

Cerebral Sinus Thrombosis with Intracerebral Hemorrhage in Pregnancy: A Case Report

Hung-Shih Lin¹, Jui-Feng Lin¹, Cheng-Kuei Chang^{1,2}, Cheng-Chia Tsai¹, and Shiu-Jau Chen¹

Abstract- A 29-year-old woman who was pregnant for 12 weeks presented with headache for one week and drowsiness for two days. Computed tomography of the brain revealed multifocal hematomas with mass effect. Decompressive craniectomy was done to relieve the increased intracranial pressure. Magnetic resonance angiography and cerebral angiography were subsequently performed, both demonstrating thrombosis of the left transverse sinus. Treatment of sinus thrombosis generally includes correction of increased intracranial pressure and administration of anticoagulants, such as heparin. However, in this case heparin was contraindicated for the presence of intracranial bleeding, a clinical dilemma that requires careful considerations to balance treatment risks and benefits.

Key Words: Cerebral sinus thrombosis, Transverse sinus, Increased intracranial pressure, Craniectomy, Pregnancy

Acta Neurol Taiwan 2008;17:189-193

INTRODUCTION

Cerebral sinus thrombosis is an unusual cause of cerebrovascular accident, and its true incidence remains unclear. In a series of 12500 autopsies, only 16 cases of sinus thrombosis were found⁽¹⁾. Another estimation of the annual incidence is 3 to 4 cases per 1 million people, with 75% of the patients being female⁽²⁾. The overall mortality in a prospective study of 624 patients was 8.3%⁽³⁾. The clinical conditions commonly associated with sinus thrombosis include infection, dehydration, rheumatologic diseases, trauma, nephritic syndromes, anti-thrombin III deficiency, cancer, oral contraceptive

use, and pregnancy⁽⁴⁾. Cerebral sinus thrombosis accounts for 2% of pregnancy-related strokes⁽⁵⁾, and the risk is especially high during the last trimester of pregnancy or after delivery⁽⁶⁾. In a study on stroke during pregnancy in Taiwan, the incidence of pregnancy-related stroke were 46.2 per 100,000 pregnancies, and there were 11 cases of cerebral sinus thrombosis among the 49 patients with stroke during pregnancy or puerperium⁽⁷⁾. Symptoms and signs may include headache, papilledema, focal deficits, seizures, changes in mental status, or frank coma⁽⁴⁾. Transverse sinus thrombosis usually involves the temporal lobe and may result in hemorrhage⁽⁸⁾. We report a case of cerebral venous

From the ¹Division of Neurosurgery, Mackey Memorial Hospital, Taipei, Taiwan; ²Graduate Institute of Injury Prevention and Control, Taipei Medical University, Taipei, Taiwan.

Received January 30, 2008. Revised February 22, 2008.
Accepted May 28, 2008.

Reprint requests and correspondence to: Jui-Feng Lin, MD, Division of Neurosurgery, Mackey Memorial Hospital, Taipei, Taiwan, No. 92, Sec. 2, Zhongshan N. Road, Taipei, Taiwan.
E-mail: lifgod@yahoo.com.tw

thrombosis with hemorrhage, a situation that complicates the decisions on the treatment.

CASE REPORT

A 29-year-old woman who was G1P0 and pregnant at 12 weeks was brought to the emergency department because of headache with nausea and vomiting for one week and drowsiness for two days. According to her family, she had no complaints of recent fever, chills, or visual difficulties. The headache was described as throbbing and persistent pain located in the left temporal region. The pain was unresponsive to oral analgesics and was aggravated in the morning when awaking. Also, the headache had become sharp and increased in severity for the recent two days. On examination, she was oriented to person, time, and place but had a slowed verbal response (Glasgow Coma Scale: E4M6V4). The pupils were isocoric and reacted normally to light. No focal neurologic deficits were present. The hemoglobin, prothrombin time and partial thrombin time were within normal limits. Electroencephalography revealed decreased background activity and slow waves in the left hemisphere, consistent with a space-occupying lesion.

