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‘Bunch of Grapes’ at the Occipital Lobe with 3.8ppm Singlet Peak on MRS: A Case of Tuberculoma

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Abstract
Intracranial tuberculomas can cause a variety of symptoms which may include headache, vomiting, hemiparesis and seizures. These lesions are often misdiagnosed as neoplasms and radiographic findings are still non-specific[2]. We report a case of a 28 year old male presenting at the emergency room with blurred vision on both eyes with a 3 year history of recurrent seizures described as having sudden bright flashes of light on the right eye which was then associated with twitching of the right eyelid followed by stiffening of the right upper extremity, head veering to the right with associated loss of consciousness. Initial contrast MRI revealed multiple rim-enhancing lesions at the left occipital area with 3.8ppm singlet peak on MRS. This case highlights the need for high index of clinical suspicion for intracranial tuberculoma in an endemic area with an uncommon radiologic finding seen in contrast MRI.

Keywords: Bunch of Grapes, Tuberculoma, Occipital Lobe, 3.8ppm Singlet Peak

1. Introduction

Tuberculosis remains one of the most lethal disease worldwide. It is a known disease of the respiratory tract which may disseminate to extrapulmonary areas representing about 5-15% of tuberculosis cases[2]. Intracranial tuberculomas are single or multiple central nervous system lesions which may result from hematogenous spread of tuberculous infection[4]. It is considered rare manifestation of mycobacterium tuberculosis as seen in 1% of the TB patients and are commonly located in the frontal and parietal lobes in adults and infratentorially located in children[5]. Clinical manifestation includes headache, seizures and papilledema. On imaging, there are no radiographic findings specific for tuberculoma. However, these present usually as round masses, occurring as a single or multiple lesions, with irregular borders which demonstrates ring enhancement on contrast imaging studies. Tuberculomas may also present as a solid lesion signifying caseation. The ‘target sign’, described as ring enhancing lesion with central nidus of calcification, was also a known radiographic finding for tuberculomas[8].

2. Case Report

This is a case of a 28 year old male, Filipino, right handed who was born and raised in Quezon City. He had no comorbidities with no history of trauma or surgery and denies history of sexually transmitted infection. He had 1 male sexual partner, unprotected, in which he was on the receptive end and 2 female sexual partners, unprotected. He is a 7 pack year smoker, occasional alcoholic beverage drinker with 1 year history of marijuana use.

The patient presented with a 3 year history of seizure episodes characterized as twitching of the right eyelid followed by stiffening of the right upper extremity with associated head veering to the right and upward rolling of eyeballs for approximately 5 minutes with loss of consciousness. This was also accompanied by headache characterized as heaviness, located in midline, 8-9/10 on pain analogue scale (PAS), non-radiating, aggravated by straining and relieved by rest. Upon consultation, the vital signs, general physical examination and review of systems were unremarkable. On neurologic examination, the patient was seen awake, oriented to person and place and was able to follow commands. He was able to identify test substance on both nostrils, with poor visual acuity, 20/50 on the right eye and light perception on the left eye. Pupils are isocoric approximately 3-4mm briskly reactive to light on both eyes. On fundoscopy, there is papilledema on both eyes. Other cranial nerve findings were unremarkable. There are no sensorimotor deficits, no meningeal signs and long tract signs noted. Patient is normoreflexive.

The patient's laboratory examination results specifically complete blood count, electrolytes and coagulation studies were normal. Other ancillaries such as random blood sugar and creatinine were also normal. On chest Xray, there was noted nodular opacities in the bilateral upper lobes and right parahilar region which may represent inflammatory process and chest CT scan was suggested. On chest CT scan, it revealed multiple pulmonary nodules on the right upper and middle lobes and left upper lobe, to consider inflammatory or infectious process. Erythrocyte sedimentation rate and c-reactive protein both showed elevated results at 52 and 192mg/dl respectively. Toxoplasma panel, sputum AFB as well as TB PCR reveled negative results.

