DECREASED INTRACRANIAL PRESSURE WITH OPTIMAL HEAD ELEVATION OF 30 OR 45 DEGREES IN TRAUMATIC BRAIN INJURY PATIENTS (LITERATURE REVIEW)

Heni Maryati*
*Lecture of Pemkab Jombang Institute of Health Science Department of Medical Surgical and Critical Care Nursing Jombang Indonesia
Email: zahra.zubir@yahoo.com

ABSTRACT
Introduction: Intracranial pressure (ICP) can be elevated in traumatic brain injury. Raised ICP is a life threatening condition. Unless recognized and treated early to reduce cerebral perfusion pressure (CPP) and progress to brain herniation and death. Management of elevated ICP is, in part, dependent on the underlying cause. The purpose of this literature review was to find a management of a noninvasive physical intervention procedure for decreasing intracranial pressure for brain injury and reduce the duration of treatment invasive. Method: Systematic searches were undertaken using Medline database, PubMed and Cochrane, restricted from 2011 to 2016. There 12 articles included by searching through the appropriate key word topic, but only 5 articles were selected based on the inclusion criteria. Results: Medical options for treating elevated ICP include head of bed elevation, IV mannitol, hypertonic saline, transient hyperventilation, barbiturates. A head elevation of 30 or 45 degrees is optimal for decreasing intracranial pressure. Discussion: Head elevations of 30 or 45 degrees is optimal a conventional nursing procedure for decreasing intracranial pressure for brain injured. Is the most effective management that showed simple, inexpensive treatment procedure and can be applied in variety ages today, independent nursing intervention without side effect. Recommended in clinical practice, intensive care unit staff members need to cautiously perform head elevation of 30 or 45 degrees its physiologic effect and potential hazard.

Key words: management intracranial pressure, head elevation, traumatic brain injury patients

INTRODUCTION
Traumatic brain injury (TBI) and its complications are the leading of mortality and morbidity. In the US alone over 2,300 deaths, 42,000 hospitalizations, and 404,000 Emergency Department visits occurs annually among children 0 -14 years old related to TBI. Mortality with severe TBI is often the result of a refractory increase in intracranial pressure (ICP). Therefore prevention and management of raised ICP is increasingly recognized as central to current neuro-critical care. Increased ICP is an important caused of secondary brain injury in TBI and both degree and duration of high ICP is associated with poor outcomes. Sustained increased to 20 mmHg for >5 min may need treatment. Though the efficacy of treatment based on ICP monitoring has been questioned intracranial pressure (ICP). Increased intracranial pressure (ICP) is associated with worse outcome after traumatic brain injury (TBI). The current guidelines and management strategies are aimed at maintaining adequate cerebral perfusion pressure and treating elevated ICP. Intracranial pressure (ICP) can be elevated in traumatic brain injury.

Management of elevated ICP is, in part, dependent on the underlying cause. Medical options for treating elevated ICP include head of bed elevation, IV mannitol, hypertonic saline, transient hyperventilation, barbiturates, and if ICP remains refractory, sedation, endotracheal intubation, mechanical ventilation, and neuromuscular paralysis. Surgical options include CSF drainage if hydrocephalus is present and decompression of a surgical lesion, such as an intracranial hematoma/ large infarct or tumor, if the patient’s condition is deemed salvageable. The purpose of this literature review was to find a method and technique of a noninvasive physical intervention procedure for decreasing intracranial pressure for brain injury, reduce the duration of treatment invasive, and reduce the cost of treatment. Head elevation a conventional nursing procedure for brain injured individuals with intracranial hypertension. It is performed with the intent of reducing intracranial pressure (ICP) by means of a noninvasive physical
intervention. Head up position may have beneficial effect on intracranial pressure (ICP) via changes in mean arterial pressure (MAP), airway pressure, central venous pressure and cerebral spinal fluid displacement. However, in some circumstances head up position may decrease MAP with in turn will result in a paradoxical rise in ICP through auto regulation the degree of head elevation has to be titrated by evaluating the most adequate cerebral perfusion pressure (CPP) for each patient by means of transcranial. A change in head position can lead to a change in intracranial pressure, however, there a conflicting data regarding the optimal degree of elevation that decreases intracranial pressure in post craniotomy patients. Patients with increased intracranial pressure significantly benefitted from a head elevation of 10, 15, 30 and 45 degrees compared with 0 degrees. A head elevation of 30 or 45 degrees is optimal for decreasing intracranial pressure. Recommended in clinical practice, intensive care unit staff members need to cautiously perform head elevation of 30 - 45 degrees with a thorough understanding of its physiologic effect and potential hazard.

METHOD

A literature review revealed that studies have been conducted in a range of countries by using a variety of management to screen leaners decrease intracranial pressure for traumatic brain injury patients. It was conventional nursing of a noninvasive physical intervention procedure for decreasing intracranial pressure for brain injured reduce the duration of treatment invasive, and reduce the cost of treatment. A head elevation of 30 or 45 degrees is optimal for decreasing intracranial pressure. Is the most effective management that showed simple, inexpensive treatment procedure and can be applied in variety ages today, independent nursing intervention without side effect. It was conventional nursing of a noninvasive physical intervention procedure for decreasing intracranial pressure for brain injured reduce the duration of treatment invasive, and reduce the cost of treatment. According to research J. Adv Nurs (2015) that a changes in head position can lead to a change intracranial pressure. Compared with a degree 10,15,30 and 45 degrees of head elevation resulted in lower intracranial pressure. Intracranial pressure at 30 degrees was not significantly different in comparison to 45 degrees of head elevation and was lower than at 10 and 15 degrees. Patients with increased intracranial pressure significantly benefitted from a head elevation of 10, 15, 30 and 45 degrees compared with 0 degrees. A head elevation of 30 or 45 degrees is optimal for decreasing intracranial pressure. According to research Agbeko RS, et al (2012) that in severe pediatric traumatic brain injury, the relations ship between change in head of the bed and change in intracranial pressure was negative and linear. The lowest intracranial pressure was usually, but not always, achieved at highest head of the bed angles depend, in parts, on the subject’s height.

