

# Neonatal Posterior Fossa Haemorrhage Associated with Vacuum Extractor

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## Summary

We report one case of posterior fossa intracranial haemorrhage in a full-term Malay baby boy following vacuum assisted delivery. The patient, a term baby boy was delivered by a vacuum extraction and later developed signs of increased intracranial pressure 72 hours after birth. Computed tomography (CT) of the brain showed a posterior fossa intracranial haemorrhage with acute obstructive hydrocephalus. He was initially treated with isolated ventricular shunting which later caused an upward cerebellar herniation. An immediate suboccipital craniectomy for evacuation of cerebellar haematoma was performed which resulted in a gradual recovery.

**Key Words:** Posterior fossa haemorrhage, Cerebellar haemorrhage, Vacuum extraction

## Introduction

The posterior fossa haemorrhage associated with assisted vaginal delivery using vacuum extractor in the term has been infrequently reported. It has been shown that maternal morbidity is much less with ventouse vacuum extraction compared with forceps. However, ventouse assisted delivery is not without risk<sup>1</sup>. We describe a case of neonatal posterior fossa intracranial haemorrhage following ventouse delivery, which was managed at the Department of Neurosciences, USM.

## Case Report

A 29 year old Malay lady in her second pregnancy with an uneventful antenatal period was admitted in spontaneous labour at term. A decision for instrumental delivery with vacuum extractor was made because of the delay in the second stage of labour and maternal exhaustion. A baby boy weighing 2.2kg was born with an Apgar score of 7, 9 and 10 at 1, 5 and 10 minutes,

respectively. His head circumference at birth was 33cm (75th to 90th centile) with some scalp boggiess over the occiput. At seventy two hours of life, the infant developed respiratory distress requiring oxygen supplement. During this time, the baby appeared less active, lethargic and not feeding well. The haemoglobin had fallen from 11.5 g/dl to 10.5 g/dl. His head circumference increased from 33cm at birth to 35cm. The anterior fontanelle was full and the sutures slightly wide. There was no focal neurological deficit. Immediate cranial ultrasound showed gross ventriculomegaly without any evidence of hemorrhage. The computed tomography (CT) of the brain showed a vermian cerebellar haemorrhage with intraventricular bleed in the fourth ventricle and both occipital horn of the lateral ventricles causing obstructive hydrocephalus (Fig. 1). Following this, the patient was referred to us at day five of life. On the day seven of life, he underwent a ventriculoperitoneal shunt for the hydrocephalus. Post-operatively he was extubated and breathing spontaneously. Five hours later, he developed a period of irregular breathing, hypotensive and bradycardia. Later he progressed to an episode of

This article was accepted: 10 August 2005

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apnoea and required an intermittent positive pressure ventilation. A diagnosis of reverse herniation was made and he underwent a suboccipital craniectomy and evacuation of cerebellar haemorrhage. Forty eight hours after surgery, he was successfully extubated without any complication. He was progressing well and was discharged at day fourteen of life. The post-operative CT scan showed a resolution of cerebellar hemorrhage and hydrocephalus.

## Discussion

The use of vacuum-assisted delivery was first reported in 1705. However, the consistent use of the vacuum extractor was not established in clinical practice until 1954<sup>1</sup>. Since then, various modifications of the cup have occurred over time to decrease both maternal and fetal complications.

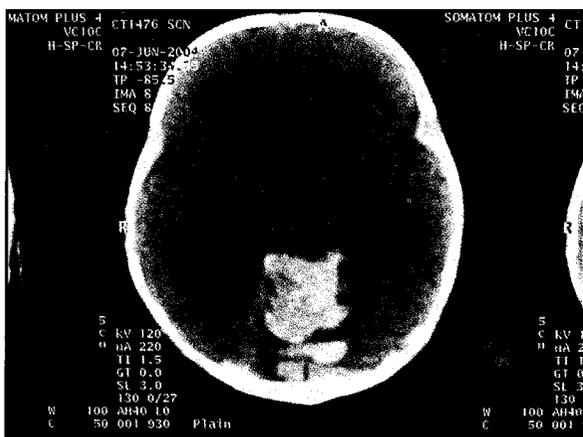
One of the main concerns regarding the safety of vacuum-assisted delivery is the risk of cranial trauma such as cephalhaematomas, subgaleal haemorrhage, intracranial haemorrhage and subdural haemorrhage due to tentorial tears. Haemorrhagic complications associated with ventouse delivery have an incidence of 0.72% and mortality of 0.2%<sup>1</sup>. In Malaysia, the incidence of subaponeurotic hemorrhage was significantly higher in neonates delivered by vacuum extraction than by other modes of delivery. However, the incidence of posterior fossa hemorrhage is low<sup>2</sup>. The diagnosis of

subgaleal haematoma is suspected when the cranium is boggy, the sutures separated and the head circumference is rapidly increasing. The intracranial haemorrhage may manifest in the form of tentorial subdural haemorrhage and intracerebellar haemorrhage. The majority of instances of significant subgaleal haemorrhage and intracranial haemorrhage are usually related to multiple attachment of the vacuum cup, duration of application longer than 10 minutes, prolonged second stage and paramedian placement of the cup. Our case report showed a cerebellar vermian haemorrhage with intraventricular blood clot. The mechanism that produces haematoma involving the cerebellum is caused by tentorial tearing and laceration of the inferior surface of the cerebellum produced by osteodiasis of the posterior intraoccipital synchondrosis. This mechanism appeared to account for intracranial haemorrhage in our case. On the other hand, the mechanism that cause tentorial subdural haemorrhage is attributed to vertical tentorial stretch with elongation of cranium in the occipitofrontal direction leading to rupture of the tributaries of Galen's vein at its fixed juncture to the straight sinus.

With regard to management, Govaert et al<sup>3</sup> proposed neurosurgical intervention via a craniotomy to remove the clot in case of life-threatening brain-stem compression and acute obstructive hydrocephalus. If intervention is required, craniotomy of the posterior fossa for removal of as much clot as possible should be the first procedure followed by ventricular drainage or permanent shunting. As illustrated in our case, isolated shunting carries the risk of reverse or upward cerebellar herniation which requires immediate intervention to remove the haematoma.

## Conclusion

We describe a relatively uncommon but life-threatening complication of assisted-vaginal delivery with vacuum-extractor. It is a treatable condition but requires an awareness and prudent judgment by those involved in the care of the newborn such as the obstetrician and neonatologist so that prompt neurosurgical referral and management is delivered early. This case illustrates the importance of early craniotomy and clot evacuation in order to minimize the complication of upward herniation with isolated ventricular shunting. A safe method is to perform craniotomy of the posterior fossa for the removal of as much clots as feasible and if necessary, ventricular drainage or shunting.



**Fig. 1: Initial CT brain showing vermian cerebellar haemorrhage with intraventricular extension causing obstructive hydrocephalus.**

## CASE REPORT



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