

Original Article

Intracranial hemorrhage in infants after massaged by a traditional birth attendant

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Abstract

Background The overall incidence of birth related injuries declines with the improvement in obstetrics. However, the incidence of head trauma in infants after massaged by a traditional birth attendant (TBA) is still unknown.

Objective To study the characteristics of intracranial hemorrhage in infants after massaged by a TBA.

Methods A retrospective study was conducted in Sardjito Hospital, Yogyakarta, Indonesia between October 2001 and May 2005. Infants with intracranial hemorrhage after massaged by a TBA were included. Data on patients' demography, history of massaging by TBA, clinical presentation, and injury characteristics such as anemia, clotting time (CT), bleeding time (BT), prothrombin time (PT) and activated partial thromboplastin time (APTT) were noted. Computed cranial tomography (CT) scans were performed.

Results A total of seven infants were diagnosed with intracranial hemorrhage after massaged by a TBA. There were four males and three females (mean age 46 days; range 27-60 days). All infants were referred to Sardjito Hospital, Yogyakarta, Indonesia with bad condition and anemia; mean hemoglobin level was 5.5 g/dl (range 3.7-8.3 g/dl). All infants presented with seizures. Coagulation screening showed normal results in five patients. The remaining patients had a prolonged CT and PT. CT scan showed subdural hemorrhage in four patients, intracerebral hemorrhage in four, epidural hemorrhage in two, and subarachnoid hemorrhage in one. Two patients had chronic hemorrhage, while the rest had acute hemorrhage. Four of them underwent craniotomy, two patients were under an observation only, and one patient was not treated due to parental refusal. Six patients survived and the one who refused to be treated died.

Conclusions The parents, midwives, and doctors have to be aware of head massaging since it may harm infants. [Paediatr Indones 2007;47:130-135].

Keywords: Intracranial hemorrhage, infant, traditional massaged.

The overall incidence of birth related injuries decline with the improvement in obstetrics. However, the incidence of head trauma in infants after massaged by a traditional birth attendant (TBA) is still unknown. Infants massaged after birth is a traditional culture in Indonesia, especially in Yogyakarta and Central Java. The reason is for health and "nice cephalic shape". Despite that good intention, the impact from head massaging is intracranial bleeding, similar that of child abuse or head trauma. Intracranial hemorrhage (ICH) may also due to other factors besides mechanical trauma to the brain, whereas mechanical trauma may also cause subdural hemorrhage (SDH).¹ Injury to the brain may also result from sudden acceleration-deceleration movement or sudden rotational or torsional movement of the head. Direct impact to the brain against the inner table of the skull and the rupture of the blood vessel and tears of the dura leads to parenchymal damage. When an infant or a young child presents with SDH, ICH, or other major cerebral complications, child physical abuse must be excluded.¹⁻⁸

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Head injury is a common diagnosis among children admitted to the Pediatric ICU. Subdural hematoma, subarachnoid hemorrhage, intracerebral hemorrhage, skull fracture, and diffuse cerebral edema are the most common clinical entities observed.³ The severity of head injury is classified into mild, moderate, and severe. It depends on the type and the extension of brain damage, the presence of brain edema, and the presence or absence of ICH.^{2,3} We reviewed cases of ICH after massaged by a TBA.

Methods

We reviewed infants with intracranial hemorrhage (ICH) after massaged by a traditional birth attendant (TBA) in Sardjito Hospital, Yogyakarta, Indonesia, between October 2001 and May 2005. Data on patients' demography, history of massaging by TBA, clinical presentation, injury characteristics such as, anemia, clotting time (CT), bleeding time (BT), prothrombin time (PT) and activated partial thromboplastin time (APTT) were noted. All infants included in the study underwent computed cranial tomography (CT scan). The bleeding is differentiated from massaging by a TBA or hemorrhagic disease of the newborn or other causes.

Since it is easy, CT scan was performed to establish the diagnosis of ICH. It is also more readily obtained for the acute unwell child and more widely available. We performed 10 mm of slices. The coagulation test result in this study fell into screening categories: PT, APTT, BT and CT. PT and APTT tests were performed using photo-metrix clot detection, Biomerieux.



