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EXTENSIVE THROMBOSIS OF THE VENOUS SINUSES OF THE BRAIN, A CASE REPORT

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Abstract: INTRODUCTION: Cerebral venous thrombosis (CVT) is a relatively uncommon disease, with an estimated annual incidence of between two and seven cases per million in the general population (STAM 2003). CVT is one of the few causes of cerebral hemorrhage that require treatment with anticoagulation. Since anticoagulation is contraindicated in most cases of cerebral bleeding, diagnostic certainty is important, making the radiologist's task more difficult (STAM, 2003). **OBJECTIVE: To** report the case of a 38-year-old patient diagnosed with extensive cranial venous sinus thrombosis and its clinical and radiological implications. **METHOD:** The data contained in this study was obtained from the electronic medical record, anamnesis, physical examination and complementary exams. **CONCLUSION:** The results obtained in this study contribute to improving the diagnosis of patients with extensive venous thrombosis, since it is a rare case in the literature, with the aim of contributing to excellence in care and building prevention of new cases.
Keywords: Cerebral Venous Thrombosis; Cranial Tomography; Cerebral Venous Sinuses; Filling Failure; Radiology.

INTRODUCTION

Cerebral venous thrombosis (CVT) is a relatively uncommon condition with an estimated annual incidence of between two and seven cases per million in the general population (STAM 2003). The incidence was probably underestimated before the advent of accurate non-invasive imaging methods. It is estimated that five to eight cases can be seen per year in a tertiary care referral center (FLORIAN MASUHR., et al 2004).

Since the possible causal factors and clinical manifestations of thrombosis are many and varied, imaging plays a key role in diagnosis. As CVT is one of the few causes of cerebral hemorrhage that require anticoagulation as a form of treatment, diagnostic certainty is important, making the radiologist's task more difficult. CVT can occur at any age, although it is more common in neonates, young adults (20-40 years) and women of childbearing age, because pregnancy, the postpartum state and the use of oral contraceptives increase the risk of CVT (STAM 2003) (GUNES., et al 2016) (ZUURBIER., et al 2016)

CASE REPORT

A 38-year-old female patient reported seeking medical attention at the Emergency Care Unit (UPA) due to dehiscence of a caesarean surgical scar, puerperal infection and drowsiness, and was subsequently referred to the Jayme dos Santos Neves State Hospital, where she developed clinical signs of cognitive dysfunction. The patient was admitted to the ward, where she had a seizure. After this, CT scans of the skull were carried out with and without contrast, which showed spontaneous hyperdensity of the right straight and transverse sinuses and failure of filling by contrast in the transverse sinuses, superior sagittal sinus, straight sinus, cavernous sinuses, as well as in the distal segments of the jugular veins, the Trolard veins and the internal cerebral veins, compatible with extensive thrombosis. After the diagnosis, the medical team decided to hospitalize him in an intensive care unit (ICU) and treat him with anticoagulants, which led to an improvement in his clinical condition and subsequent discharge from hospital.

Image 1: Non-contrast CT scan of the skull showing: spontaneous hyperdensity of the straight sinus.

Image 2: Non-contrast CT scan of the skull showing: spontaneous hyperdensity of the right transverse sinus.

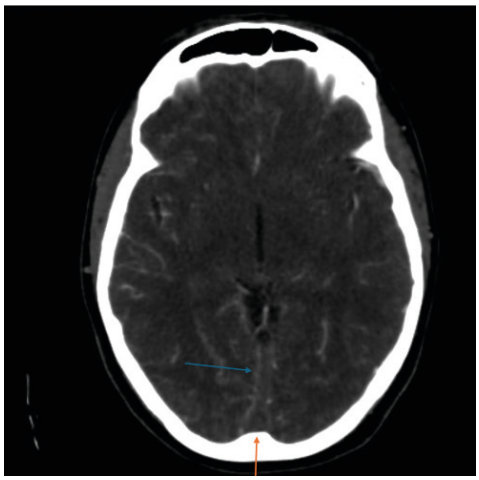

Image 3: Computed tomography angiography of the skull showing: failure of the straight sinuses to fill (blue arrow) and confluence of the sinuses or torcula (orange arrow).

