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Rare Case of Abnormal Signal in Corpus Callosum

Dr. Grusha Kasham[1], Dr. Sarfaraz Shaikh[2], Dr. Madan Manmohan[3]

[1]Junior Resident Department of Radiodiagnosis. Dr DY Patil Medical College, NAVI Mumbai

[2]Assistant Professor, Department of Radiodiagnosis, M. D (Radio- Diagnosis) Dr DY Patil Medical College, NAVI Mumbai

[3]Professor & H. O. D Department of Radiodiagnosis, M. D (Radio- Diagnosis) DR DY Patil Medical College, Navi Mumbai

Abstract: ***Transient splenial lesion of the corpus callosum can be observed in various diseases such as cancer, drug use, metabolic disorders, and cerebrovascular disorders, as well as in patients with infectious diseases. During the coronavirus disease 2019 (COVID - 19) pandemic, there were increasing reports of these lesions being detected on brain imaging tests performed in patients with neurological symptoms. On brain magnetic resonance imaging, findings suggestive of cytotoxic edema are observed in the splenium; these are known to disappear with improvement of clinical symptoms. Cytokinopathy caused by infection increases the permeability of the blood–brain barrier and activates the glial cells of the brain to induce cytotoxic edema. Most patients have a good prognosis. The causes, mechanism, diagnosis, treatment and prognosis of transient splenial lesions of the corpus callosum will be summarized in this review.***

Keywords: Transient splenial lesion of the corpus callosum, cytotoxic edema, infection

1. Introduction

The corpus callosum is a thick bundle of nerve fibers connecting both the cerebral hemispheres. The splenium is located in the posterior part of the corpus callosum and contains crossing axonal fibers from the occipito - parietal and temporal cortex. Transient lesions of the splenium are reported in a variety of cytotoxic lesions of the corpus callosum (CLOCC), including mild encephalitis/ encephalopathy with a reversible isolated SCC lesion (Middle East respiratory syndrome [MERS]), and reversible splenial lesion syndrome (RESLES). Lesions in the splenium of the corpus callosum are associated with various diseases, including infection, metabolic disturbance, drug use, epilepsy, malignancies, cerebrovascular disease, and trauma. In this article, we review the transient splenial lesions.

Corpus Callosum: Anatomy and Development Anatomy:
The corpus callosum is a fiber connecting the left and right cerebral hemispheres and is composed of four parts: the rostrum, genu, body, and splenium

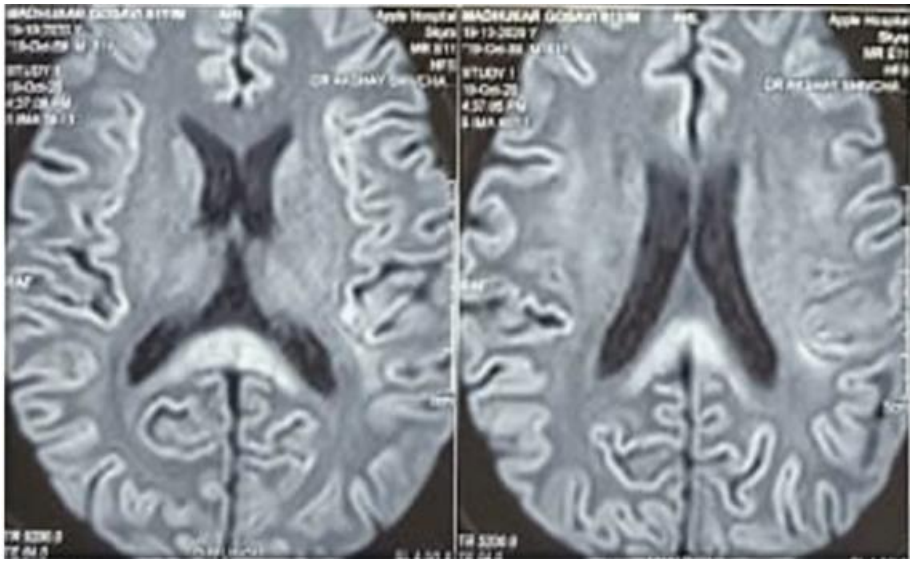
Transient splenial lesions are observed in various diseases and conditions and can be classified as follows: infectious disease, drug and toxic substance - related, metabolic disturbance, functional brain disease, malignancy, vascular disease, trauma, and miscellaneous

