Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

All cases have been reported to the Spanish Pharmacovigilance Agency (AEMPS). Previous studies have shown a correlation between the COVID-19 vaccine and ITP, but the relationship with relapse has only been hypothesised. The time of onset, the early response to steroid treatment and prior platelet stability lead us to believe in a causal relationship. According to the algorithm described by Naranjo et al., there is a probable causal relationship.[5] Therefore, in patients with pre-existing ITP, it would be advisable to obtain a platelet count before and after vaccination to avoid fatal bleeding events.

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Case report: Pituitary apoplexy after COVID-19 vaccination

Caso clínico: Apoplejía hipofisaria tras vacunación frente a la COVID-19

Dear Editor,

The discovery and widespread use of different SARS-CoV-2 vaccines has made it possible to combat the COVID-19 disease in an effective and safe way. Among the adverse effects that have been observed during the implementation of the vaccination campaign is the appearance of thrombosis and bleedings associated with a syndrome known as Vaccine-Induced Thrombotic Thrombocytopenia (VITT), related only to viral vector vaccines. VITT is more frequent in young women and appears to be a phenomenon similar to heparin-induced thrombocytopenia and have an autoimmune source.[1,2]

Pituitary apoplexy, described as an infarction or hemorrhage of the pituitary gland, is a rare entity generally associated with pituitary adenomas and constitutes, in most cases, an endocrine emergency that may require decompressive surgery and specific treatment. Currently, in the context of SARS-CoV-2 infection, rare and specific cases of pituitary apoplexy have been described both associated and not associated with pituitary adenomas. However, to date, there have been no reported cases of vaccine-associated pituitary apoplexy.[3]

We present the case of a 37-year-old woman who, 5 days after vaccination with ChAdOx1-S, developed a high-intensity frontal headache with partial relief with habitual analgesia. A complete physical examination was performed, which did not demonstrate the presence of neurological focality, cranial nerve involvement, or campimetric involvement. Despite this, due to the intensity of the headache, a brain MRI was performed (Fig. 1). It showed signs concordant with adenohypophysis hemorrhagic bleeding in association with a possible 10 mm intraglandular adenoma without chiasmatic involvement. The patient did not present syndromic signs consistent with Cushing's disease or acromegaly, nor did she present symptoms or signs of pituitary hormonal deficits prior to the event. A campimetry and a pituitary hormonal analysis were performed, both yielding normal results. Symptoms were resolved within 2–3 weeks with no complementary treatment and without associated hormonal deficits in that period.

To our knowledge, this is the first case of pituitary hemorrhage described after SARS-CoV-2 vaccination. The possible presence of a previous undiagnosed adenoma could have influenced the appearance of a hemorrhagic phenomenon at this level. Unfortunately, a

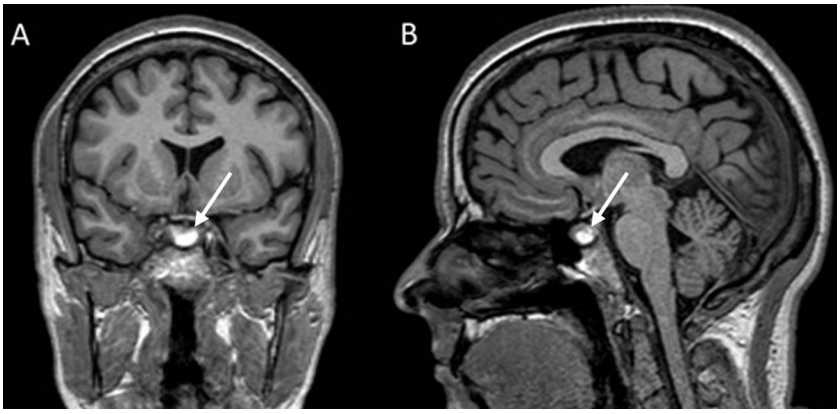

Fig. 1. Coronal (A) and sagittal (B) slices of the skull MRI. Adenohypophysis hemorrhagic bleeding in association with a possible 10 mm intraglandular adenoma without chiasmatic involvement.