Figure 1. Massaging an infant by a traditional birth attendant

Results

Seven infants were identified with intracranial hemorrhage (ICH) based on CT scan and all of them had the history of massaging by a TBA (**Figure 1**). The patients comprised of four males and three females, with the mean age at presentation was 46 days (range 27 to 60 days). All infants with ICH after having been massaged by a TBA were from rural area (**Table 1**). The most common clinical manifestations were seizure, which happened in all patients (**Table 2**). Decrease of consciousness was found in six patients, fever in two patients, and vomiting in three patients. The anterior fontanel was tense and bulging in three cases.

The prenatal information (mean gestation 40 weeks, mean birth weight 2890 g) noted no difficulty during pregnancy and delivery (four infants were delivered by midwives, two by obstetricians, and one by a TBA (**Table 1**).

The type of bleeding in one patient varied in duration (acute or chronic) and location. SDH was the most frequent form of ICH and this was found in 4 patients. Four infants had intracerebral hemorrhage, 2 had epidural hemorrhage, and 1 had subarachnoid

Table 1. Demographic and birth information for intracranial hemorrhage infants

No	Age (day)	Sex	GA (weeks)	Birth Weight (g)	Birth in
1.	36	M	40	3500	Midwife
2.	27	M	40	3000	Obstetrician
3.	60	F	40	2000	Midwife
4.	50	M	term	Not known	TBA
5.	53	F	41	3340	Obstetrician
6.	43	F	term	2800	midwife
7.	53	M	37	2700	midwife

hemorrhage. Five patients had acute hemorrhage (Figure 2), one had chronic hemorrhage, and the last one had a mixed hemorrhage (Figure 3).

The laboratory results varied. All patients suffered from anemia, with the mean hemoglobin level of 5.5 g/dl (range 3.7-8.3 g/dl). CT scan revealed normal in six patients. PT displayed elevation in 3 patients and APTT showed prolongation in four of five patients who underwent the examination (Table 2).

Neurosurgical intervention, such as blood clot evacuation, was required for four patients, one patient refused to be treated when the parents knew that the treatment would be a surgery, and the remaining two were treated conservatively. Six patients survived and the one who refused to be treated died. A skull fracture was not detected in any patient.

Discussion

People in Yogyakarta and its surrounding areas have a traditional culture to massage the baby until they are two months of age or if the baby is sick. The frequency of massage is twice a day. It is started after the baby delivered or until the umbilical cord comes off, and each massage takes 10-15 minutes. Then it is continued twice a week until the baby is 35 days old. Even though the massage is not so hard, it is performed

frequently so that may cause intracranial hemorrhage. This habit still persists in the rural area of Yogyakarta.

In our cases, all infants came from rural areas. Nowadays in the urban area, the traditional custom to massage the baby after delivery almost disappear due to the educated and knowledgeable parents, or due to unavailability of the traditional birth attendance (TBA). Ferber *et al*⁹ studied that massage therapy done by mothers and trained professionals enhanced weight gain in preterm infants. The method of "massage therapy" has consistently shown increased of weight gain in preterm infants. It means that massage for healthy infants is recognized by professionals in the world and that makes the babies healthy; however, massage to the head must be avoided.

The aim of massaging by a TBA is to keep the baby healthy; however, the intracranial impact is as the same as abusive head trauma. Besides that, abusive head injury is commonly recognized due to prolonged crying and is often inflicted by a caregiver with limited patience or experience in handling a child.¹⁰ Risk factors for non-accidental injuries in children include young parents, unstable family situations, low socioeconomic status, disability or child prematurity, and education level.¹¹

Intracranial hemorrhage (ICH) in infants is considered to be traumatic and non-accidental causes, like Shaken Baby Syndrome and child abuse, thus



Figure 2. Case 2, CT scan showed acute epidural hemorrhage (EDH) on the left parietal pars posterior, acute intracranial hemorrhage (ICH) on the left parietal and chronic subdural hemorrhage (SDH) on the left parietal.



Figure 3. Case 5, CT scan showed chronic epidural hemorrhage on the right fronto-temporoparietal, chronic subarachnoid hemorrhage on the left frontal & right parieto-occipital, left lateralization, cerebral edema.