Subsequently, the patient's mental status declined to E4M5V2 and right hemiparesis developed. Computed tomography (CT) of the brain demonstrated multifocal hematomas in the left temporal and occipital regions, maximally $\sim 4 \times 3 \times 1.5 \text{ cm}^3$ in size and showing evidence of mass effect (Fig. 1). Decompressive craniectomy of the left fronto-temporo-parietal region was performed. An external ventricular drainage tube and a Codman intracranial pressure (ICP) monitor were placed. The ICP returned to normal immediately with craniectomy, so the parenchymal hematomas were not evacuated as to preserve as much cortex as possible. Postoperatively, propofol was given by continuous infusion to sedate the patient through the first night. She regained full consciousness the following day. The pregnancy was terminated five days after cranial surgery. Magnetic resonance angiography and cerebral angiography demonstrated absence of blood flow within the left transverse sinus, indicating transverse sinus thrombosis



Figure 1. Brain computed tomography revealing multifocal hematomas in the left occipitotemporal region with perifocal edema and mass effect.

(Fig. 2).

Postoperatively, the ICP ranged between 6 and 18 mmHg without vivid fluctuation. No anticoagulants or thrombolytic agents were given throughout the three-week hospitalization. The patient recovered well to have independent daily activities, and was discharged with only slight non-fluent aphasia. A follow-up brain CT 12 weeks after surgery showed encephalomalacia in the speech area (Fig. 3). In the 16th week after operation, Cranioplasty was performed. CT venography revealed that the left transverse sinus was free of thrombus and had excellent blood flow (Fig. 4). The patient continues to be slightly aphasic but has no other motor or sensory deficits.

DISCUSSION

This case illustrates some of the challenges in the treatment of cerebral sinus thrombosis in pregnancy. Because of the low incidence and different etiologies of cerebral sinus thrombosis, there are no clear-cut stan-

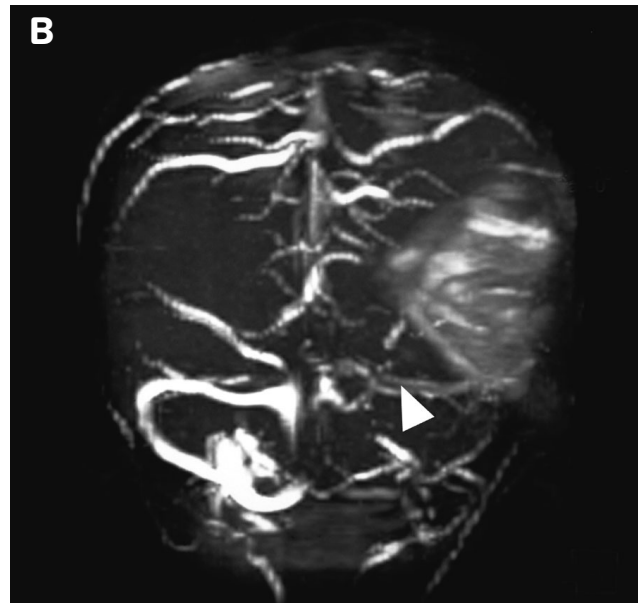
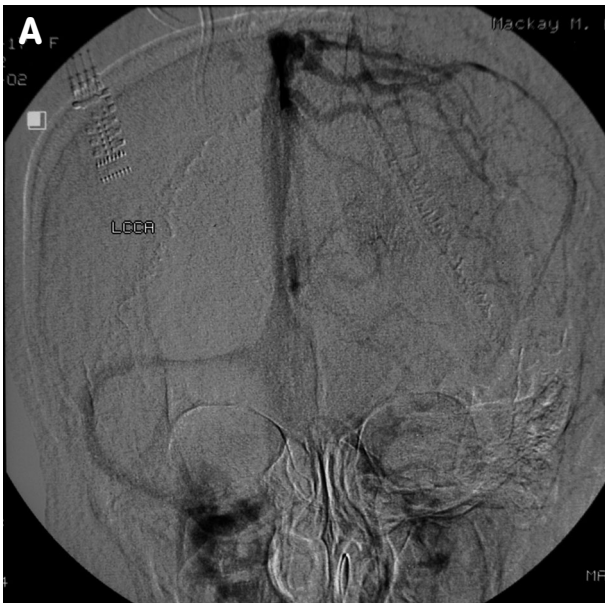


Figure 2. (A) Cerebral angiography demonstrating absence of blood flow within the left transverse sinus, indicative of occlusion of the sinus. (B) Magnetic resonance angiography showing no flow in the left transverse sinus (arrowhead).



Figure 3. Encephalomalacia on brain computed tomography 12 weeks postoperatively.

