Case Report

Intracranial Hemorrhage Diagnosed with Transcranial Ultrasound in a Comatose, Postliver Transplant Patient

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Transcranial ultrasound is a well validated diagnostic technique used to assess cerebral perfusion or to detect structural damage in intensive care unit patients. We report a case of an intracranial hemorrhage first suspected during a trans-cranial Doppler assessment of a postorthotopic liver transplant patient. The patient was at considerable risk of bleeding, due to a primary graft nonfunction, but he had also elevated ammonium levels, justifying the comatose state, and no focal neurological deficits. The clinical conditions were unstable, making the transportation to the radiology suite at elevated risk. The hemorrhage was identified by B-mode ultrasound before the development of focal neurological signs or alterations in the middle cerebral artery Doppler flow and optical nerve sheath diameter. We suggest that transcranial B-mode ultrasound may prove useful as a monitoring tool in selected patients, also providing early clinical suspicion for the onset of intracranial hemorrhage even before the development of intracranial hypertension or focal neurological deficits.

Key Words: Transcranial ultrasound—liver transplantation—acute graft malfunction—intracerebral hemorrhage—intracranial hypertension

Case Report

Transcranial Doppler and ocular nerve sheath diameter (ONSD) ultrasound measurement are validated tools for the monitoring of the critically ill patient.[1,2] Both techniques have proven useful in the evaluation of intracranial hypertension secondary to various CNS conditions. Transcranial ultrasound is also used to assess structural damage to the brain, such as intracranial hemorrhage, midline shift, space-occupying lesions. Most of the published literature on the topic is based on neonatal patients, in whom the anterior fontanelle is used as an acoustic window to the cranial vault.[3]

There have been some reports of structural lesions firstly identified with ultrasound, but to our knowledge this is the first case of a hemorrhage identified in a Postorthotopic liver transplantation (OLT), comatose patient with no focal neurological deficits.

A 60 years old male was admitted to our intensive care unit (ICU) for monitoring and stabilization after an OLT. The transplant indication was hepatocellular carcinoma. model of end-stage liver disease score was 35. Comorbidities included: systemic hypertension, obesity and metabolic syndrome. We started vasopressor support with noradrenaline (max 0.6 mcg/kg/min) in the operating room and continued in the ICU due to refractory hypotension. Weaning was not started due to altered neurological status. During the following days, the liver function tests showed a severe malfunction of the graft. The patient was comatose, with a GCS of 5 and no focal deficits. The ongoing diagnosis was metabolic coma due to hyperammonemia. On day 5 postoperative, a transcranial Doppler and ONSD ultrasound measurement were performed to assess the blood flow to the brain and

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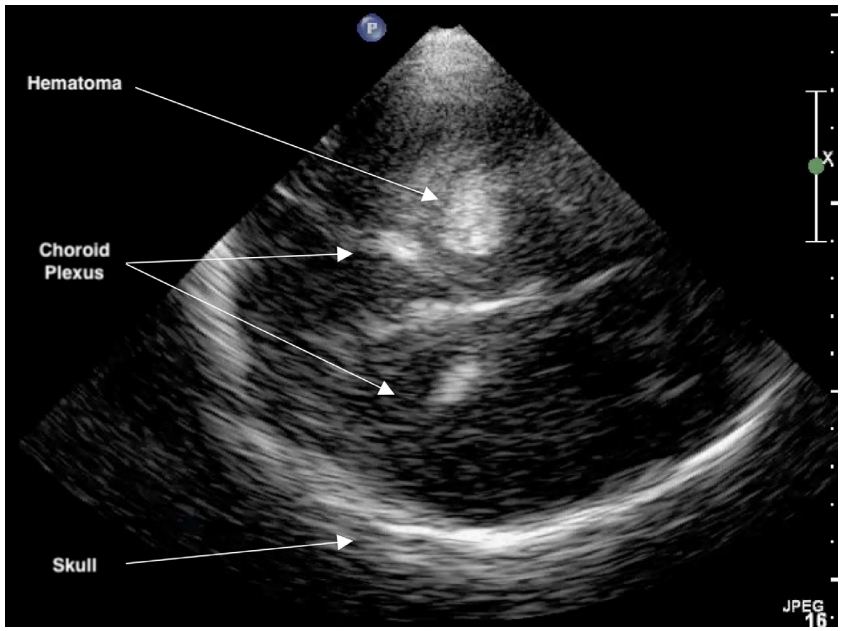

Figure 1. *Transcranial Doppler showing hyperechoic with well-defined edges and nonhomogeneous content lesion.*

screen for intracranial hypertension. As a collateral finding, a 5 mm midline shift was detected at the level of the third ventricle and a lesion was located on the right parietal lobe (Fig 1). Given the clinical picture, the suspicion was high for an intracranial hemorrhage, so a plain CT scan was ordered. CT scan showed a massive hemorrhage of the right temporal lobe, extending to the ventricular system, with an associated bilateral parieto-occipital SAH and a 5 mm midline shift. No surgical intervention was indicated. There was no improvement, leading to the death of the patient two weeks later.

Although Doppler monitoring and ONSD measurement are already validated and frequently adopted techniques, this case shows the importance of an often-underused tool at our disposal: B-Mode echography, which can show structural alterations, such as hemorrhage or mid-line shift, which can even precede the hemodynamic alterations seen on Doppler.

Declaration of Competing Interest

The authors have declared that no conflict of interest exists.

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