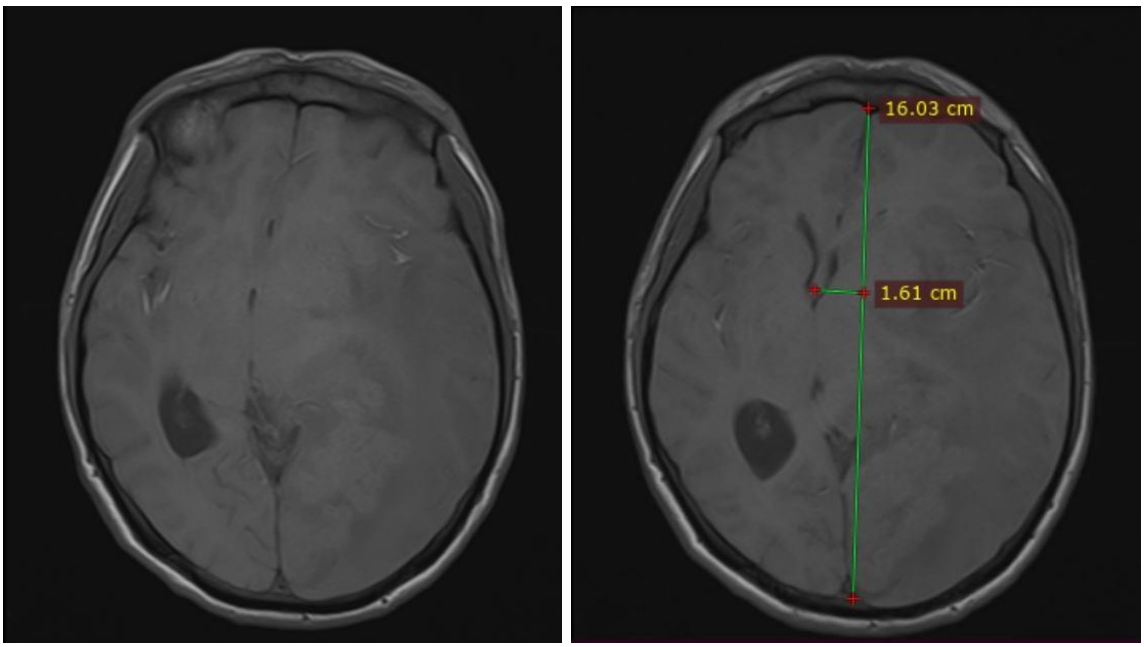

Figure 1 shows the cranial MRI T1WI showing isointense lesion at the left occipital area with surrounding iso to hypointensity which may represent perilesional edema. Midline shift of 1.5cm is also noted.