Table 2. Clinical features of infants with intracranial hemorrhage

No	Clinical finding	Hb (g/dl)	CT/BT	PT/APTT	Intracranial bleeding	Therapy	Freq. of massaging	Out-come
1.	Convulsion, fever, fontanel bulging	6.6	3' (5'-15') /5' (1'-6')	14.6"/19.4"	ICH	Conservative	10x	Alive
2.	Convulsion, decrease of consciousness, fever, fontanel bulging	4.4	6' / 3'	ND	aEDH, ICH, cSDH	Craniotomy	20x	Alive
3.	Fever, vomiting, pale, focal convulsion, decrease of consciousness	3.71.5/2.5	ND	aSDH	Craniotomy	25x	Alive	
4.	Focal seizure, pale, decrease of consciousness	8.3	>45'/4'	>120" >60"	SDH, ICH	Refuse to treat	15x	Dead
5.	Focal seizure, pale, decrease of consciousness	5.0	9' /2.5	11.3" (11.7"-14.7") 49" (24.7"-35.0")	cEDH, cSAH	Craniotomy	5x	Alive
6.	Vomiting, pale, convulsion, decrease of consciousness	5.5	10'/1.5	46.5" (13.7-16.5") 60.2" (23.6"-32.5")	SDH	Conservative	10x	Alive
7.	Vomiting, seizure, pale, decrease of consciousness, fontanel bulging	5.2	4.5' /15'	27.4" (13.7-16.5") >120 (23.6-32.5")	ICH	Craniotomy	6x	Alive

massaged by a TBA should be the main consideration. In infants, many severe cerebral injuries involving ICH are prominently due to the results of non-accidental trauma and subdural hematomas.¹²

Almost all TBAs are female. This is different from perpetrators in child abuse cases that male caretakers are at most risk to abuse infants.¹²⁻¹⁵ Starling *et al*¹⁵ reported that male infants were 1.5 times more likely to suffer abusive head trauma than females. Sinal *et al*¹³ found that 68% of the victims were males, and the perpetrators were fathers for 44%, mother's boyfriends for 20%, and other males for 4%. They found mothers as perpetrators in only 7% of the cases.

Each year, an estimated 50,000 infants become victims of this abuse. In the US, approximately 10 to 12 percents of infants death are resulted from abused or neglected due to rigorous shaking.¹⁴ King *et al*¹⁶ reported that a minimum of 40 cases of Shaken Baby Syndrome (SBS) occur annually in Canada, from which 8 died, a further 18 had permanent neurological injury requiring life-long assistance, and 17 needed to be taken into foster care. In 1999, the population

based study in the UK showed that the incidence of SDH due to child abuse was found in 21 per 100,000 children under one year and 12.8 per 100,000 in children under two years.⁴ Unfortunately, we do not have accurate data about how many infants suffering from ICH after having been massaged by TBAs in Indonesia.

Intracranial hemorrhage is clinically characterized by seizures, lethargy, irritability, increased or decreased tone, impaired consciousness, vomiting, poor feeding, breathing abnormalities, and apnea.¹¹ Loh *et al*¹⁷ reported that the most common clinical manifestation in infants was seizure (91%). Duhaime *et al*¹¹ also reported that seizures happened in 40 to 70 percents of patients. In our study, all patients suffered from focal seizures, general seizures, or both. The condition similar to ICH due to after massaged by a TBA is generally not so difficult to be distinguished. The difference in clinical features of SBS and our cases is retinal hemorrhages. Retinal hemorrhages are often found in SBS and are frequently the first clue to abuse.¹² We did not find

it in our cases. The shaken infants are often experienced mild to moderate anemia.¹⁷ Our patients were all moderately to severely anemic. This condition might have been caused by the chronic bleeding.