hemogram was not performed at the time of the event, so we could not confirm the presence of thrombocytopenia that would reinforce the association between pituitary bleeding and vaccination in the context of VITT. At the time of our evaluation, two months later, the patient had a normal blood count without observing this abnormality. In this context, we cannot affirm the correlation between both phenomena, although the temporal evolution of the clinical picture and the radiological findings in which evidence of acute bleeding was denoted does make us consider this case as probably associated with vaccination.[4] Generally, the evaluation of headache after SARS-CoV-2 vaccination in the context of screening for cerebral sinus thrombosis is carried out through a cranial CT scan. In this type of examination, the pituitary area is difficult to evaluate, especially when small bleeds occur without hormonal and/or campimetric repercussions, such as in the case presented. Therefore, these types of entities may be underdiagnosed.

In conclusion, we suggest that this case should be taken into account for the evaluation of postvaccinal headache and the possibility of VITT, evaluating campimetric compromise and the possibility of hormonal deficits, both in patients with known pituitary adenomas and in cases without prior diagnosis. Despite not having occurred in our case, the development of an undiagnosed pituitary hormonal deficiency can lead to a torpid evolution.

Patient consent

Informed consent has been obtained from the patient for publication of the case report and accompanying images.

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Conflict of interest

The authors declare no conflict of interests.

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Late anthracycline cardiotoxicity and genetic alteration of iron metabolism☆

Cardiotoxicidad tardía por antraciclinas y alteración genética del metabolismo del hierro

Dear Editor:

Acute lymphoblastic leukaemia is the most common neoplasm in children, with anthracyclines being the treatment that has shown a greater increase in survival and cure rates. Cardiotoxicity secondary to these drugs, especially in the long term, has been gaining importance in recent years, due to the increase in the number of cases detected as a consequence of improved prognosis and the development of some prevention strategies[1].

We report the case of a 42-year-old female smoker with no other cardiovascular risk factors or drug treatment. She was diagnosed with acute T-lymphoblastic leukaemia with a poor prognosis at 2 years of age, treated with a chemotherapy regimen that included daunorubicin at a cumulative dose of 440 mg/m^2, achieving complete remission. Ventricular function determined by ultrasound one year after completion of treatment was normal. The patient presented with a 3-month history of progressive exertional dyspnoea, which progressed to minimal exertion with orthopnoea, paroxysmal nocturnal dyspnoea and oedema up to the knee. Without chest pain. The examination revealed tachycardia with third heart sound, jugular vein congestion and hepatomegaly. The laboratory tests revealed NT-ProBNP 17,161 pg/mL in addition to high levels of ferritin (848 ng/mL) of years of progression. The electrocardiogram showed sinus rhythm with narrow QRS, and the echocardiogram showed a non-dilated left ventricle with global hypokinesia and ejection fraction of 20%. A heart nuclear magnetic resonance confirmed severe left ventricular dysfunction without late gadolinium enhancement, and coronary computed tomography ruled out ischemic heart disease.

The patient experienced progressive improvement after starting treatment with diuretics, angiotensin-converting enzyme inhibitors, beta-blockers, and antialdosterone therapy, recovering ventricular function several months later, although maintaining some limitation on exertion. A *HFE* gene study identified a heterozygous H63D mutation, and the patient was diagnosed with hypokinetic non-dilated cardiomyopathy possibly related to late anthracycline toxicity.

The most accepted mechanism of toxicity is the generation of free oxygen radicals during the intracellular metabolism of the drug. It causes deoxyribonucleic acid damage and mitochondrial dysfunction[2], leading to apoptosis and fibrosis, with the myocardium being a particularly sensitive tissue. This leads to heart failure that can manifest from the time of treatment (acute toxicity) to several decades later (late toxicity). The most important risk factor is the total accumulated dose, with patients receiving more than 300 mg/m^2 being especially susceptible. Other factors are: age younger than 5 years, concomitant chest irradiation, high

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