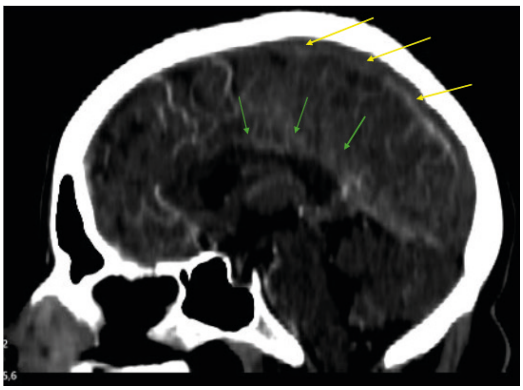

Image 4: Computed Tomography Angiography of the Skull showing: Filling failure in the superior sagittal sinus (yellow arrow) and inferior sagittal sinus (green arrow).

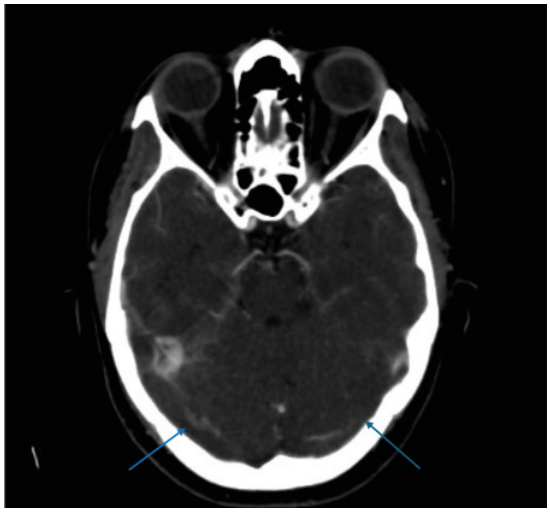

Image 5: Computed Tomography Angiography of the Skull showing: Filling failure in the right and left transverse sinuses.

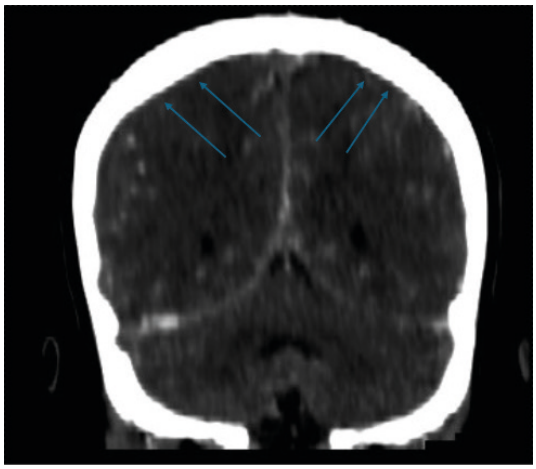

Image 6: Contrast-enhanced computed tomography angiography of the skull showing: Filling failure in the superior anastomotic veins (Trolard).

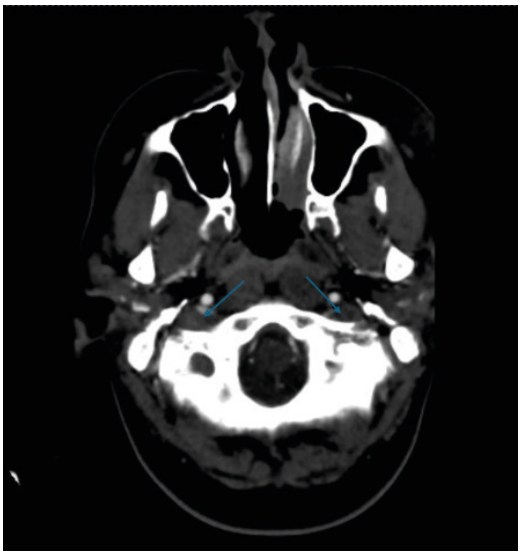

Image 7: Computed tomography angiography of the skull showing: failure of the right and left jugular veins to fill in their distal portions.

DISCUSSION

Direct visualization of CVT as hyperattenuation in the occluded sinus known as the "cord sign" is not very sensitive, as it is present in only 25%-56% of cases (VIJAY,2006)(TEASDALE, 2000), which is generally only observed in acute and subacute cases due to the isoattenuation of the thrombus 2 weeks after occlusion (VIJAY,2006).

