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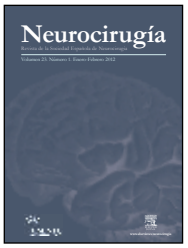

Casos clínicos

Cerebral salt wasting syndrome: postoperative complication in tumours of the cerebellopontine angle

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ABSTRACT

Cerebral salt wasting (CSW) is a rare complication in posterior fossa tumour surgery. We present two patients with cerebellopontine angle (CPA) tumours who developed cerebral salt wasting postoperatively. Both patients deteriorated in spite of intensive fluid and salt replacement. On CT scan the patients presented mild to moderate ventricular dilation, which was treated with an external ventricular drainage. After the resolution of hydrocephalus, fluid balance rapidly returned to normal in both patients and the clinical status improved. Identification and treatment of secondary obstructive hydrocephalus may contribute to the management of CSW associated to posterior fossa tumour surgery.

Síndrome pierde sal cerebral: complicación posquirúrgica en tumores del ángulo pontocerebeloso

Palabras clave:
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Síndrome pierde sal cerebral
Hidrocefalia
Hiponatremia
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RESUMEN

El síndrome pierde sal cerebral (CSW, en sus siglas en inglés) es una complicación rara en la cirugía de los tumores de la fosa posterior. Presentamos a 2 pacientes con tumores del ángulo pontocerebeloso que desarrollaron un CSW posquirúrgico. Ambos pacientes tuvieron un empeoramiento pese a la fluidoterapia y la reposición de sal intensivas. La tomografía computarizada (TC) mostraba una dilatación ventricular leve a moderada que fue tratada mediante un drenaje ventricular externo. Tras la resolución de la hidrocefalia el balance hidroelectrolítico se normalizó rápidamente en ambos pacientes y su situación clínica mejoró. La identificación y el tratamiento precoz de la hidrocefalia obstructiva pueden contribuir al tratamiento del síndrome pierde sal asociado a la cirugía de tumores de la fosa posterior.

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Introduction

Hyponatremia is the most common electrolyte disorder in hospitalized patients and carries a significant increase in the risk of mortality[1]. It is associated with numerous disorders of the central nervous system like subarachnoid hemorrhage, trauma, infections and tumors[2,3]. Excluding excessive fluid administration and diuretics, the most frequent form of hyponatremia in the neurosurgical patient consists in hypotonic hyponatremia with elevated natriuresis[4]. This can occur in the context of a syndrome of inappropriate antidiuretic hormone secretion (SIADH) or CSW.

CSW was first described by Peters et al. in 1950 as hyponatremia associated to volume depletion and renal sodium (Na+) wasting without an obvious disturbance in the pituitary-adrenal axis in the setting of various neurological disorders[5]. However following the description of (SIADH) by Schwartz et al, CSW became viewed as a rare disorder and was frequently misdiagnosed as SIADH[6]. The recognition of the particular clinical features of CSW with its own physiopathology and treatment has led in recent years to give a special consideration to CSW in the neurosurgical practice. Some prospective studies have found CSW even more frequently than SIADH among neurosurgical patients[2,7].

We present two rare cases of CSW after removal of a CPA tumor. The differential diagnosis of CSW and SIADH and the specific treatment of CSW is discussed. Special emphasis is given to the early recognition and treatment of hydrocephalus in patients with CSW after posterior fossa surgery.