2. Case Report

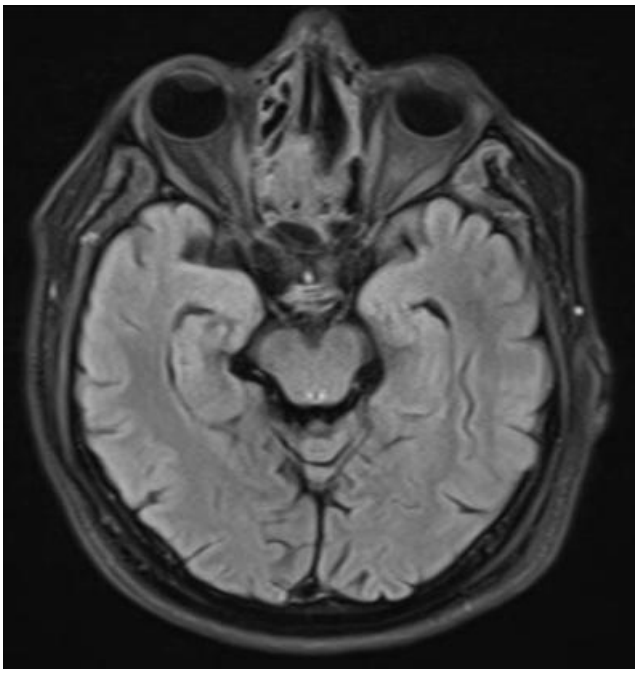
A 61- year old male patient came to our hospital which chief complaints of giddiness and disorientation. Patient also had some occasional nasal discomfort. The patient was then referred to the department of radiology for MRI brain.

With informed consent patient underwent Plain MRI brain scan.

MRI Brain Findings



Restricted diffusion involving the splenium of corpus callosum



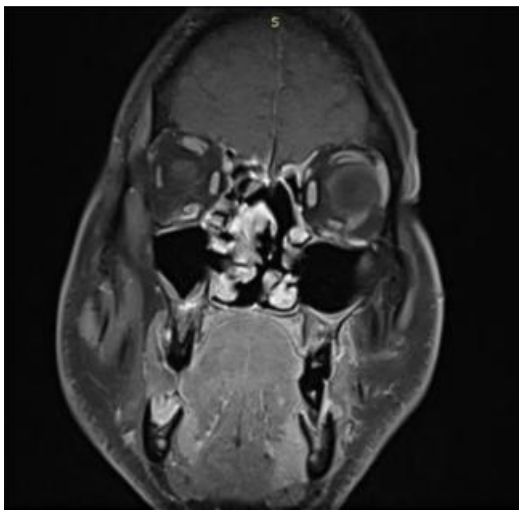
Area of altered signal intensity was noted involving the bilateral posterior ethmoid cells

Report:

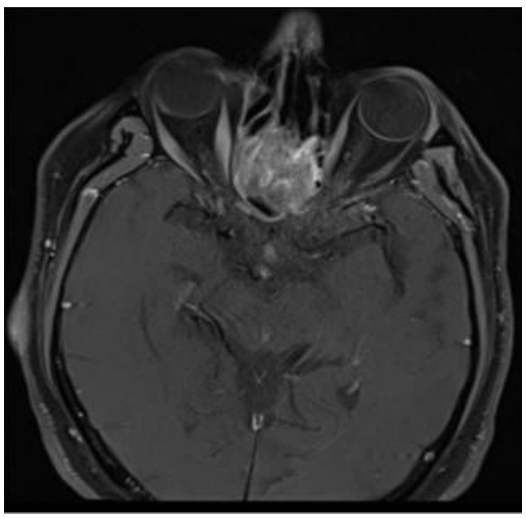
Provisional diagnosis –
Cytotoxic Lesions of the Corpus Callosum (CLOCC). On detailed clinical evaluation

- History along with giddiness and disorientation patient also had complaints of nasal congestion.
- One episode of epistaxis 1 month back.
- Further past history revealed patient was a histopathology proven case of naso - pharyngeal - squamous cell carcinoma.

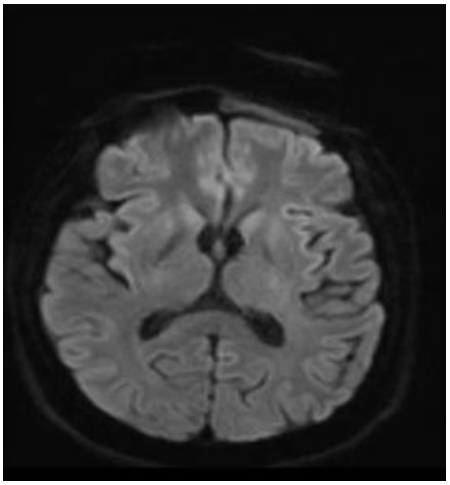
Previous scans were reviewed



Coronal T1 FS PC sequence revealed: Heterogeneously enhancing soft tissue mass lesion predominantly in the right half of the nasal cavity

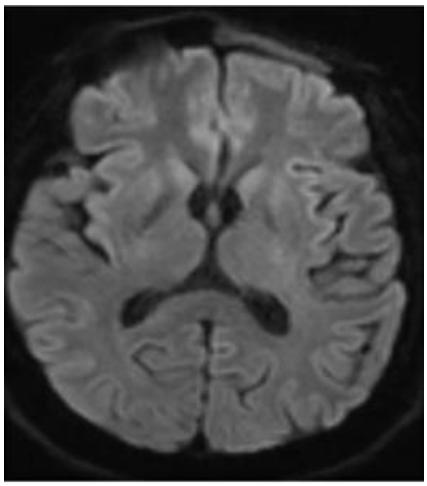


Axial T1 FS PC sequence revealed: heterogeneously enhancing soft tissue lesion extending to the posterior ethmoid sinus

