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SCIENTIFIC LETTER

Atypical development of hypopituitarism due to septic embolism: A case report

Presentación infrecuente de hipopituitarismo secundario a émbolos sépticos: caso clínico

This article outlines the case of a 57-year-old male, originally from Morocco, who presented to the Emergency Room with a fever of 39 °C, along with a discomfort, foul-smelling urine, and diffuse abdominal pain. The patient reported a healthy lifestyle, including no smoking or alcohol consumption, and was not affected by diabetes or any condition or treatment known to impair the immune system. Notably, he had been hospitalized a few weeks prior to his visit at a different hospital following an accidental fall while working in the field, resulting in perineal bruising and overt hematuria.

Biochemical tests revealed elevated levels of C-reactive protein (210 mg/L; reference range (RR): 0–30), ferritin (2558 ng/mL; RR: 5–204), total bilirubin (7.79 mg/dL; RR: 0.2–1.2), mainly due to direct bilirubin (6.46 mg/dL; RR: <0.5), brain natriuretic peptide (5782 pg/mL; RR: 0–450), and procalcitonin (1.46 ng/mL; RR: <0.5). There was also a slight increase in transaminases – GOT (59 U/L; RR: 5–34) and GPT (67 U/L; RR: 0–55). The urinalysis showed significant bacteriuria (14,419/μL) and leukocyturia, with a count of 526 cells/μL (RR: 0–15).

The abdominal ultrasound revealed no significant findings; however, a CT scan revealed septic embolism with bilateral psoas abscesses, and renal and splenic infarctions. Transthoracic echocardiogram led to the diagnosis of mitral valve endocarditis on a native valve. The patient was admitted to the hospital. Notably, this examination also revealed previously undiagnosed mitral valve disease, characterized by the presence of a vegetation. Blood cultures revealed *methicillin-resistant Staphylococcus aureus* (MRSA), leading to treatment with daptomycin and cloxacillin.

A subsequent coronary CT angiography detected the presence of nodules in the lung parenchyma (cultures for mycobacteria and the Quantiferon® test turned out negative), resulting in the discontinuation of daptomycin and the initiation of a regimen with linezolid. On hospitalization day 6, the patient developed acute renal failure (GFR, 10 mL/min/1.73 m^2; RR >90) requiring dialysis.

The brain magnetic resonance imaging (MRI) showed numerous small ischemic lesions at different stages of development, spanning from acute to chronic (Fig. 1A and B). Furthermore, the cranial CT scan revealed multiple areas of hypodensity in the right cerebellar hemisphere, indicative of necrosis (Fig. 1C and D).

A subsequent comprehensive hormonal study indicated hypopituitarism: TSH, 0.02 mU/L (RR, 0.35–4.94); free T4, <0.42 ng/dL (RR, 0.7–1.48); free T3, <0.95 pg/mL (RR, 1.88–3.18); FSH, <0.1 mU/mL (RR, 0.95–11.95); LH, <0.1 mU/mL (RR, 0.57–12.07); growth hormone, 0.84 ng/mL (RR, 0.06–5); testosterone, 0.45 ng/mL (RR, 2.209–7.158); ACTH, 82.6 pg/mL (RR, 9–40); cortisol, 11.1 μg/dL (RR, 3.7–19.4); somatomedin, 45 ng/mL (RR, 67–225), and prolactin, 32.9 ng/mL (RR, 3.46–19.4). These findings were confirmed with a subsequent sample.

Hypopituitarism was considered secondary to necrosis of the pituitary gland caused by a vascular event or septic embolization. A pituitary MRI confirmed this suspicion, showing an enlarged pituitary gland with T1 shortening consistent with necrosis (Fig. 1E and F).

The patient was put on levothyroxine replacement therapy (25 μg/day) to treat the hypopituitarism. He remained hospitalized on dialysis and antibiotic therapy among other treatments. Follow-up blood cultures initially cleared the MRSA, but *Candida albicans* and *Pseudomonas aeruginosa* were later identified.

Over the following weeks, the patient maintained hemodynamic stability; however, renal function and laboratory profiles progressively worsened. He subsequently experienced a sudden deterioration, resulting in death 24 h later. The MRSA causing the endocarditis was linked to the bacteria entering the bloodstream through skin or genitourinary tract lesions from the previous fall.

The current case describes an atypical scenario where the patient developed hypopituitarism due to septic embolism. The primary cause of hypopituitarism, with an incidence of 4.5–20 cases per 100,000 inhabitants, is usually mechanical compression from benign pituitary tumors or, in 9% of cases, from adjacent areas, particularly the hypothalamus. Treatment-related factors also contribute. Although infections such as tuberculosis or meningitis can rarely cause hypopituitarism, the main reason in such cases is gland destruction due to the infectious/inflammatory process *per se*.[1,2]

Metastatic septic embolism results from the fragmentation and/or detachment of cardiac vegetations. The occurrence rate of this phenomenon varies widely among studies,[3–6] with the central nervous system (CNS) being the

