

Cerebral Dural Sinus Thrombosis

A Case Report

Faik Budak, M.D.*
Okan Bölükbaşı, M.D.*
Ali Demirci, M.D.†
Mehmet Özmenoğlu, M.D.*
and Baki Komsuoğlu, M.D.‡

TRABZON, TURKEY

ABSTRACT

Cerebral dural sinus thrombosis is an uncommon syndrome that a patient presents with severe headache, which may be associated with complex physical and neurologic findings. The authors present a thirty-two-year-old woman with severe headache, focal motor seizures, and subsequent hemiparesis when she was ten weeks pregnant, diagnosed as having a dural sinus thrombosis by magnetic resonance imaging and magnetic resonance angiography. In this report, the application of magnetic resonance techniques, including angiography to diagnose and monitor therapy for dural sinus thrombosis, is presented.

From the Departments of *Neurology, †Radiology, and ‡Cardiology, KTÜ, Faculty of Medicine, Farabi Hospital, Trabzon, Turkey.

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Introduction

Thrombosis of a dural sinus is most commonly seen in association with pregnancy, the puerperium, the use of oral contraceptives, tumors, trauma, hematologic disorders, and rheologic causes like dehydration.^{1,2} Magnetic resonance imaging (MRI) combines the capability for direct imaging of the clotted blood in the vessels with noninvasiveness.³

The case of a thirty-two-year-old woman with dural sinus thrombosis (DST) and with diagnosis and follow-up made by MRI and magnetic resonance angiography (MRA) is presented.

Case Report

A thirty-two-year-old woman presented with severe frontal headache associated with focal motor seizures and nausea. On the day of ad-

mission, she was ten weeks pregnant. Examination revealed a 37°C temperature, mild confusion, a stiff neck, normal fundi, a left hemiparesis, left extensor plantar response, and left brisk deep tendon reflexes. Computed tomography (CT) showed a minimal hyperdense focus on the right parietal lobe. A lumbar puncture revealed an opening pressure of 52 cm cerebrospinal fluid, 416 red blood cells. Protein was 62 mg/dL, and glucose was 76 mg/dL. Coagulation tests, including fibrin, D. Dimer, prothrombin time, and partial thromboplastin time were all within normal limits.

MRI showed a hyperintense thrombus completely filling the superior sagittal sinus (SSS), right transverse sinus, and the jugular vein on sagittal and axial T1-weighted images (Figure 1). A hyperintense millimetric focus was detected as a cortical hemorrhagic infarction area on CT. Two-dimensional time-of-flight (TOF) and three-dimensional phase contrast MRA con-

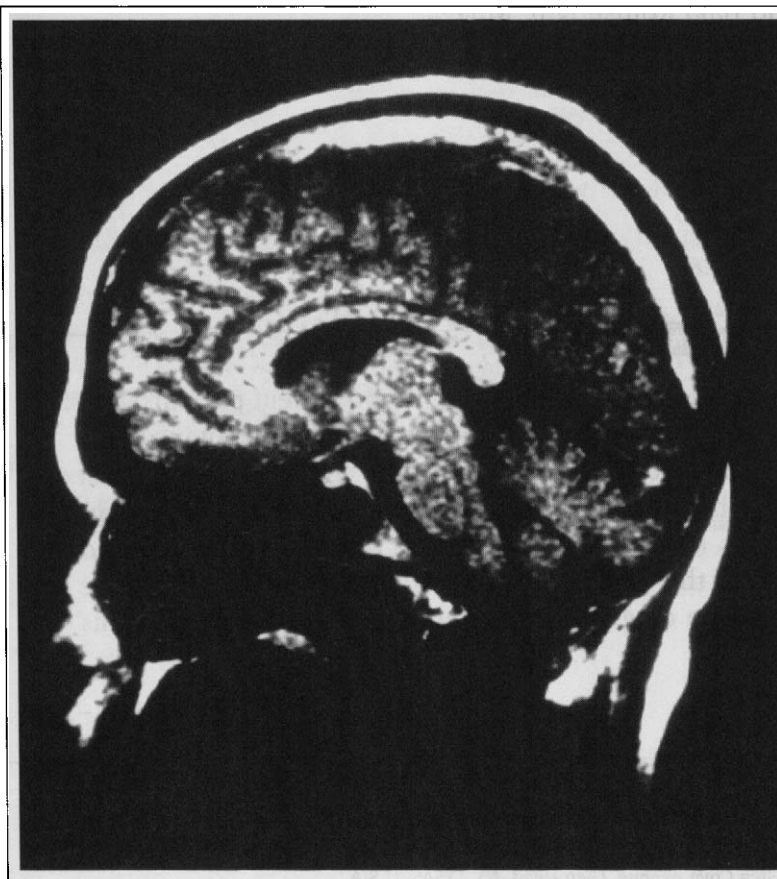


Figure 1. T1-weighted (TR/TE 450/20 ms) sagittal magnetic resonance image shows a hyperintense thrombus completely filling superior sagittal sinus.

firmed the spin-echo MR images, showing an absence of dural sinus flow on the right side. Dural sinuses of the left side showed "signal void," indicating patent lumina (Figure 2).

