embryogenesis, ischaemia, infection and trauma. Another school argues for a syringomyelic process involving expansion of the spinal parenchyma secondary to processes such as haemorrhagic necrosis within the cord parenchyma. Neither school of thought can satisfactorily explain why the pathology is isolated to the VT and does not involve other parts of the cord.

Management of CLVT depends on the patient's clinical state. Fenestration of the cyst and excision of a window from the cyst wall to prevent recurrence is an effective surgical technique. Persistent symptomatic recurrences may warrant a cysto-subarachnoid shunt but have poor long-term results. More recently, Takahashi et al. performed percutaneous aspiration of CLVT using real-time MRI with good early results.

4. Conclusions

CLVT is a rare cause of conus medullaris syndrome, with 32 patients reported to date. At present, the gold standard for intervention is open surgery but percutaneous aspiration may well become more common. Due to low prevalence, it would be difficult to compare treatment modalities with a randomised controlled trial.

Appendix A. Supplementary material

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.jocn.2010.04.026.

References


The parahippocampal gyrus as a multimodal association area in psychosis

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ABSTRACT

Temporal lobe lesions may lead to schizophrenia-like psychosis, a phenomenon resembling psychotic disorders such as schizophrenia. We discuss a patient with a temporo-basal low-grade glioma presenting with bimodal hallucinosis (visual and auditory), a symptom set that is rarely described in psychotic disorders associated with morphological correlates. In light of a literature review of patients experiencing similar bimodal psychotic symptoms and electrophysiological data obtained in non-human primates, we suggest the parahippocampal gyrus to be a multimodal association area with bimodal units.
1. Introduction

There is growing interest in the study of brain abnormalities underlying schizophrenia.1–3 Postmortem and MRI studies have demonstrated structural abnormalities in the hippocampus and parahippocampal gyrus (PHG), specifically showing abnormal PHG volume and PHG volume asymmetry.1–3 These findings suggest a role for these regions in the pathogenesis of psychosis and related symptoms.2

Temporal lobe lesions may lead to schizophrenia-like psychosis, a phenomenon resembling psychotic disorders such as schizophrenia.4–6 Clinical symptoms of schizophrenia-like psychosis are similar to those of schizophrenia, with the exception of negative symptoms, namely abulia, autism and affective flattening, which are absent in schizophrenia-like psychosis.7

Studies examining the underlying pathology of, and the brain structures involved in, the clinical presentation of patients with schizophrenia-like psychosis may help to uncover pathophysiological mechanisms of related psychiatric disorders. We discuss a patient with a temporo-basal low-grade glioma presenting with bimodal hallucinosis as an illustrative example.

2. Case report

A 32-year-old, right-handed woman suffered from a right temporo-basal tumor. A stereotactic biopsy was performed in another neurosurgical department leading to a histopathological diagnosis of an oligoastrocytoma World Health Organization (WHO) grade II. Two years after that diagnosis, she began experiencing auditory hallucinations of men and women imposing orders, in addition to visual hallucinations characterized by dead or absent people. Her symptoms were unresponsive to antipsychotic and antiepileptic medication. Three months before admission to our department, a worsening of the psychotic symptoms was paralleled by tumor growth. On admission, she demonstrated incoherent behaviors with visual and auditory hallucinations, as well as short-term memory and naming deficits. The patient was aware of her clinical status. No signs of epileptic seizures or negative symptoms such as abulia, autism or affective flattening were observed. A MRI scan revealed a temporo-basal tumor extending into the right amygdala, PHG and lateral occipitotemporal gyrus with no hippocampal involvement (Fig. 1A). An electroencephalogram revealed the absence of epileptic discharges. The patient’s psychotic symptoms resolved completely following total tumor resection (Fig. 1B).

3. Discussion

Previously, it has been shown that dysfunction of limbic structures and their projections caused by trauma, stroke, epilepsy or brain tumors can lead to psychotic symptoms resembling schizophrenia.5–10 This patient experienced both auditory and visual hallucinations, a finding that is rarely described in psychotic disorders associated with morphological correlates.6,8,9 In light of a literature review of patients experiencing similar bimodal (visual and auditory) hallucinatory psychosis and brain lesions, we suggest the temporo-basal region, specifically PHG, to be the most common morphological substrate (Supplementary Table 1).5–9

Electrophysiological data obtained in nonhuman primates identifies the PHG as a multimodal association area with bimodal units (visual and auditory).11 The PHG can be divided into three distinct areas of cortical inputs that are related to the three major sensory modalities.11 The lateral and intermediate areas of the PHG include units preferentially responsive to visual stimuli, while the medial PHG contains the neurons responsive to auditory, visual or bimodal stimuli.11 Somatosensory responsive neurons are found between the intermediate and lateral areas of the PHG.12 Due to converging inputs of highly processed multimodal information and projections from the hippocampal formation to the various PHG areas, the PHG comprises a unique cortical region for sensory distribution and long-term memory storage throughout the neocortex.11

Using stereoelectroencephalography, Vignal et al. found that stimulation applied to the amygdala, hippocampus or PHG evoked feelings of familiarity (deja vu), complex visual hallucinations and “feelings of strangeness”. In addition, stimulation to these areas resulted in retrieval of memories of personal experiences, emphasizing the role of the amygdala and hippocampus in memory recall.12 A non-convulsive status epilepticus can induce symptoms that resemble those of psychosis.10 Both partial complex and simple partial status epilepticus may produce behavioral, cognitive, affective and psychic symptoms including hallucinations.10 Therefore, differentiating the dreamy state of epileptic patients from hallucinatory psychosis can be somewhat problematic. However, the absence of concomitant epileptic seizures, the continuous rather than paroxysmal clinical course, and the complexity of the hallucinations experienced together by this patient suggest a diagnosis of psychosis.

Visual and auditory hallucinatory psychoses comprise a rare clinical presentation of temporo-basal tumors. Mesial temporal lobe structures, specifically the PHG and the amygdala, have been shown through electrophysiological experiments to be areas involved in multimodal association and memory recall in humans and in nonhuman primates. Clinicians should be aware of these findings in order to avoid misdiagnosis of psychotic disorders and the delay of proper management.

Appendix A. Supplementary material

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.jocn.2010.03.052.

References


Fig. 1. (A) Coronal T2-weighted MRI scan showing a right temporo-basal tumor extending into the amygdala, the parahippocampal gyrus and lateral occipitotemporal gyrus. (B) Immediate postoperative coronal T2-weighted MRI scan showing total tumor resection.


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