

CASE REPORT

Antenatal Traumatic Brain Injury Secondary to Maternal Motor Vehicle Accident

SHAMALA N, FAIZAL AH

Department of Emergency Medicine, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaacob Latif, Bandar Tun Razak, 56000 Cheras, Kuala Lumpur, Malaysia

ABSTRAK

Trauma merumitkan 1 daripada 12 kehamilan. Rawatan perubatan wanita mengandung agak berbeza kerana kandungan boleh mengubah fisiologi si ibu. Tambahan pula, janinnya mempunyai potensi untuk menjadi mangsa kedua kejadian. Di Jabatan Kecemasan, rawatan yang diberi perlu memfokus kepada diagnosis kecederaan yang dialami oleh janin dan prognosinya untuk masa hadapan. Kecederaan otak janin berpunca dari kemalangan si ibu boleh berlaku tetapi agak jarang. Kes kami melibatkan seorang wanita mengandung yang berumur 22-tahun dan terlibat dalam kemalangan jalan raya. Rawatan awal tidak mengesan sebarang kecederaan janin tetapi selepas kelahiran pre-matang mendapati ianya mengalami kecederaan otak akibat kemalangan tersebut. Diagnosis melalui gelombang ultrasonik dan tempoh pemerhatian menggunakan alat pemantauan janin boleh meningkatkan pengesanan dan rawatan kecemasan boleh diberi pada kes-kes sebegini.

Kata kunci: pranatal, keibuan, luka memar otak, trauma

ABSTRACT

Trauma is thought to complicate 1 in 12 pregnancies. The management of trauma during pregnancy requires special consideration because pregnancy alters maternal physiology and the foetus is a potential collateral victim. The approach of these cases in the setting of the Emergency Department should not only be diagnostic for any foetal injuries but also prognostic for any future undue outcome. Antenatal traumatic brain injury is a rare but real complication of maternal blunt force trauma. Our case involves a 22-year-old primigravida who suffered a motor vehicle accident and on initial assessment revealed normal foetal assessment but

Address for correspondence and reprint requests: Dr. Shamala Nair. Department of Emergency Medicine, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaacob Latif, Bandar Tun Razak, 56000 Cheras, Kuala Lumpur, Malaysia. Tel: +6016-3635092 E-mail: sham_128@outlook.com

subsequently after premature labour revealed a new born with traumatic brain injury. Early ultrasonographic evaluation and observational period with continuous electronic foetal monitoring may improve the detection and emergent treatment in these cases.

Keywords: antenatal, contusion, maternal, trauma

INTRODUCTION

Trauma is one of the leading causes of nonobstetric maternal death in the world (Mendez-Figueroa et al. 2013). Trauma is usually the resultant of motor vehicle injuries, falls or domestic violence and are subdivided to blunt and penetrating injuries (Rogers et al. 1999). According the World Health Organization, every year the lives of more than 1.25 million people are cut short as a result of a road traffic accidents. Between 20 and 50 million more people suffer non-fatal injuries, with many incurring a disability as a result of their injuries (Khor et al. 2017; Nelson et al. 2016; Kuehn 2018). In Malaysia alone, in the year 2016, 521466 motor vehicle accidents were reported by the Asean Road Safety Centre. The common causes of foetal morbidity and mortality in the second or third trimester following blunt abdominal trauma includes maternal death, placenta abruption, uterine rupture and/or foeto-maternal haemorrhage (Esposito et al. 1991; Jain et al. 2015).

However, direct foetal injury resultant from a maternal blunt force abdominal trauma is rare as it is perceived that the protective nature of the maternal uterus, amniotic fluids

and soft tissue prevents direct injury to the unborn. Cases that have been previously reported involving in-utero skull fractures and intracranial haemorrhage invariably involves maternal pelvic fracture, a feature that was absent in our case (Piastra et al. 2009).

CASE REPORT

A 22-year-old, primigravida was involved in a motor vehicle accident during her third trimester-POA at 34 weeks and 3 days. The victim was a passenger in a van that skidded and lost control, subsequently resulting in her being ejected from the vehicle. The exact distance of her being propelled from the vehicle was unknown. She was not restrained by a seatbelt at the time of incident. She was brought to the Emergency Department of a district hospital and found to have sustained fractures of the right lateral and medial malleolus. Any loss of consciousness, vomiting, dizziness, or bleeding from the ear, nose and throat was ruled out. Foetal assessment via ultrasonography by the Obstetrics team (as per local protocol) during that setting revealed good foetal movement and present foetal heart rate. There was no evidence of placental abruption and