The administration of contrast media to study the venous system (CT venography) makes it possible to identify a filling defect in the occluded dural sinus. To perform CT venography, we image the area from the calvarial apex to the C1 vertebra to visualize the origin of the internal jugular veins and administer 90 mL of a non-ionic contrast medium at a speed of 3 mL/sec with a pre-imaging delay of 45-50 seconds. For better visualization of the sinuses located immediately next to the bone, it is advisable to vary the window configuration (width, approximately 260 HU; level, 130 HU). Multiplanar, three-dimensional (3D) reconstructions and maximum intensity projection (MIP) images help in the diagnosis of CVT (WALECKI et al., 2015). The empty delta sign consists of a triangular area of contrast enhancement that surrounds a hypoattenuating area and represents the thrombus; although this sign is classically found in the superior sagittal sinus, a similar sign can be seen in sagittal and coronal images in the transverse sinus. The empty delta sign is seen in 29%-35% of cases and may be absent in the acute phases of the process, in which the thrombus is hyperattenuating (mimicking sinus opacification), and in the chronic phases, in which the thrombus may contain recanalization channels (VIRAPONGSE et al.,1987) (LEE, 2002).

CVT can be associated with skull fractures that extend to the dural sinus or jugular bulb, brain tumors, local infections and systemic causes (e.g. hormonal imbalance, surgery, hematological disease, systemic infections and dehydration), but is generally more associated with hypercoagulability generated by pro-thrombotic conditions (e.g. pregnancy, postpartum state, cancer or use of oral contraceptives) (FERRO et al.,2004) (SAPOSNIK et al, 2011). Although most patients with CVT have more than one risk factor, up to 20% of cases may be idiopathic, so the absence of risk factors does not rule out the diagnosis (WASAY et al,2008) (GABRIEL et al.,2008)(DMYTRIW et al,2018)(POON et al.,2007)

The time until the onset of CVT symptoms varies greatly. Subacute presentation occurs within 2-30 days and is the most common (50% of cases), followed by acute manifestation that occurs within 2 days and chronic manifestation that occurs after 30 days (30% and 10% of cases, respectively) (FERRO, 2004) (GUENTHER et al, 2011). The most common symptoms associated with CVT are headaches (89%-91%), motor deficits (52%-68%) and convulsions (39%-44%) (FERRO, 2004) (MASUHR et al., 2006). The clinical manifestations of CVT are generally associated with the time elapsed since the development of the disease. In the acute phases, focal neurologi-

cal deficits are commonly seen, while in the chronic phases, symptoms are related to increased intracranial pressure (GUENTHER et al, 2011) (MASUHR et al, 2006).

Abnormalities associated with the brain parenchyma may be present in up to 40%-60% of DVT cases (SASSI et al, 2016)(RENOWDEN, 2004) and are located in subcortical territories that are not in the typical arterial vascular distribution. Changes in the parenchyma tend to be located close to the drainage of the sinus involved (MEDER et al., 1994) (ZUBKOV et al., 2009). However, it is important to know that in some cases, parenchymal changes do not correlate with the site of venous occlusion (MEDER et al.,1994) (ZUBKOV et al.,2009).

Cerebral intraparenchymal hemorrhage can be observed in only 30%-35% of cases, typically in the cortex and extending subcortically (SASSI et al., 2016) (LEACH et al., 2006). Hemorrhages in the frontal and parietal lobes are more typical of thrombosis of the superior sagittal sinus, while hemorrhages in the temporal and occipital lobes are often caused by thrombosis of the transverse sinus (KEIPER et al., 1995).

Although cerebral venous thrombosis is uncommon and has a variable clinical presentation, it can present in a more extensive form, with spontaneous hyperdensity not being seen on non-contrast-enhanced computed tomography of the skull, with subsequent filling failure on contrast-enhanced computed tomography angiography of the skull. In the present study, as there are no repercussions on the brain parenchyma, it is difficult to recognize the diagnosis due to the extensive filling failure of the sinuses and veins of the brain on the contrast-enhanced CT scan, which can be confused with a predominantly arterial acquisition at the time of the scan, and one should always be sure that the CT scan of the skull acquired was in the venous phase, it is therefore important to know the parameters for acquiring contrasted CT angiography of the skull in the venous phase in order to correctly assess the venous sinuses of the skull, to recognize that most thromboses of the cerebral venous sinuses may not show spontaneous hyperdensity when studied without contrast and that repercussions under the brain parenchyma will not always be observed, making diagnosis difficult.

CONCLUSION

Extensive DVT is uncommon and difficult to diagnose because its clinical manifestations are non-specific. Early treatment is essential to reduce the rate of complications and sequelae. Imaging techniques are fundamental for its detection, so radiologists should be familiar with the imaging findings associated with this vascular condition in order to obtain the appropriate diagnosis.

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