Introduction

Primary Central Nervous System Lymphoma (PCNSL) is a relatively rare localisation of non-Hodgkin’s lymphoma (NHL) that is confined to the brain, the leptomeninges, the eyes, the cerebrospinal fluid (CSF) or the nerve bundles. PCNSL is, as a primary brain tumour, by definition not diagnosed in the setting of widespread localisations outside the central nervous system (CNS) [37]. Therefore, it should be differentiated from the secondary involvement of the CNS which occurs in 5% to 29% of patients with systemic NHL, usually associated with progressive widespread systemic disease and involving often only the meningeal surface. The prognosis of patients with PCNSL with conventional treatment similar to that for other NHL is very poor, with a 5-year survival rate at usually less than 10%. Some rare but distinctive subtypes of PCNSL should be recognised.

Incidence

PCNSL accounts for about 1% of all intracranial neoplasms and for about 1 to 2% of all NHL. The highest incidence of non AIDS-related PCNSL is reported in the age group from 45 to 70 with a median age of 60. The incidence is higher in men (male/female ratio 1.7:1). A higher incidence is found in patients with a congenital, acquired or iatrogenic immunodeficiency syndrome, especially in patients with the acquired immunodeficiency syndrome (AIDS). Their risk for developing PCNSL is 2-6%. It increases over time and is found in 12% during post mortem examination, suggesting that the diagnosis is not always suspected. The incidence
of AIDS-related PCNSL is decreasing in developed countries after the introduction of highly active antiretroviral therapy (HAART). Over the last decades a marked increase in the incidence of PCNSL was seen, which can however not entirely be explained by the increased incidence of especially AIDS, the use of new diagnostic tools, or better pathological examinations. Notably in the United States, currently up to 5% of all newly diagnosed primary brain tumours are PCNSL [11, 46]. This chapter only deals with PCNSL in immunocompetent patients.

Diagnosis

Clinical signs and symptoms vary considerably and depend on the site of the tumoural involvement. A combination of behavioural changes, focal sensory or muscle function loss, seizures, visual disturbances and signs of elevated intracranial pressure can occur. PCNSL develops preferentially in supratentorial sites, notably the deeper-seated structures including the periventricular white matter, the corpus callosum, the basal ganglia and the thalamus. Typically, up to 50% of the patients present with multifocal cerebral disease. Involvement of the meningeal surface and/or the CSF is reported in at least one-third of the cases [5]. In 7% of the cases, only meningeal involvement without an obvious parenchymal tumour localisation is found [30]. Spinal cord lymphoma is very rare and can occur alone or associated with brain involvement. During careful ophthalmologic examination in about 20% of the patients ocular disease will be found and at follow up of PCNSL patients after treatment, ocular lymphoma will develop in up to one quarter of them.

Optimal imaging of the brain parenchyma requires a gadolinium-enhanced MRI scan (Figure 1). A contrast-enhanced CT scan can be used for patients where MRI is medically contraindicated (e.g. cardiac pacemaker) or unavailable. The appearance on CT and MRI examinations is highly variable, although often rather suggestive for PCNSL. On CT-scanning, isodense or slightly hyperdense lesions typically enhance densely and diffusely after contrast administration. T1-weighted MRI images show

Fig. 1. Pre-treatment MRI images of a male, 25 years old, complaining of headache, nausea and visual disturbances. Treated with combined modality treatment. Disease free after 2.5 years.