Dear Sir,

Although increasing incidence is report-
ed, primary central nervous system lympho-
ma (PCNSL) is still uncommon in im-
munocompetent individuals. Accurate and
timely diagnosis of PCNSL is often difficult
due to its ambiguous clinical behaviors
and inconsistent radiological findings [1–
4]. We describe an unusual case of PCNSL
whose clinical-radiological manifestations
were first suggestive of idiopathic normal-
pressure hydrocephalus (NPH) with hypo-
natremia.

Case Report
A 71-year-old man with an unremark-
able medical history presented with pro-
gressive dementia and gait disturbance. He
had been in good health until 8 months be-
fore admission, when he began to show the
insidious onset of memory loss and unsta-
able gait. Within the next 7 months, he con-
tinued to deteriorate to the point where he
was markedly demented, could not walk
alone, was completely dependent on his
spouse for daily activities and finally devel-
oped urinary incontinence. His family not-
ed recurrent episodes of somnolence and
lethargy that lasted a few days. Brain CT
obtained elsewhere showed a triventricular
hydrocephalus (NPH) with hypono-
natremia.

MR imaging disclosed normal opening pres-
ture. Brain CT, after intravenous contrast,
showed no evidence of systemic lymphoma.
A stereotactic biopsy of the lateral ven-
tricle wall demonstrated atypical large lym-
phoid cells positive for CD20, indicating
that was comparable to the initial outside
CT. After gadolinium enhancement, there
were a thick homogenous enhancement
along the ventricle lining and a focal en-
hancing lesion in the pituitary stalk (fig. 1a,
b). A stereotactic biopsy of the lateral ven-
tricle wall demonstrated atypical large lym-
phoid cells positive for CD20, indicating
brain MRI at that time revealed a triventricular hydrocephalus
mental signs were normal. He was confused and
disoriented to time and place. He showed
profound memory impairment and a Mini-
Mental Status Examination read 5 out of
30. Cranial nerve, motor, sensory and reflex
functions were intact. Speech was slightly
dysarthric and hypophonic. He was gener-
ally bradykinetic, accompanied by neither
tremor nor rigidity. His gait disturbance
was characterized by upright posture, wide-
based short steps, gait initiation difficulty,
shuffling, freezing and postural impair-
ment. Routine blood works were normal ex-
cept for mild hyponatremia (124 mmol/l).
Serological tests for syphilis and AIDS were
negative. Cerebrospinal fluid (CSF) exami-
nation disclosed normal opening pressure,
3 white cells/mm³, normal glucose and
there were no malignant cells. Three consecu-
tive therapeutic CSF drainages of approximate-
ly 70 ml failed to show any clinical improve-
ment. Subsequent CSF tests for virus, tu-
berculosis, mycoplasma, syphilis, fungi and
parasites were negative. One week after ad-
mission, he became drowsy and somnolent,
with declining responsiveness. Marked hy-
natremia (110 mmol/l) was noted and his
mentally had gradually returned to base-
line following correction of hyponatremia.
Investigation for significant hyponatremia
disclosed cortisol deficiency (1.1 μg/dl; nor-
mal range, 5–25) and complete hormonal
evaluations suggested the presence of pan-
hypopituitarism. Brain MRI revealed a triventricular hydrocephalus
that was comparable to the initial outside
CT. After gadolinium enhancement, there
were a thick homogenous enhancement
along the ventricle lining and a focal en-
hancing lesion in the pituitary stalk (fig. 1a,
b). A stereotactic biopsy of the lateral ven-
tricle wall demonstrated atypical large lym-
phoid cells positive for CD20, indicating
diffuse large B-cell lymphoma. A thorough
systemic investigation including chest and
abdominal CT, and bone marrow biopsy
showed no evidence of systemic lymphoma.
Finally, he was diagnosed as having PCNSL
and a scheduled chemotherapy was com-
menced with dexamethasone, leucovorin,
cytosine arabinoside and combined intra-
venous/intrathecal methotrexate (1 cycle
for 3 weeks). Within 2 weeks after the ini-
tiation of chemotherapy, the encephalo-
pathic symptoms of confusion, hallucina-
tion and somnolence improved to baseline.
Repeat brain MRI after completing 2 cycles
of chemotherapy revealed complete disap-
ppearance of ventricle wall enhancement.
site affected by PCNSL in our patient is very unusual. Although the most frequently involved site on MRI appearance is the periventricular one, only infiltration of ventricle walls in the form of isolated diffuse ventriculitis accompanied by communicating hydrocephalus has been rarely encountered [5, 6]. Therefore, it is important to recognize this rare presentation of PCNSL in the differential diagnosis of diffuse ventriculitis that can be seen in other tumors or in infectious conditions. The progressive dementia and frontal disequilibrium in our patient may be ascribed to hydrocephalus, but the cause of hydrocephalus remains elusive. We assumed that concomitant leptomeningeal involvement that was not evident on MRI may be responsible for the development of communicating hydrocephalus.