CT scan has a role in evaluating a child with brain injury. CT scan is generally a method of choice for demonstrating subarachnoid hemorrhage, mass effect and large extra axial hemorrhage.¹⁸ An infant may have subdural hemorrhages, subarachnoid hemorrhages, intracerebral hemorrhages, or combinations of them. The classical case of shaken baby is heralded by the presence of blood in the meninges (subdural hemorrhage) and in the retina (retinal hemorrhage) in the absence of an adequate mechanical explanation for their occurrence.¹²

Systemic bleeding disorders, such as hemophilia and thrombocytopenia, have been associated with acute intracranial hemorrhages. Acute infections and infiltrative disorders of the central nervous system have also been reported to have a similar symptom to that of the intracranial hemorrhage after massaged by a TBA. These include meningitis¹⁸ and blood dyscrasias.¹⁹ Taking a thorough medical history and performing a physical examination and simple laboratory investigations are generally sufficient to exclude these conditions.

Hymel *et al*²⁰ mentioned that coagulopathy is a potential complication of severe head trauma, including abusive head trauma. In our study, PT and/or APTT prolongation occurred in four of five patients who underwent the examination. An isolated, elevated PT is often the result of depressed factor VII. In the absence of vitamin K deficiency, liver disease, or inherited factor VII deficiency, PT prolongation can only be the result of tissue factor released and subsequent consumptive coagulopathy. They hypothesize that head trauma causes tissue factor to release from damaged brain parenchymal cells. In our cases, we also think that the impact of head massage was almost as same as the head trauma due to any other causes.

Bleeding due to vitamin K deficiency, previously known as hemorrhagic disease of the newborn, may occur in an infant who has not received appropriate prophylaxis.^{21, 22} Thus, information from the health providers who help the labor is needed to differentiate from bleeding caused by vitamin K deficiency or head massage. There was no data about that in our medical

record, since the parents did not know exactly what their child received.

One patient in our series who had prolonged CT, PT and APTT died. In the previous study, among pediatric abusive head trauma patients with parenchymal brain damage who died, 94% displayed PT prolongations and 63% manifested evidence of activated coagulation. Lee *et al*¹⁹ reported ten cases with Shaken Baby Syndrome; one of them had a transient prolonged PT and this patient also died. We did not have accurate data on morbidity and mortality of infants with ICH after having been massaged by a TBA. If we compare it with the SBS, there is a high rate of morbidity and mortality among infant with SBS.¹⁸ Mortality rates ranged from 15% to 38% with a median of 20% to 25%.¹⁷ King *et al*¹⁶ found that the mortality rates is 19%.

Craniotomy and blood clot evacuation are generally required for infant with acute subdural hematoma.¹⁷ In contrast, cerebellar hematoma in term neonate cannot be managed surgically. Loh *et al*¹⁷ reported that among eight patients who underwent craniotomy and evacuation of the blood clot, five (63%) of them had good recovery and one (13%) patient died. However, none of those who developed chronic subdural hematoma were treated conservatively. Chronic subdural hematoma developed at a mean of 28 days after acute subdural hematomas. They concluded that infantile acute subdural hematoma, if treated conservatively or neglected, may cause infantile chronic subdural hematoma. In our cases, we found many variations of hemorrhages; four patients with subdural hemorrhage, four with intracerebral hemorrhage, two with epidural hemorrhage, and one with subarachnoid hemorrhage. In the bleeding manifestation, two patients had a chronic hemorrhage and the rest had an acute hemorrhage. In these cases, we analyzed that chronic hemorrhage appears gradually due to long period of hemorrhage after massaged by a TBA. The prognosis of the survivors was very poor, with a high incidence of intellectual impairment, cerebral palsy, epilepsy, behavioral problem and developmental delayed.^{4,16}

To conclude, intracranial hemorrhage may result from infant massaging by a TBA which the purpose "to keep the baby healthy". This may lead to poor prognosis especially in those infant with prolonged CT, PT, and APTT.

Acknowledgements

We thank Professor Satoshi Takada, from Faculty of Health Science, Kobe University, Japan for giving the idea to present this topic in the 9th International Child Neurology Congress (ICNC) and the 7th Asian & Oceanian Congress of Child Neurology (AOCCN) in Beijing, China 2002. Also thank Professor Sutaryo, from Hematology subdivision, Pediatric Department, Faculty of Medicine, Gadjah Mada University for their critical review of this manuscript.

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