Temporal Lobe Lesions

This PatientPlus article is written for healthcare professionals so the language may be more technical than the condition leaflets. You may find the abbreviations list helpful.

Disturbance in function of the temporal lobe may be caused by ischaemic or haemorrhagic damage, as with a cerebrovascular event (CVE). Disturbance of temporal lobe function may also occur with space-occupying lesions, trauma and may be associated with epilepsy. The temporal lobe is a complex part of the brain dealing with many 'higher functions' and so behaviour and intellect may be affected rather than gross motor skills.

There is a separate article Temporal Lobe Epilepsy elsewhere. This article will concentrate on neurological problems caused by temporal lobe deficits.

Aetiology

- The most common cause of temporal lobe lesions is a cerebrovascular event (CVE).
- Space-occupying lesions may be primary tumours, benign (such as meningioma) or malignant. They may also be secondary tumours or metastatic carcinoma, most often from lung cancer or breast cancer.
- Trauma from head injury may be involved or surgical damage when removing a tumour from that region. Head injury often includes extradural haematoma and contrecoup injuries (brain injury on the opposite side to the point of impact). Surgery for intractable temporal lobe epilepsy is well established and will cause disturbance of temporal lobe function.
- Progressive deterioration of language can be part of a frontotemporal lobe dementia. It presents earlier than Alzheimer's disease and about 50% have a family history that suggests an autosomal dominant inheritance.
- Other pathologies such as multiple sclerosis can affect the temporal lobes although this is an unusual manifestation.

Presentation

A stroke tends to produce a rapid onset of symptoms whilst a space-occupying lesion will produce a more insidious onset. Whilst a hemiparesis is obvious to the patient and family, and will be recognised as such, the manifestations of temporal lobe lesions are more subtle and they may be interpreted as psychosis or dementia. It is Important to unravel these strange presentations and to suspect the diagnosis. A careful, detailed history is required with examination. Often the patient will be oblivious to symptoms and will be uncomplaining. Some history from a third party can be useful. There are 8 principal symptoms of temporal lobe damage:

- Disturbance of auditory sensation and perception.
- Disturbance of selective attention of auditory and visual input.
- Disorders of visual perception.
- Impaired organisation and categorisation of verbal material.
- Disturbance of language comprehension.
- Impaired long-term memory.
- Altered personality and affective behaviour.
- Altered sexual behaviour.

Manifestations of temporal lobe lesions

- Disorders of auditory perception:
  - Lesions of the left superior temporal gyrus produce problems of speech perception with difficulty in discriminating speech and the temporal order of sounds is impaired.
  - Lesions of the right superior temporal gyrus produce prosody. Prosody is the study of the metre of verse. Here it means the rhythm of speech.

- Lesions of the right superior temporal gyrus can produce disorders of perception of music with inability to discriminate melodies.
- The inferior temporal cortex is responsible for visual perception and lesions produce inability to recognise faces,[1] called prosopagnosia.
- There may be disturbance of visual and auditory input selection. This presents as impairment of short-term memory, also called working memory, and of judgement about

the recency of events.

- The area is responsible for the organisation and categorisation of words and pictures. Impairment of this ability to categorise means reduced ability and fluency in listing categories.
- There may be difficulty using contextual information, in extracting information from the environment and using visual and social cues.
- The medial and inferior temporal cortex and hippocampus are responsible for memory.[2] There is complete anterograde amnesia following bilateral removal of medial temporal lobes, including hippocampus and amygdala. There is difficulty recalling information. The left side is responsible for verbal material and the right for nonverbal memory such as faces, tunes and drawings. The difference between retrograde and anterograde amnesia is that retrograde amnesia is loss of memory from before an event. It often happens with head injury with loss of memory leading up to that event, although this is commonly gradually recovered. Anterograde amnesia is loss of memory between the event and the present time.
- There is a temporal lobe personality. There is an emphasis on trivia and the small details of daily life. There is egocentricity, pedantic speech, perseveration of speech, paranoia, religious preoccupations and a tendency to aggressive outbursts, especially after right temporal lobectomy. Perseveration is when there is a continuous but futile attempt to produce a word or perform an action long after others would have given up or tried a different approach.
- As well as behavioural change, temporal lobe lesions can present with visual field defects in the form of superior quadrant loss, sometimes called the 'pie in the sky defect'.
- Temporal lobe lesions may be associated with true hypersexuality, transvestite and transsexual behaviour. A cerebrovascular event (CVE) normally reduces libido but temporal lobe lesions can increase it.[3] Lesions of the inferior temporal lobe have been reported to produce the Klüver-Bucy syndrome.

Examination

The problems of examining difficulties of speech and comprehension are discussed in the separate article Dysarthria and Dysphasia. In terms of recognising the ability to recall information or to recognise faces, it is complicated if there is impairment of speech. A strange or 'temporal lobe personality' may be apparent but history from one close to the

patient is more reliable and will attest to changes in personality. Accurate testing and ability to make an anatomical diagnosis may well be beyond the ability of most general practitioners when presented with such patients and the help of a neuropsychologist may be required.

If a cerebrovascular event (CVE) is suspected, check the cardiovascular system, including blood pressure, auscultation of the heart and carotid arteries. A brief examination of the rest of the nervous system is required.

Differential diagnosis

Many conditions may be worthy of consideration:

- Alcoholism.
- Alzheimer's disease.
- Amyloid angiopathy.
- Aphasia.
- Apraxia and related syndromes.
- Arteriovenous malformations.
- Cardioembolic stroke.
- Cerebral aneurysms.
- Glioblastoma multiforme.[4]
- Low-grade astrocytoma.[4]
- Meningioma.[4]
- Multiple sclerosis.
- Pick's disease.
- Primary central nervous system lymphoma.
- Secondary brain tumours.
- Substance abuse.

Investigations

- Modern imaging studies can now localise lesions with great accuracy. MRI tends to be better than CT.

- If metastatic cancer is suspected, a CXR is required.
- Visual field defects can be assessed by perimetry.
- A possible or certain diagnosis of a cerebrovascular event (CVE) requires investigation, as outlined in the separate article Stroke Prevention.
- Referral to a neuropsychologist may still be useful to elucidate the precise nature of the problem and for help with management.

Management

This is similar to that for stroke rehabilitation. See separate article Cerebrovascular Event Rehabilitation.

Prognosis

Young people, especially children, have an ability to let one part of the brain take over the function of a damaged part (plasticity) but this is lost with increasing age. Hence young patients may regain some function but this is less likely with advancing age.

Provide feedback

Further reading & references

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