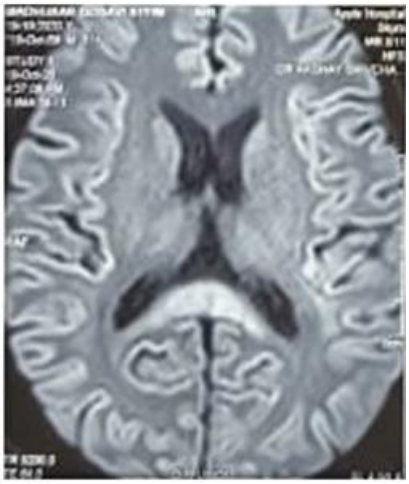


Shows normal morphology and signal intensity of the splenium of the corpus callosum

After the initial diagnosis of naso - pharyngeal - squamous cell carcinoma patient was recently started on chemotherapy with 5 - fluorouracil.

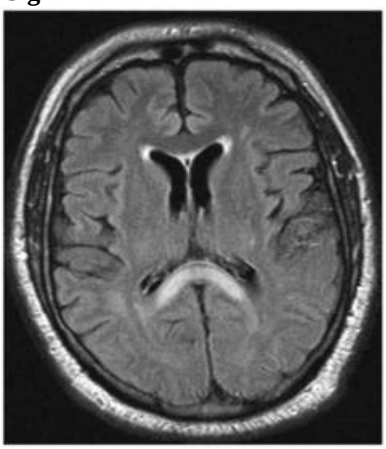


Normal signal intensity of the corpus callosum in the initial scan



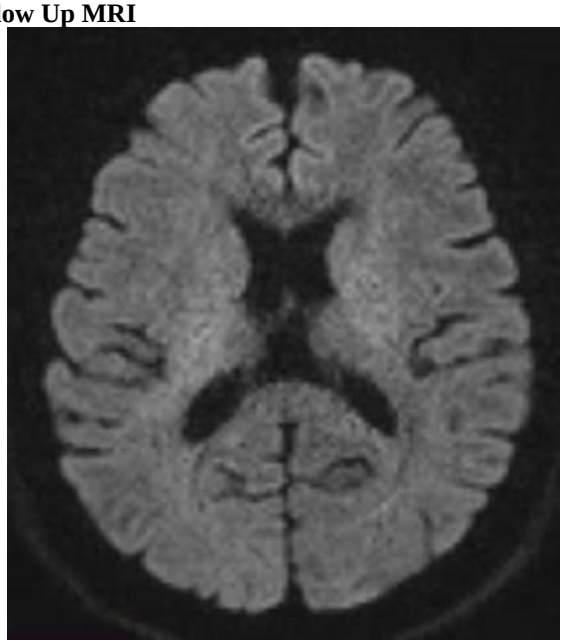
Restricted diffusion involving the corpus callosum after starting 5- Fluorouracil.

Boomerang Sign



And was co - related with increase in Serum Ammonia levels. Findings are most likely suggestive of 5 - Fluorouracil induced encephalopathy.

Follow Up MRI



CLOCC (Cytotoxic Lesions of Corpus Callosum)

A number of causes of CLOCC have been identified, most common includes:

1) Sudden stoppage of anti - epileptic drugs.
2) Infections
3) Metabolic.
4) drugs and toxins
5) CNS malignancy
6) Subarachnoid hemorrhage

3. Treatment

Reported treatment for transient splenial lesions vary. There have been reports of immunotherapy, such as steroids and immunoglobulin, along with supportive care for the underlying disease, or treatment with prophylactic antibiotics and antivirals. However, no differences were observed in clinical recovery and prognosis depending on the treatment method.

4. Conclusion

Knowledge of drug induced neurotoxicity and its features on MRI is crucial. Early diagnosis of 5 - fu induced toxicity is important to provide proper treatment and prevent irreversibility and mortality. Development of viral or bacterial infectious diseases is known to induce cytotoxic edema by increasing the permeability of the blood–brain barrier and activating glial cells after infection, similar to the mechanism underlying cytotoxic edema resulting from causes other than infection.

5. Discussion

Transient splenial lesions have been identified alongside various infections including viral, bacterial, drugs, bacterial. Lesion of the corpus callosum was previously recognized as an imaging finding of encephalitis or encephalopathy, but recently it has been reported that it can occur in various clinical situations. Clinical details are mandatory. Discussion with clinicians helps in narrowing differentials

The prognosis is good in most cases, and brain imaging can be helpful for identifying transient splenial lesions in patients who present with an infectious disease accompanied by neurological abnormalities, and can also help determine treatment and predict the prognosis of patients by differentiating stroke, etc.

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