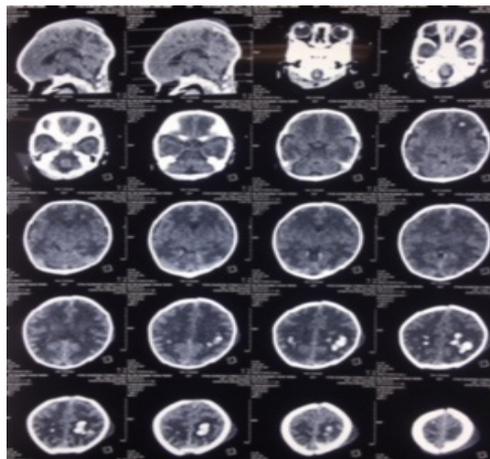


Figure 1: CT- Brain at Day 2 of life

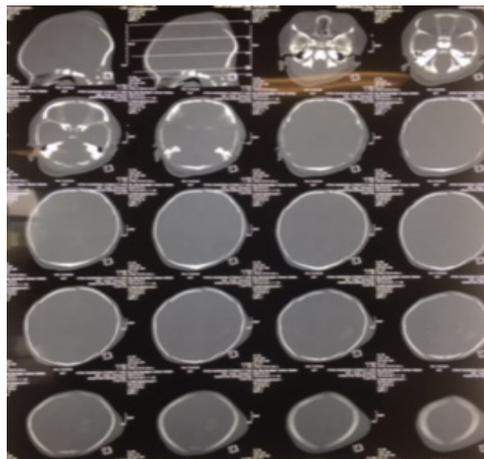


Figure 2: CT-Brain, bone window

no signs of pervaginal bleeding. She was admitted to the Orthopaedic wing for fracture stabilization.

About 12 hours later, the victim developed signs of labour. Noted poor beat to beat progression on cardiotocography (CTG). IM Dexamethasone single dose was given and subsequently child was delivered via emergency caesarean section for foetal distress. The baby was born not vigorous with Apgar of 6/8 and intubated for airway protection (Figure 1). Survanta given once and the infant were put on High Frequency Oscillatory Ventilation (HFOV) for a total of 12 hours, and subsequently weaned down to lower ventilator setting. In the ward, the infant developed tonic clonic movement involving both upper limbs with no involvement of lower limbs at 7 hours of life and another episode at 20 hours of life. The seizure was stopped with anti-convulsant agents and the infant was started on intravenous antibiotics as meningitis was a primary concern.

Subsequently an ultrasound

cranium was done. It revealed a lesion over left parietooccipital region, a possible sequelae of intraparenchymal bleed. A CT-brain was done (Figure 2 and 3), with the findings of multiple bilateral intraparenchymal contusional bleed, more over the left parietal region about 1.2 cm and hematoma over the parietal site. There was also a concurrent ipsilateral fracture. The case was referred to the Neurosurgical team and planned for conservative



Figure 3: CXR post intubation

management.

The infant was subsequently weaned off to room air. Complete screening of inborn error of metabolism (IEM), haemophilia and bleeding disorders was done with negative results (Table 1).

DISCUSSION

This case describes traumatic antenatal brain injury secondary to the motor vehicle accident sustained by the mother. Even the slightest of maternal trauma can result in adverse outcome usually secondary to placenta abruption. This is believed to be due to the fact that placenta does not have elastic tissue and thus has no capability to expand and contract (Grossman et al. 2004). In contrast, the uterus contains elastic tissues and can adapt to acceleration – deceleration forces by changing its shape resulting in the generation of very high intrauterine pressure. In our case however, it is likely that the injury sustained during the motor vehicle accident was a direct blunt force trauma.

Many international clinical practice guidelines including the board of the American Family Physician and Society of Obstetrician and Gynecology (1998) has established an algorithm for management of pregnant women after trauma. They have incorporated ultrasonography assessment (Mirza et al. 2010) for evaluation of foetal viability/size, gestation age, position, uteroplacental separation, uterine rupture and biophysical profile (Achiron et al. 1993). However, studies show that diagnosis of intracranial haemorrhage is usually made late in second/third trimester. The most common finding are ventriculomegaly and hyperechoic lesions in the brain parenchyma in the presence of intracranial haemorrhage (Catanzarite et al. 1995).

MRI evaluation adds little information compared to prenatal ultrasound. Findings of small volume contusional bleeds via ultrasounds are still controversial.

Additional continuous electronic heart monitoring CTG (Shy et al. 1990) for all gestations that are more than 24 weeks is also advocated. This is to

Table 1: Investigation at the time of admission

Full Blood Picture	Hb	93.0 g/L
	WBC	7.9 x 10 ⁹ /L
	PCV	0.271 L/L
	Retic	6.8%
CRP	CRP	0.67 m/L
Renal Profile	Urea	2.1 mmol/L
	Sodium	147 mmol/L
	Potassium	3.8 mmol/L
	Chloride	121 mmol/L
	Creatinine	57 µmol/L
Calcium	Ca	1.92 mmol/L
Phosphate	PO ₄	1.10 mmol/L

be carried out for at least 4 hours and if no signs of foetal distress is elicited they are deemed safe to be discharged home. Abnormal electronic-foetal-monitoring tracings can be detected in intracranial haemorrhage.

When head trauma results in a cerebral contusion, the haemorrhagic lesion often progresses during the first several hours after impact, either expanding or developing new, non-contiguous haemorrhagic lesions, a phenomenon termed haemorrhagic progression of a contusion (HPC) (Kurland et al. 2012). Delayed bleed and expansion in extreme ages has been suggested.

The outcome and clinical manifestation of foetal intracranial haemorrhage was strongly related to the grade of the lesion (Ghi et al. 2003) thus judicious duration of observation is warranted.

CONCLUSION

Pregnancies complicated by trauma is associated with significant maternal and perinatal morbidity and mortality. Foetal assessment in management of trauma in pregnancy should include both component of ultrasonography and continuous electronic foetal monitoring. Observation for minimum of 4 - 6 hours is suggested as HPC may occur and diagnostic manifestation via these modalities can become evident only after certain duration. These algorithms should be standardized for all traumas in pregnancy in the Emergency Department to prognosticate any adverse outcomes.

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Received: 8 Mar 2018

Accepted: 2 Aug 2018