Second MR and MRA examination, performed two weeks later, showed that the hyperintense appearance of the SSS detected on the previous MRI was resolved this time; however, the flow void could not be detected definitely. But the hyperintensity of the right sigmoid, transverse sinuses, and jugular vein had not disappeared.

On third MR examination performed six weeks later, the thrombus in the right transverse sinus had resolved. The sigmoid sinus and jugular vein had thrombi but were partly reopened. Two-dimensional TOF MRA showed recanalized right-side dural sinuses with some residual thrombi and dilatations (Figure 3). She made complete recovery and was discharged home on a phenytoin regimen.

Discussion

The diagnosis of DST is often clinically unsuspected because the symptoms resulting from increased intracranial pressure, such as headache and emesis, are nonspecific. Other common symptoms include mild paresis, lethargy, change in the level of consciousness, and disturbance of vision.⁴

CT signs include cord and the delta signs, demonstration of dilated collateral veins, increased tentorial contrast enhancement, small ventricles, and hemorrhagic infarction or low-density areas not confined to a single arterial territory.^{5,6} These signs are inconstant, are less specific, and can be overlooked.^{4,7} Our patient demonstrated a hemorrhagic infarction of the right parietal lobe.

The superiority of MRI over CT in detection of DST is well known.^{2,4} MRI offers major advantages for evaluating these patients because

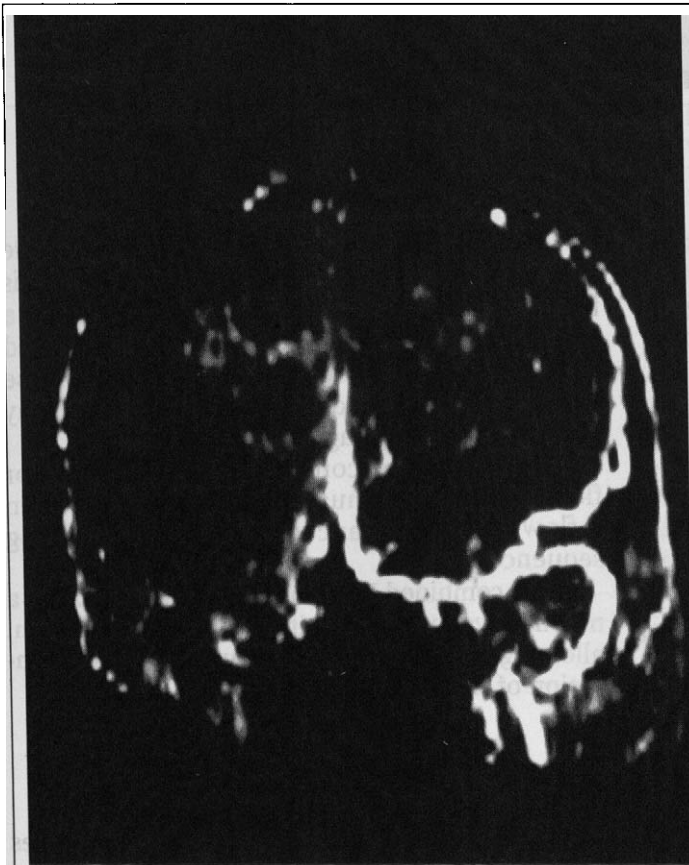


Figure 2. Magnetic resonance angiography shows an absence of dural sinus flow on the right side.



Figure 3. Magnetic resonance angiography shows recanalized right-side dural sinuses with some residual thrombi and dilatations.

of its sensitivity to blood flow, its high intrinsic contrast, and its noninvasiveness. The thrombus is isointense with brain on T1-weighted images⁸ in the case of an acute thrombosis. Thrombosis in the subacute and chronic stages shows an increased signal as compared with that of brain on both T1- and T2-weighted images because of the formation of methemoglobin.⁹ Subacute thrombus demonstrates a hyperintense signal characteristic on T1-weighted images and slightly later on T2-weighted images related to methemoglobin formation on the clot.

In this case, the noncontrast axial T1-weighted MRI demonstrated hyperintensity to brain within the superior sagittal sinus, right transverse sinus, and the jugular vein, suggesting methemoglobin. However, T2-weighted noncontrast images showed an abnormal high signal in the superior sagittal sinus, right transverse sinus, and the jugular vein, which was inconsistent with early blood denaturation product.

Angiography has been for a long a time the single direct diagnostic modality.¹⁰ However, this invasive procedure may not be ordered without a specific indication. As for CT, the use of iodinated contrast medium is potentially dangerous in these patients.⁴ It can produce dehydration that may aggravate a hypercoagulable state.

MRA provides conclusive visualization for flow in the dural sinuses in place of reliance on a flow-related enhancement effect in imaging sequences.¹¹

The combined MRI and MRA study provides a noninvasive technique without ionizing radiation, allowing direct visualization and accurate delineation of the thrombus.

Conclusion

We believe that application of MRI techniques including MRA will become the test of choice

for diagnosing and monitor therapy for dural sinus thrombosis.

Faik Budak, M.D.
KTÜ Tıp Fakültesi, Nöroloji ABD
TR 61080 Trabzon, Turkey

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