

# Contralateral Cerebral Infarction Following Vacuum Extraction

Manoj Kumar, M.B.B.S., M.D.,<sup>1</sup> Sanja Avdic, M.D., F.A.A.P.,<sup>1</sup>  
and Bosco Paes, M.D., F.R.C.P.C., F.R.C.P.I.<sup>1</sup>

## ABSTRACT

Cerebral infarction is a rare complication following a vacuum-assisted delivery occurring on the side of the vacuum application and often accompanied by a cephalhematoma. We report a case of cerebral infarction that was contralateral to the side of the vacuum application in a term baby. The baby presented with seizures in the immediate neonatal period. There was no fracture of the skull to account for a contusion injury. We discuss the mechanisms of intracranial vascular injuries during the process of natural and assisted birth.

**KEYWORDS:** Cerebral infarction, contralateral, vacuum

## CASE REPORT

A 32-year-old, gravida 3 woman with a previous history of two miscarriages at 7 and 6 weeks of pregnancy developed spontaneous onset of labor at 39 weeks' gestation. Her antenatal course was uncomplicated. She was treated with progesterone in the first 12 weeks of pregnancy and prophylactic low-dose aspirin subsequently because of the history of previous miscarriages. A vacuum extraction was performed following prolonged second stage of labor after epidural anesthesia. The vacuum cap was placed over the right parietal bone because of fetal malposition in the brow presentation. Vacuum extraction was performed without any difficulty,

and a 2870-g male infant was born with Apgar scores of 7 and 9 at 1 and 5 minutes, respectively. Umbilical cord blood gases were normal.

The infant was admitted to the special care nursery for observation because of a history of maternal fever of 38.5°C prior to delivery and a vacuum extraction. On initial examination, the infant was noted to be jittery, without clonus, and the rest of the neurological assessment was normal. There was a large cephalhematoma over the right parietal bone with bruising of the face and scalp.

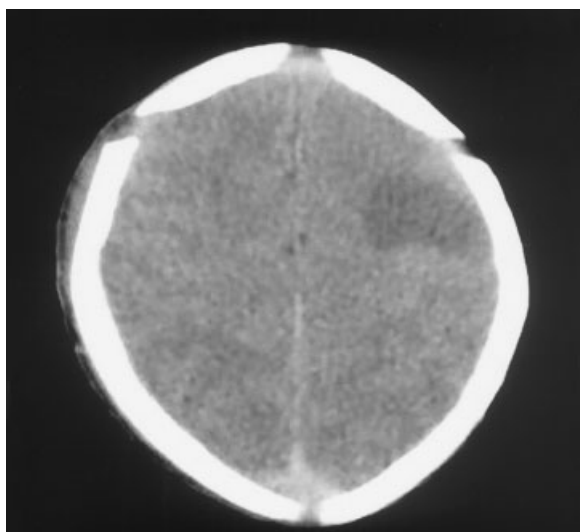
Initial blood counts showed normal hemoglobin with a mild left shift, following which a partial septic evaluation was done and antibiotics were started. The initial serum glucose was

*American Journal of Perinatology*, Volume 21, Number 1, 2004. Address for correspondence and reprint requests: Manoj Kumar, M.B.B.S., M.D., Division of Neonatology, Department of Pediatrics, Room 4G40, McMaster Children's Hospital, 1200 Main Street West, Hamilton, Ontario, Canada L8S 4J9. <sup>1</sup>Division of Neonatology, Department of Pediatrics, McMaster Children's Hospital, Hamilton, Ontario, Canada. Copyright © 2004 by Thieme Medical Publishers, Inc., 333 Seventh Avenue, New York, NY 10001, USA. Tel: +1(212) 584-4662. 0735-1631,p;2004,21,01,015,017,ftx,en;ajp39060x.