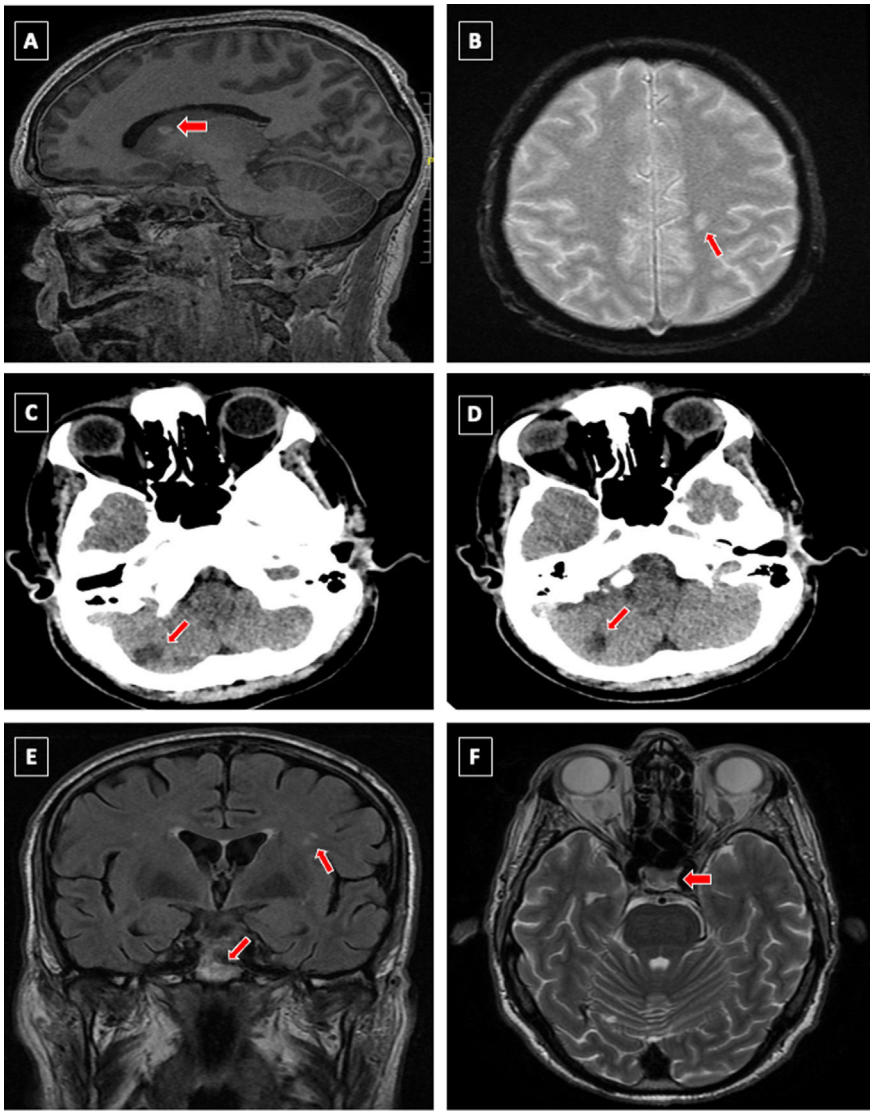

Figure 1 Imaging modalities performed on the patient. (A) Sagittal MRI of the brain demonstrating ischemic lesions. (B) Axial MRI of the brain demonstrating ischemic lesions. (C) CT scan of the brain revealing hypodensity in the cerebellar hemisphere, indicative of necrosis. (D) CT scan of the brain revealing hypodensity in the cerebellar hemisphere, indicative of necrosis. (E) Frontal MRI of the pituitary gland demonstrating necrosis and ischemic lesions. (F) Axial MRI of the pituitary gland demonstrating necrosis.

most widely affected organ (65%).[6] Moreover, the incidence decreases from 4.82 to 1.71 per 1000 inhabitants after starting antibiotic therapy.[6] Given our patient's condition, it is difficult to determine when the emboli damaging the pituitary formed, but it likely occurred before admission and treatment initiation. This is supported by the finding of lesions at different stages of evolution.

The main pathogens identified as responsible for this phenomenon are *Staphylococcus aureus* and fungi such as *Candida* or *Aspergillus*, two of which were identified in this patient.[7] The signs of septic emboli in the CNS vary depending on the number, location, and extent of the damaged area,[6] but prognosis is generally grim.[5] In this case, the characteristic symptoms of hypopituitarism went unnoticed, likely due to the patient's significant pathological burden. However, up to 48% of patients with septic embolism in the CNS can be asymptomatic, as can many cases of hypopituitarism.[8] This underscores the importance of a complete hormonal study in patients whose symptoms of pituitary hormone deficiency may be masked or attributed to other conditions, as well as in those with conditions that may trigger hypopituitarism, such as severe infections or ischemic processes.[1]

ADH and oxytocin levels were not determined; additionally, acute renal failure and subsequent death make it difficult to identify a possible development of central diabetes insipidus. Therefore, it remains to be elucidated whether there was also neurohypophysis involvement.

Most cases of septic embolism presented in the literature are pulmonary. This unusual condition[9] may have also been present in this patient associated with the presence of pulmonary nodules, despite the fact that it was not precisely identified. No similar scenario has ever been described, although Saranac et al. reported a case of hypopituitarism

due to neonatal sepsis, attributed to gland destruction by infection.[10]

In conclusion, hypopituitarism due to septic embolism-related pituitary necrosis is a rare condition that should be considered, especially in patients with endocarditis or catheter infections.[6] Early detection and treatment initiation will improve prognosis and mitigate the severity of the condition.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work the authors used ChatGPT to review the English grammar. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

Conflict of interest

None declared.

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