The other therapies to reduce elevated intracranial pressure if ICP not remains refractory used osmotic agents, such as mannitol, hypertonic saline and the other therapies, such as hyperventilation and barbiturates. Recording the research Scalfani, et al (2012) that in cerebral blood flow (CBF) is reduce after severe traumatic brain injury (TBI) with considerable regional variation osmotic agents are used to reduce elevated intracranial pressure (ICP). In 8 patients with acute TBI, we measured regional CBF with positron emission tomography before and 1 hour after administration of equi osmolar 20% mannitol (1 ml/kg) or 23,4 % hypertonic saline (0,686 ml/kg) in regions with focal injury and baseline hypo perfusion CBF < 25 ml per 100 gr/min. Result that osmotic therapy reduce the number of hypo-perfuse brain regions by 40% (p , 0,001). Recording the research Mangat HS (2012) that in hyperosmolar agents are commonly used as an initial treatment for the management of raised intracranial pressure (ICP) after several traumatic brain injury (TBI). They have an excellent adverse effect profile compared to other therapies, such as hyperventilation and barbiturates, which carry the risk of reducing cerebral perfusion. The hyperosmolar agent mannitol has been used for several decades to reduce raised ICP, and there is accumulating evidence from pilot studies suggesting beneficial effects of hypertonic saline (HTS) for similar purposes. An ideal therapeutic agent for ICP reduction should reduce ICP while maintaining cerebral perfusion (pressure). While mannitol can cause dehydration over time, HTS helps maintain normovolemia and cerebral perfusion, a finding that has led to a large amount of pilot data being published o benefits of HTS, albeit in small cohorts. Prophylactic therapy is not
recommended with mannitol, although it may be beneficial with HTS. To date, no large clinical trial has been performed to directly compare the two agents. The best current evidence suggest that mannitol is effective in reducing ICP in the management of traumatic intracranial hypertension and carries mortality benefit compared to barbiturates. Current evidence regarding the use of HTS in severe TBI is limited to smaller studies, which a benefit in ICP reduction and perhaps mortality. According to research Mangat HS, et al (2015) that a Hypertonic saline (HTS) given as bolus therapy was more effective than mannitol in lowering the cumulative and daily ICP burdens after severe TBI. Patients in the HTS group had significantly lower number of ICU days.

RESULTS
Systematic searches were undertaken using Medline database, Pubmed and Cochrane, restricted from 2011 to 2016. There 7 articles included by searching through the appropriate key word topic, but only 3 articles were selected based on the inclusion criteria. Management of raised ICP includes care air way, ventilation and oxygenation, adequate sedation and analgesia, neutral neck position, head end elevation 30 or 45 degrees and short term hyperventilation, and hyperosmolar therapy (mannitol or hypertonic saline), in critically raised ICP barbitural coma, moderate hypothermia and surgical decompression.

DISCUSSION
Intracranial pressure (ICP) can be elevated in traumatic brain injury. Management of elevated ICP is, in part, dependent on the underlying cause. Medical options for treating elevated ICP include head of bed elevation, IV mannitol, hypertonic saline, transient hyperventilation, barbiturates, and if ICP remains refractory, sedation, endotracheal intubation, mechanical ventilation, and neuromuscular paralysis. Surgical options include CSF drainage if hydrocephalus is present and decompression of a surgical lesion, such as an intracranial hematoma/ large infarct or tumor, if the patient’s condition is deemed salvageable. Intracranial pressure (ICP) can be elevated in traumatic brain injury. Raised ICP is a lift threatening conditions. Unless recognized and treated early to reduce cerebral perfusion pressure (CPP) and progress to brain herniation and death. A head elevation of 30 or 45 degrees is optimal for decreasing intracranial pressure. Is the most effective management that showed simple, inexpensive treatment procedure and can be applied in variety ages today, independent nursing intervention without side effect. It was conventional nursing of a noninvasive physical intervention procedure for decreasing intracranial pressure for brain injured.

The other therapies to reduce elevated intracranial pressure used osmotic agents, such as mannitol, hypertonic saline and the other therapies, such as hyperventilation and barbiturates. Mannitol can cause dehydration over time, HTS helps maintain normovolemia and cerebral perfusion. Prophylactic therapy is not recommended with mannitol, although it may be beneficial with HTS. To date, no large clinical trial has been performed to directly compare the two agents. The best current evidence suggest that mannitol is effective in reducing ICP in the management of traumatic intracranial hypertension and carries mortality benefit compared to barbiturates.

CONCLUSION AND RECOMMENDATION
Head elevations of 30 or 45 degrees is optimal a conventional nursing of a noninvasive physical intervention procedure for decreasing intracranial pressure for brain injured. Is the most effective management that showed simple, inexpensive treatment procedure and can be applied in variety ages today, independent nursing intervention without side effect.

In clinical practice, intensive care unit staff members need to cautiously perform head elevation of 30 or 45 degrees its physiologic effect and potential hazard.

REFERENCES
