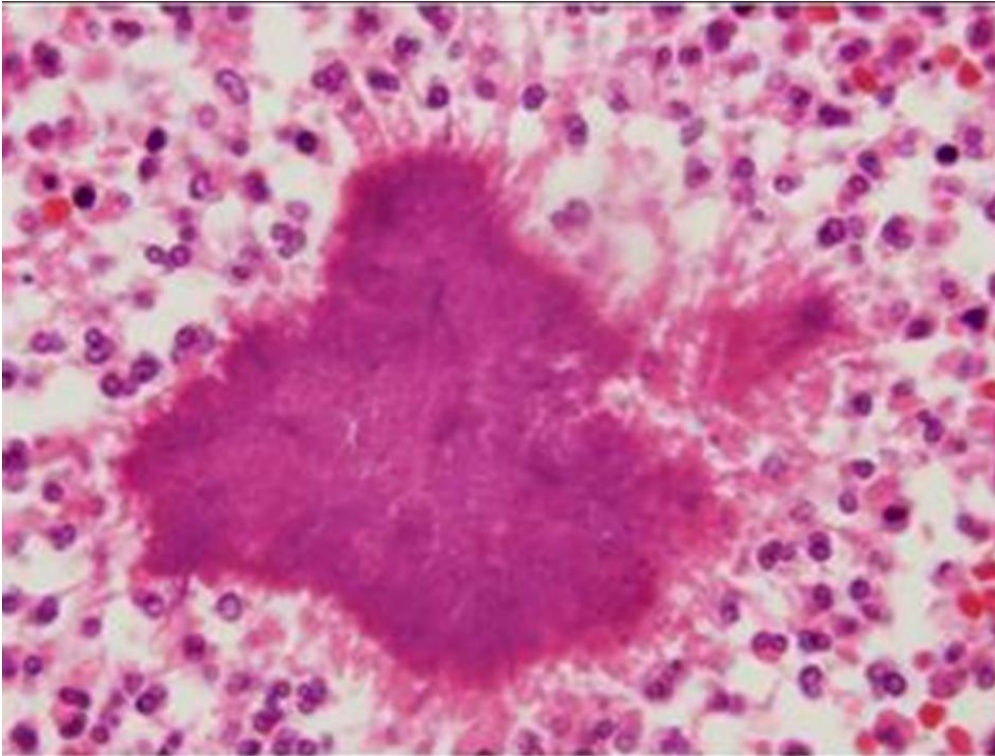
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Description: Corresponding Axial ADC image shows no intralesional restricted diffusion. **Origin:** Shalby hospital, Ahmedabad, India.

Figure 8

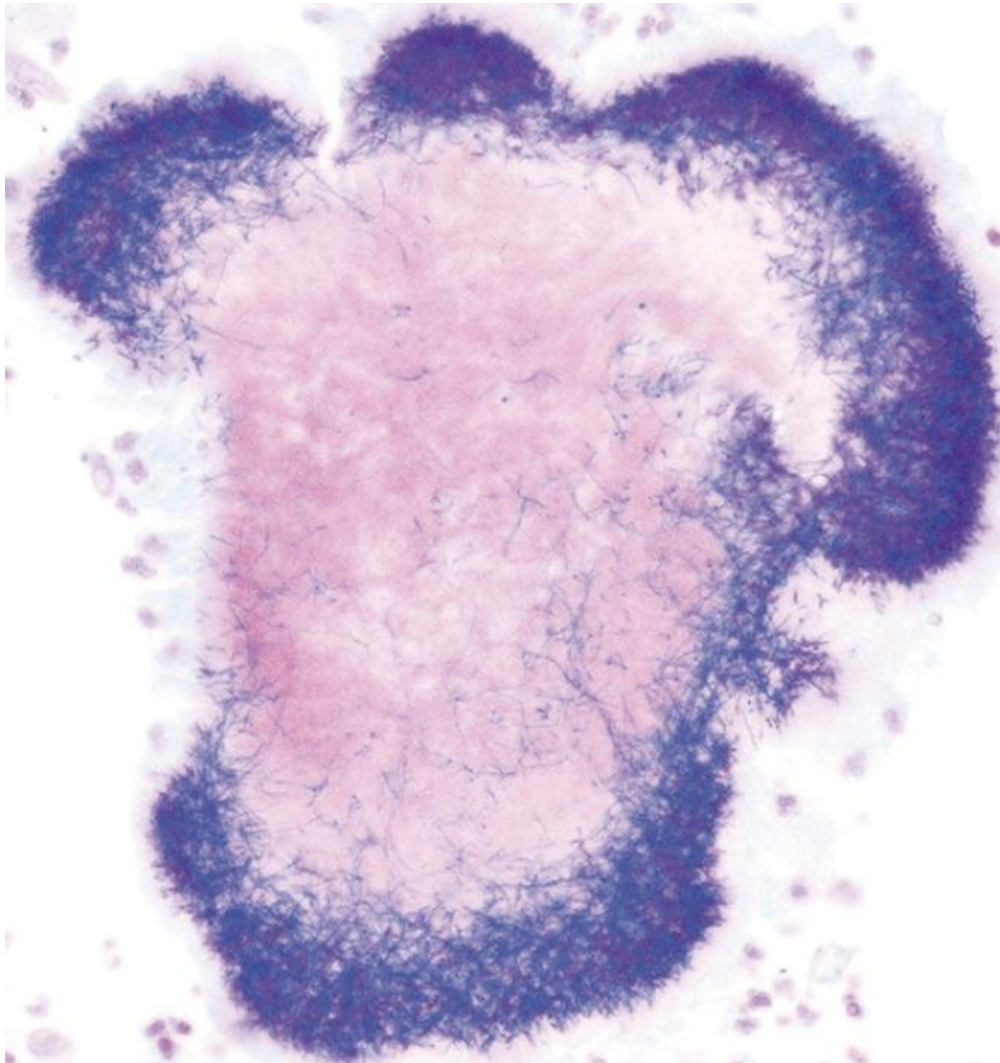
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Description: Histopathology results show Colony of actinomyces (in centre) and mixed inflammatory response at the periphery which include Histiocytes, Lymphocytes, Plasmocytes, Eosinophils and Neutrophils. **Origin:** Shalby Hospital, Ahmedabad, India.

Figure 9

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Description: Gram-positive staining of an *Actinomyces* colony. **Origin:** Shalby Hospital, Ahmedabad, India.