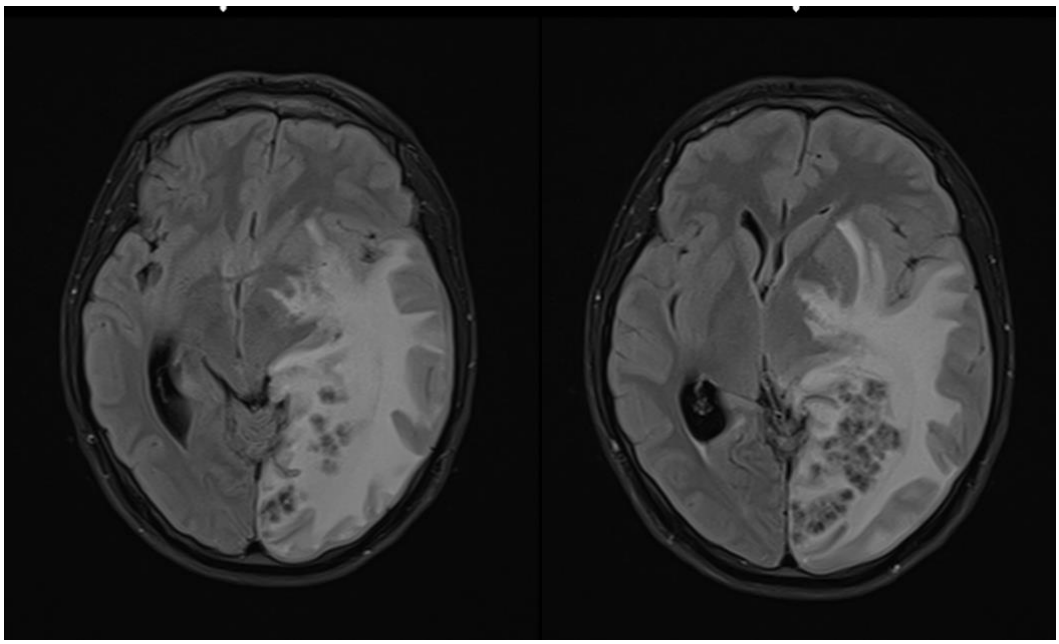

Figure 2 shows the T2 FLAIR with multiple circular hyperintense lesions with central hypointensities at the left occipital area with surrounding perilesional edema.

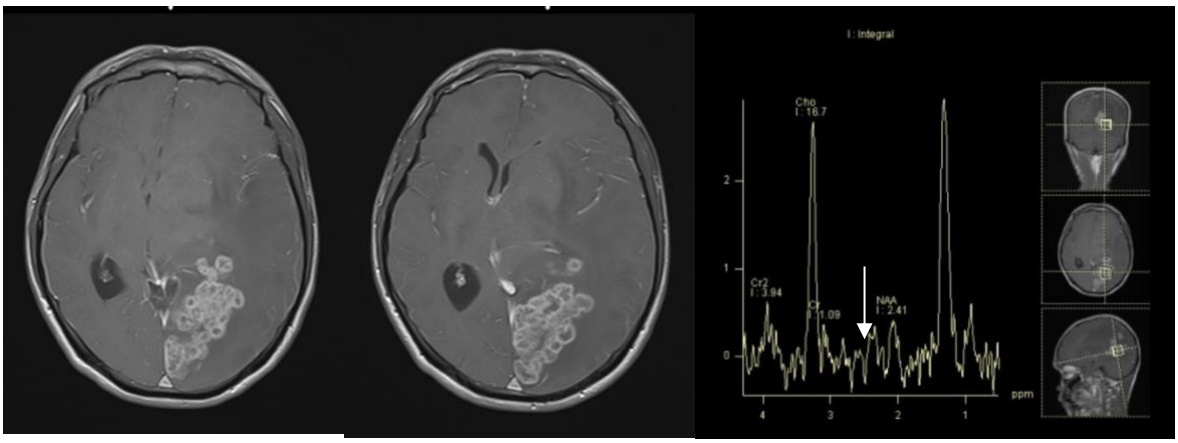

Figure 3 shows T1WI post gadolinium, with multiple rim enhancing lesions which may be described as “bunch of grapes” at left occipital area. The corresponding magnetic resonance spectroscopy (MRS) finding showing that there is high choline peak and low NAA peak which may signify a neoplastic process rather than infection. However, there have been studies showing similar MRS findings with biopsy proven tuberculoma showing elevated choline peak and low NAA peak with singlet peak at 3.8ppm (arrow). This finding have been consistent with other studies to be present in tuberculomas.

Upon examination of the Ophthalmology service, the patient had a visual acuity of 20/20 on the right eye and light perception on the left eye. Ishihara test revealed scores of 3/15 on the right eye and cannot be fully assessed on the left eye. His fundoscopy revealed (+) red orange reflex, clear media with 2-3 A-V ratio with indistinct disc borders (grade 2) on both eyes. On perimetry, there was noted junctional scotoma on the right eye. Optical coherence tomography showed posterior vitreous detachment on both eyes.