Another intriguing finding is lymphomatous involvement of the pituitary stalk. Cortisol deficiency and hypothyroidism presented with symptomatic hyponatremia that could account for the recurrent lethargy. Lymphomatous involvement of the pituitary gland with hypopituitarism is rare [7] and, to our knowledge, our patient is the first case of PCNSL involving the pituitary stalk with resultant panhypopituitarism that caused symptomatic hyponatremia in the elderly immunocompetent patient.

PCNSLs have heterogenous T₁- and T₂-weighted signal abnormalities but the majority has a moderate to strong gadolinium enhancement on T₁-weighted MR images. Without enhanced MRI, the final diagnosis of our patient might be idiopathic NPH with hyponatremia [8] and thus emphasis should be placed on enhanced MRI in patients with hydrocephalus of undetermined etiology. Moreover, marked reduction or complete radiological disappearance of lymphoma lesions after short-term steroid treatment, as in our patient, is well described [9]. Given the PCNSL in the differential diagnosis, pathological confirmation should be established before starting steroid therapy, as it may elude the diagnosis.

The presented case is an example of PCNSL simulating other conditions. Heterogeneous radiological findings, together with diverse clinical manifestations and low diagnostic yield of CSF examination, pose a diagnostic challenge of PCNSL and a direct biopsy is mandatory for a correct diagnosis. Awareness that PCNSL can rarely present as hydrocephalus and hypopituitarism may shorten the interval between the clinical onset and diagnosis and prompt the clinicians to commence early treatment.

**Discussion**

In our patient the presenting symptoms manifested as progressive dementia, gait disturbance and urinary incontinence, in association with the radiological appearance of communicating hydrocephalus, were first suggestive of idiopathic NPH because no other identifiable causes of hydrocephalus were found. However, several findings were considered extraordinary for the idiopathic NPH: the rapid course of clinical deterioration, increased CSF protein and lack of improvement following CSF drainages. By the time the patient became lethargic, marked hyponatremia resulting from panhypopituitarism was found. Brain MRI documented a focal enhancing lesion in the pituitary stalk as well as diffuse ventriculitis with communicating hydrocephalus. These unique MRI features led to a brain biopsy, confirming a diagnosis of PCNSL.

PCNSL can present as single or multiple lesions within the brain and the clinical presentation is variable, depending largely on the location of the lesions or possibly related to raised intracranial pressure. The and a slightly diminished size of the lateral ventricle. Along with the radiological improvement, frontal gait disturbance gradually improved to standing alone and walking with a cane to some distance.

**Fig. 1.** Sagittal (a) and coronal (b) T₁-weighted MR images showing an enlargement of the lateral ventricle and a thick homogenous enhancement along the ventricle wall. A focal enhancing lesion was also found in the pituitary stalk with thickening (white arrowheads).
References