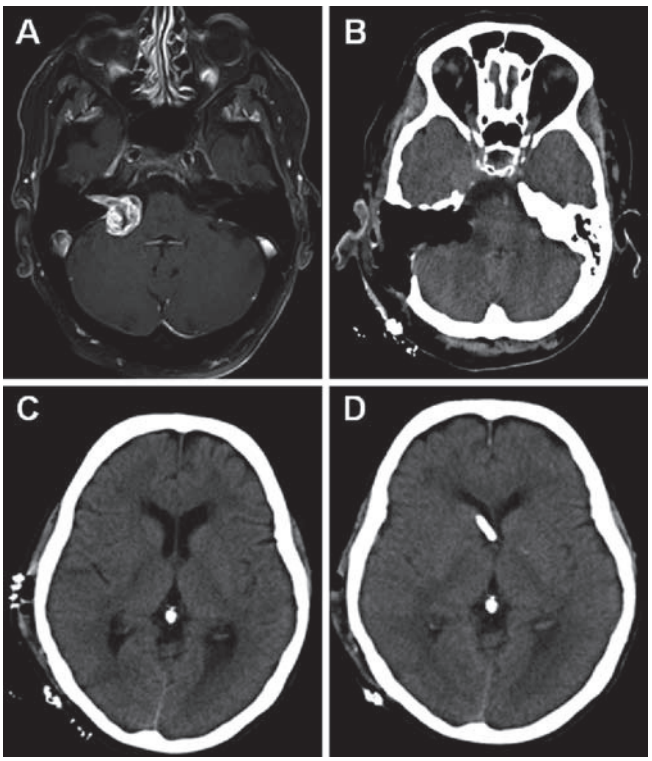

Figure 1 – (A) Preoperative MRI showing a right sided CPA tumor with intracanalicular extension. (B) Postoperative CT showing complete tumor removal through a translabyrinthine approach. (C) CT on the fourth postoperative day revealing mild ventricular dilation and cortical edema. D) CT after EVD placement with resolution of hydrocephalus.

Case reports

Case 1

A 60-year-old woman with a history of hearing loss on the right side, vertigo and tinnitus was admitted to our department. Audiometry revealed a moderate sensorineural hypoacusis (Gardner-Robertson class III). On magnetic resonance imaging (MRI) an extraaxial mass 2,4 × 2 ×1,6 cm occupying the right CPA with intracanalicular extension and slight compression of the brainstem was found (Fig. 1A). No significant ventricular dilation was present. At our institution vestibular schwannomas below 3 cm of maximal diameter are offered either microsurgery or radiosurgery. Our preferred approach for lesions over 2 cm with significant hearing loss is the translabyrinthine approach. The patient was operated through a translabyrinthine approach with facial nerve monitoring achieving a complete tumor resection. The pathologic diagnosis confirmed a vestibular schwannoma. Postoperatively the patient had a normal neurological examination and no signs of complication on the CT-scan (Fig. 1B). On the fourth postoperative day she presented a progressive decline of consciousness with confused speech and drowsiness (GCS score 13), associated to headache and vomiting. Clinically the patient had signs of dehydration. Laboratory findings showed hyponatremia of 118 mmol/L with plasma osmolarity 237 mOsm/L, urinary Na+ 140 mmol/L and urinary osmolarity 517 mOsm/L. Natriuretic peptides and antidiuretic hormone (ADH) levels are not performed on an emergency basis at our institution, therefore based on clinical and laboratory data a CSW was suspected. Treatment was initiated with volume repletion with isotonic saline and a perfusion of hypertonic saline. Six hours later the clinical status of the patient continued to deteriorate presenting a GCS score of 11. Laboratory values showed no response to initial treatment with plasma Na+ 118 mmol/L, plasma osmolarity 238 mOsm/L, urinary Na+ 142 mmol/L and urinary osmolarity 519 mOsm/L. Invasive monitoring showed a central venous pressure (CVP) of 0 mmHg. A CT-scan revealed moderate hydrocephalus and cortico-subcortical edema. An external ventricular drainage (EVD) was placed in the right frontal horn (Fig. 1C-D). After placement of the ventricular drainage the patient improved rapidly. The laboratory control at 12 hours from onset of the symptoms showed a good response with plasma Na+ 129 mmol/L, plasma osmolarity 267 mOsm/L, urinary Na+ 51 mmol/L and urinary osmolarity 184 mOsm/L. The urinary output during the first 24 hours was 3000 cc with a negative fluid balance of 700 cc. Treatment was continued with volume repletion for 2 days until the patient presented normal fluid balance and Na+ levels with oral fluid intake as needed. The control CT showed small ventricles and no edema. The EVD was removed on day 6. The patient was discharged 16 days after later in good general health.