Electroencephalogram was also done for the patient which showed abnormal interictal EEG due to the presence of: a. symmetric background with mild slowing on the left, indicative of a mild left hemispheric dysfunction of non-specific etiology; b. focal slowing over the left temporal region suggestive of additional focal pathology over

the said area; c. frequent left temporooccipital epileptiform discharges. There was no clinical seizure or paroxysmal events during the recording.

During this time, patient was started on HRZE tablet, 3 tablets once daily, Dexamethasone 4mg TIV every 6 hours, Omeprazole 40mg TIV once daily, Paracetamol 600mg TIV every 6 hours if with headache, Vitamin B complex tablet once daily and Levetiracetam 500mg/tab, 1 tablet twice daily. After 2 weeks of treatment, patient had noted improvement on his visual field from light perception to counting fingers on the left eye. The patient was then discharged after 4 weeks. Before discharge, patient had undergone cranial MRI with contrast as shown in the figures below.

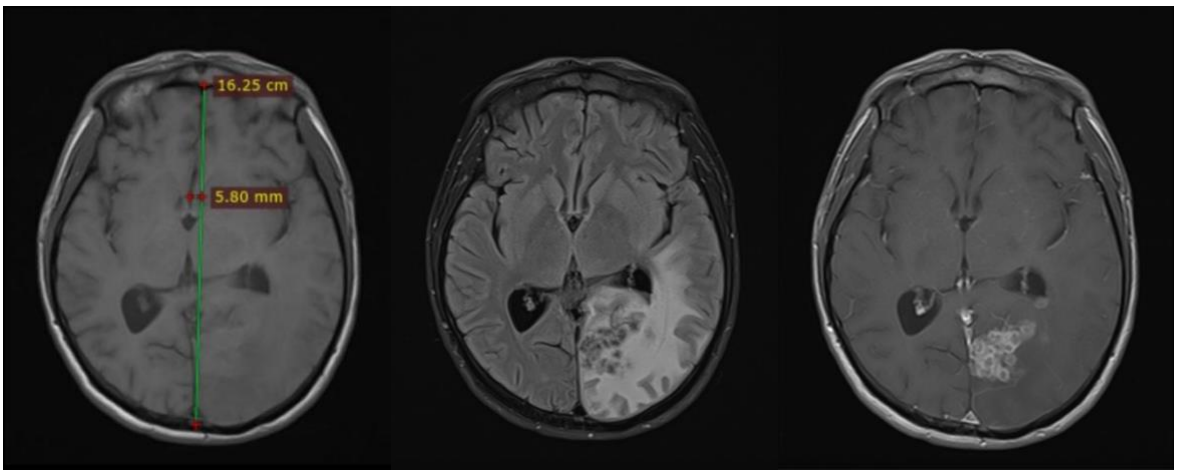

Figure 4, 5 and 6 showed T1WI, T2 FLAIR and TI with contrast sequences done 1 month after initiation of treatment which showed interval decrease in the size of contrast ring enhancing lesions with significant decrease in surrounding edema. There was also decrease in midline shift from 1.5cm to 0.58cm.

He was advised for repeat contrast MRI with contrast at 3 months and 6 months after initiation of treatment for monitoring. He was able to follow-up at the out-patient department with gradual improvement in his visual acuity in his left eye, from counting fingers to a visual acuity of 20/200 after 3 months of treatment initiation. However, due to financial constraints, he was not able to undergo repeat imaging.

3. Discussion

Our patient presented with isointense lesion on left occipital area on T1WI, multiple circular hyperintense lesion with central hypointensities on T2 FLAIR and multiple rim enhancing lesions on T1WI post gadolinium appearing as “bunch of grapes” at the same area.