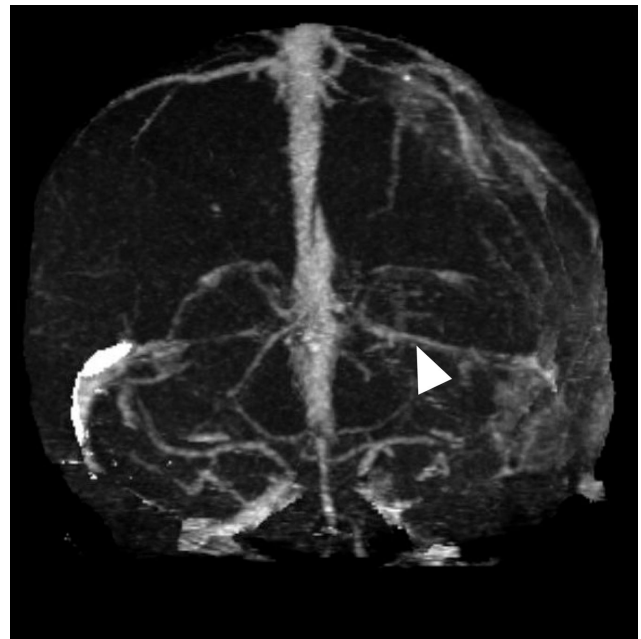


Figure 4. Computed tomographic venography 16 weeks post-operatively showing the presence blood flow within the left transverse sinus, indicative of recanalization of the sinus (arrowhead).

dards to follow. Some authors recommend heparin^(2,9), but about 40% of patients with sinus thrombosis have hemorrhagic infarcts and are therefore poor candidates for anticoagulation⁽²⁾. Two clinical trials compared heparin with placebo in the treatment of cerebral sinus thrombosis^(10,11), and both showed no significant benefit of anticoagulation. Low-molecular-weight heparin has been widely recommended for the treatment of venous thrombosis, pulmonary embolism, recurrent miscarriage, and antiphospholipid antibody syndrome in pregnancy, but it is not clear if they are superior to unfractionated heparin⁽¹²⁾. Major bleeding, of course, is one of the most severe potential complications of any form of heparin therapy, and may well be life-threatening in a woman undergoing spontaneous abortion. Our patient had several contraindications to the use of heparin, including the intracranial hematomas and planned termination of the pregnancy. Fortunately, she made a good neurologic recovery and had complete recanalization of her left transverse sinus later. Thrombolytic agents are theoretically an alternative to anticoagulation. However, as of 2004, there were no controlled trials investigating the efficacy and safety of thrombolytic therapy in dural sinus thrombosis⁽¹³⁾.

Prompt, aggressive surgery to prevent further brain damage is indicated in patients with cerebral sinus thrombosis if the ICP is markedly elevated and the patient is in danger of brain herniation^(14,15). Impairment of venous flow and of cerebrospinal fluid absorption, in addition to brain edema, are the main causes of elevated ICP in patients with cerebral sinus thrombosis⁽²⁾, and herniation would further worsen the whole situation. Decompressive craniectomy may therefore be the only option to break this life-threatening cycle, allowing time for the formation of collateral venous circulation and resumption of adequate venous drainage⁽¹⁵⁾. An additional contribution of the surgery to this reported patient is that the ICP dropped immediately with craniectomy and duraplasty, obviating the need for immediate evacuation of the patient's intracerebral hematoma. Large brain areas that appear to be involved in hemorrhagic infarct are functionally or metabolically disturbed but not irreversibly damaged⁽¹⁶⁾. Attempts to remove the hematoma

may thus damage the brain tissue that might otherwise recover. This issue is still controversial, with isolated case reports either arguing for or against direct thrombectomy⁽¹⁷⁻²⁰⁾.

CONCLUSION

While one may recommend the use of anticoagulants in cerebral sinus thrombosis in theory, this case illustrates the imperativeness of individualization of therapy. The same could be said of advice that intracerebral hematomas be evacuated. This patient's hemorrhage was a clear contraindication to heparin. Her increased ICP requires immediate surgery to relieve the pressure. The effect of the surgery was so remarkable that we felt safe to leave the hematoma untouched. The good neurological recovery achieved in this patient was certainly not guaranteed, nor would the same management work in every case. Rather, we wish to raise the issues that must be considered in similar cases, and provide an example of how an individualized approach may be worked out.

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