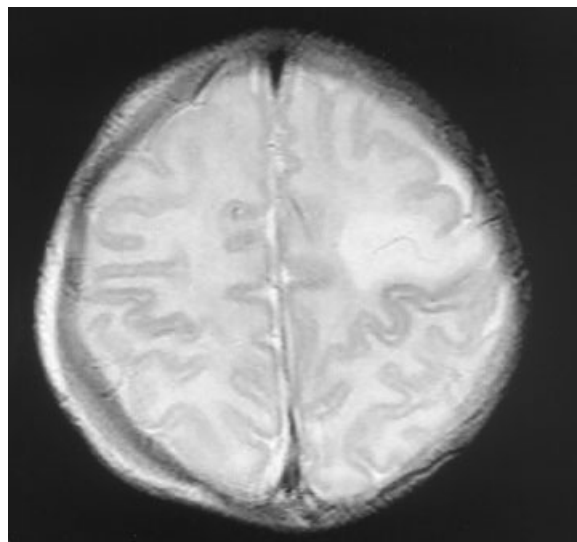
1.5 mmol/L; however, further values were in the normal range. Hypomagnesemia of 0.62 mmol/L was treated with intravenous magnesium sulfate.

At 18 hours of age the infant developed generalized tonic-clonic seizures lasting for 2 minutes, which were followed by five more episodes of right-sided seizures, ranging in duration from 20 seconds to 5 minutes. A loading dose of phenobarbitone was commenced and no further seizure activity was noted. A head ultrasound revealed a possible left periventricular bleed. Transfer to a tertiary care center for further investigation was instituted.

Computed tomography of the brain showed an infarct, likely arterial in origin, identified by a low-density area in the left anterior parietal region, without any abnormal blood vessels (Fig. 1). Magnetic resonance imaging (MRI) confirmed the infarct in the left posterior frontal lobe (Fig. 2). MRI angiography revealed a hypoplastic A1 segment of the left anterior carotid artery, with the rest of the circle of Willis being normal; no occlusion or embolus was noted. MRI venography results were normal, with patent dural sinuses and deep cerebral veins. An electroencephalogram showed poorly formed sharp and slow waves over the left frontal and central region in keeping with a structural abnormality.



**Figure 1** Computed tomography scan showing a low-density area in the left parietal region consistent with an arterial infarct.



**Figure 2** MRI T2-weighted image confirming the location of the infarct in the posterior frontal lobe.

Echocardiography showed no obvious intracardiac thrombus. Serum ammonia, lactate, liver function tests, and urine screen for homocystinuria were normal. Protein C, protein S, antithrombin III, anticardiolipin, and antiphospholipid antibody levels were appropriate for age. Placental histopathology was normal. The infant made an uneventful recovery. The neurological exam was normal at the time of discharge home and at 3 months of age.

## DISCUSSION

At the onset we were uncertain if the vacuum application with a resulting ipsilateral hematoma could explain contralateral cerebral infarction. An extensive diagnostic evaluation for known causes of thrombotic disorders in the newborn period (namely, protein C, protein S, and antithrombin 3 deficiency states, antiphospholipid syndrome, homocystinuria, polycythemia, mitochondrial disorders, and magnetic resonance angiography for vascular malformations), revealed no abnormality. More importantly, a full coagulation profile was normal, excluding low-dose aspirin, as a potential

etiology for the disorder. Low-dose aspirin is efficacious in recurrent miscarriage and is considered safe without adverse effects on the newborn.<sup>1,2</sup>

Mechanical birth trauma has been recognized as a direct cause of intracranial arterial injury leading to ischemic or hemorrhagic stroke in the newborn. The trauma could result from the process of natural birth or from assisted instrumentation with forceps or ventouse. Various mechanisms have been postulated for the injury including laceration of the middle meningeal arteries, spasm, dissecting aneurysm, local thrombus formation resulting from mechanical damage of the vessel wall from extreme stretching, and occlusion of the posterior cerebral arteries after uncal herniation or of the middle meningeal artery following a subdural hematoma.<sup>3-5</sup>

This case is unusual because the cerebral infarction occurred contralateral to the site of the vacuum application. A broad search of the scientific databases revealed only one previously reported case of contralateral cerebral infarction following ventouse use.<sup>6</sup> The authors speculated that brain shifts had occurred during traction, leading to stretching of the intracerebral arteries. However, they failed to document the results of pertinent investigations that may have had an association with the outcome of interest.

This report heightens awareness about contralateral cerebral infarction as a rare complication

following ventouse application. It remains important to exclude all relevant causes of infarction before implicating a vacuum-assisted delivery as the underlying pathogenesis. In the absence of any identifiable cause, the infarction may be considered due to the skull being subjected to abnormal forces during the process of birth, especially when there is history of difficult labor.

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