There have been rare cases of tuberculomas presenting as “bunch of grapes” especially on the occipital area. To our knowledge, there was one article about a 12 year old presenting with 1 month history of fever and 2 episodes of left focal seizures. On physical examination, the child had spastic hemiparesis on the left side of the body with chest auscultation of bilateral crepitations. The patient’s cranial MRI revealed multiple ring enhancing lesions in the right high parietal area with perilesional edema demonstrating a “bunch of grapes” appearance. One case report of a 36 year old female with a history of headache, abnormal behavior described as poor work performance, lack of inhibition in a social gathering, as well as gait disturbance. She also presented with urinary incontinence as well as frontal release signs including grasp, rooting and palmo-mental reflexes. Her cranial MRI revealed multiple contrast enhancing lesions presenting as a “bunch of grapes” located at the falx cerebri with significant surrounding vasogenic edema. She was treated with anti-tubercular medications and responded well with treatment. This pattern in a cranial contrast imaging had been related to intracranial granulomatous infection particularly tuberculoma. The ring enhancement of these lesions represents a conglomeration of contrast-enhancing layers of

predominantly lymphocytes and collagenous cells surrounding a granulomatous foci[5]. The 'target sign', which was once thought as a specific feature of tuberculoma, is a ring enhancing lesion with a central nidus of calcification is another presentation of tuberculomas[2]. Ring enhancement in contrast studies may be seen in various inflammatory diseases such as neurocysticercosis, neurotoxoplasmosis, abcesses and in neoplastic lesions such as metastasis and a high index of suspicion is necessary in diagnosing tuberculoma in these patients.

In the study of Morales, et al, peaks representing lipids as well as peak at 3.8ppm were demonstrated in 77% (10/13) and 69% (9/13) cases of tuberculomas respectively. The cases that were included in the study were 10 patients which responded to anti-mycobacterial therapy and 3 of the cases were biopsy proven. These were then compared with the malignant lesions in which these peaks were seen in 79% (15/19) and 10% (two of 19) cases. With these findings, there is a statistically significant difference in comparison of tuberculoma and malignant lesions correlated with 3.8ppm peak (p <0.001). In the study of Ranjan, et al in 2020, three cases of tuberculoma, all responsive to anti-mycobacterial treatment demonstrated singlet peak in 3.8ppm in MRS.

4. Conclusion

We present an uncommon case of tuberculoma in the occipital lobe presenting as a "bunch of grapes" on contrast imaging. Though in an endemic area, this case highlights the need for a high index of suspicion for patient presenting with a chronic progressive blurring of vision with repetitive seizures and AFB staining or culture of CNS tissue was not done. As seen in other cases, the radiographic characteristics of a tuberculoma can vary which may demonstrate ring enhancement, a solid center, or a nonspecific feature of "target sign". This case adds to the increasing number of reports of tuberculoma presenting as a "bunch of grapes" on imaging when other diagnostics are inconclusive, not available or may not be done. With this, it may be hypothesized as a rare but specific feature of intracranial tuberculoma and further case documentation is warranted. Moreover, recent studies showed that aside from the lipid peak seen in the MRS of cases of tuberculoma, a singlet peak at 3.8ppm in MRS may be considered a supportive feature in the diagnosis CNS tuberculomas.

Ethical Consideration

Patient form was secured before submission of manuscript. Secured data collection will be implemented during the course of this study and will involve only the researcher and the staff of the Medical Records in charge of the patient's records. Only necessary information such as identification of patient, date of birth, diagnosis, ICD-10 codes used, prenatal data, family history and treatment outcome will be collected and no other revealing personal information will be recorded upon throughout the study. A non-disclosure agreement and redacted data only will be recorded. The protocol was submitted to the Institutional Review Board for approval.

Data Plan

All data obtained from this study will be stored for 1 year in a secured envelope, in case the investigators need to review the source data should there be questions about the results. These data will be used solely for the study and only the principal investigators can access these data. We will destroy the data after the said duration. Data collection will commence after approval of the IRB and will last for the whole duration of the study.

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Declaration of Competing Interest

None declared.

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