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(CASE REPORT)

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Vestibular schwannoma and communicating hydrocephalus: A case report

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Abstract

Background: Vestibular schwannoma (VS) is benign tumor. VS can produce obstructive hydrocephalus by compressing the fourth ventricle, but also, can be also associated with communicating hydrocephalus.

Case presentation: We report a 53-year-old woman patient who underwent ventriculoperitoneal shunt for hydrocephalus complicating VS, and had elevated protein concentrations in the ventricular CSF.

Conclusion: Different CSF protein concentrations have been reported in patients with VS and communicating hydrocephalus and the concentration of protein necessary to produce this is unknown.

Keywords: Vestibular schwannoma; Communicating; Hydrocephalus; CSF; MRI

1. Introduction

Vestibular schwannomas (VS) are benign tumors of the vestibular nerve that invariably lead to hearing loss. They are the most common neoplasm of the cerebellopontine angle in adults. VS account for 8 % of all intracranial tumors [1]. Large VSs can produce obstructive hydrocephalus by compressing the fourth ventricle and obstructing the flow of cerebrospinal fluid (CSF) [2]. However smaller VSs can be also associated with communicating hydrocephalus. The association of communicating hydrocephalus, an elevated CSF protein concentration, and a small VS was first reported by Gardner and associates in 1954 [3]. Less is known about communicating hydrocephalus, which occurs in patients with small VS. We report the case of persistent hydrocephalus after seated ventriculoperitoneal shunt in a patient observed for VS.

2. Case presentation

A 53-year-old woman patient, suffering from headache, vomiting, dizziness and tinnitus, was admitted to our department. The patient had no past medical history. neurologic clinical assessment found slowing in the finger–nose test in the right side and hypoacousia. There was no motor deficit. The blood test values were within the acceptable range. The brain magnetic resonance imaging (MRI) showed an extra-axial isosignal lesion on T1-weighted imaging, which heterogeneously enhanced in the right cerebellopontine angle after gadolinium injection (Figure 1AB). No signs of vasogenic oedema, calcification or bleeding associated with the lesion were detected. This lesion was associated with communicating hydrocephalous (Figure 1CD). The patient underwent a ventriculoperitoneal shunt (VPS), and the ventricular CSF protein concentration was 2.4 g/L (normal: 0.15 to 0.45 g/L). One month later, the patient was admitted as an outpatient with cerebral CT scan control without any clinical manifestations.

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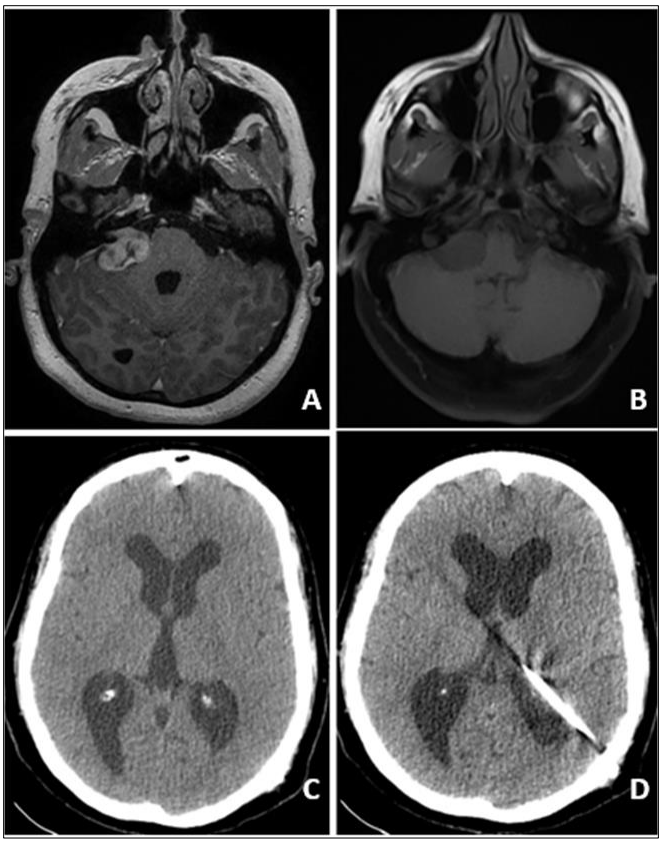

Figure 1 Brain magnetic resonance imaging (MRI) showed an extra-axial isosignal lesion on T1-weighted imaging (B), which heterogeneously enhanced in the right cerebellopontine angle after gadolinium injection (A). Cerebral CT scan ventricular dilatation corresponding to hydrocephalus (C) which was derivated (D)

3. Discussion

A few cases of the patients with VS associated to communicating hydrocephalus have been reported in literature. In most of cases, the occurrence of hydrocephalus within VS resulting of obstruction of the fourth ventricle by compression of the tumor [4]. There are several factors that may play a role in the development of communicating hydrocephalus in patients with VS. The most commonly discussed issue is a high protein concentration in the CSF. However, tumor size, recurrent tumor bleeding, the colonization of tumor cells in the cerebrospinal fluid, age and other factors can also play a role [2].

In our case, we suggested that CSF protein concentration was the factor responsible for the occurrence of communicating hydrocephalus. Gardner suspected that the communicating hydrocephalus present in her patients was the result of partial obstruction of the absorptive areas of the cerebrospinal fluid by protein molecules secreted by the tumor [2]. The protein concentration in CSF is distributed as a gradient: it is lowest in the ventricles, increases as it reaches the cisterns at the base of the brain, and is highest in the lumbar subarachnoid space. The CSF enters the venous system at the level of the arachnoid granulations through transendothelial pores or by pinocytosis via the endothelial cells [2]. Bloch et al. reported that all patients in their study had an increased ventricular CSF protein concentration and concluded that this hindered the absorption of CSF at the level of the arachnoid granulations [5]. Bloch et al reported elevated protein concentrations in the ventricular CSF of their six cases and concluded that a 2.5- to 3-fold increase in ventricular CSF protein concentration is necessary to produce communicating hydrocephalus in patients with small VS [5]. The ventricular CSF protein concentration in our patients was 5 to 16 times the upper limit of normal. Rogg et al. have pointed out that CSF protein concentrations can be up to 15 times normal in some cases [6].

4. Conclusion

Different CSF protein concentrations have been reported in patients with VS and communicating hydrocephalus. Although proteins in the CSF may play a key role in the development of communicating hydrocephalus in patients with a small VS, the protein concentration required for this is unknown.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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