Chapter 3

The Interpretation of Neurological Symptoms and Signs

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The clinical diagnosis of neurological disease requires a particularly detailed analysis of patients' symptoms. This is partly because the nervous system is a communications system with direct access to consciousness, so that the patient is in a unique position to monitor his own disorder. Clinical diagnosis becomes very difficult in the presence of dysphasia, confusion or dementia. Another reason is that useful biochemical and histological information about the function of neurons is rarely available, in contrast to the wealth of data used in the assessment of diseases of other organs, such as the lungs, liver or kidneys. The failure of neurons in the CNS to regenerate means that delay in making a precise diagnosis can worsen the eventual outcome; the clinician often cannot afford to watch how an illness progresses before intervening.
The clinical diagnosis is established in about four out of five cases on the basis of the patient’s history. There are two important components to diagnosis. The symptoms and signs help to locate the site of the pathology. The time course of the symptoms and the age of the patient suggest the nature of the pathology.

Such information is used to try to place the patient’s illness into one of four broad structural groups. The first group is the largest and includes focal lesions, such as tumours or the effects of trauma, that damage all the various structural elements in a circumscribed part of the nervous system. The lesions may be single or multiple. The second group includes conditions which cause widespread or diffuse pathological changes such as presenile dementia or encephalitis; such processes may be hard to distinguish clinically from the effects of multiple discrete lesions. The third group comprises system disorders such as motor neuron disease or parkinsonism, in which the damage is confined to specific neuronal systems that traverse a number of different anatomical regions of the brain and intermingle with unaffected structures. The fourth group includes conditions secondary to systemic disorders, such as toxaemia, biochemical disorders, or cardiac failure, in which there is usually no structural abnormality of the nervous system.

This chapter briefly reviews those aspects of clinical diagnosis that are of special relevance to the pathologist and indicates the areas in which the clinician is likely to be mistaken.

Clinical localisation of brain disorders

Focal lesions

A focal lesion in the brain gives rise to appropriate focal signs if a region with a clearly defined function is damaged. For example, a lesion of the motor cortex causes paralysis of voluntary movement in the appropriate limb. The impairment of function may be due to destruction of normal tissue, in which case function is permanently lost. Some loss of function may be due to potentially reversible factors such as oedema, distortion, raised intracranial pressure or ischaemia, which can affect a larger volume of brain tissue than the provoking lesion itself.

By distorting intracranial structures, a mass can produce signs of impaired function in areas some distance away. One example of this is the temporal lobe tumour that causes herniation of the parahippocampal gyrus on the medial aspect of the temporal lobe through the opening in the tentorium cerebelli (transient herniation; see Chap. 4); compressing the third cranial nerve and causing diplopia. A second example is the deficit caused by cerebral arterial spasm following subarachnoid haemorrhage. Focal neurological deficit after subarachnoid haemorrhage is more often due to cerebral ischaemia than to haematoma and the part of the brain affected by vasospasm may be some distance away from the site of the haemorrhage, or even in a different vascular territory.

The time course of the development of symptoms helps to distinguish infarction or haemorrhage (sudden onset) from neoplasia (gradual onset). Infective lesions such as an abscess are usually accompanied by systemic signs of infection. Degenerative diseases usually run an insidious course. The age of the patient helps to restrict the possible diagnosis in a particular case; cranial arteritis, for example, is virtually unknown under the age of 55 years.

Synopsis of regional functions in the cerebral hemispheres

Impaired function on one side of the body is generally due to a lesion in the contralateral cerebral hemisphere, especially if the face is also involved. Formal loss of power with 'upper motor neuron' signs in lesions of motor cortex, and profound sensory loss in lesions of sensory cortex are usually easy to diagnose and will not be elaborated here, except to point out that homonymous hemianopia due to a lesion of the contralateral optic radiations or visual cortex is often undetected by the patient provided macular vision is spared. Even with a complete homonymous hemianopia, the patient may notice only that he keeps colliding with objects on one side.

Frontal lobe syndromes

Lesions of the frontal lobe are associated with changes in personality, usually in the direction of disinhibition, euphoria, increased appetite and lack of foresight and judgement. Sometimes a frontal lobe tumour presents as progressive dementia without other focal symptoms; careful assessment supported by psychometric testing may identify circumscribed functions that are normal, casting