# Therapeutic hypothermia assignment

Cooling Methods 8. The relative experience 9. The role Of advanced clinical practitioner and multidisciplinary approach 10. Synthesis 11. Conclusion 1. Introduction In there are approximately 50, 000 treated cardiac arrests, of which 5-30% of patients survive to leave the hospital every year (Intensive Care Society, 2008). The Majority of these patients have suffered chemic brain injury, which results in severe disability or ultimately leads to death.

Until recently, there has been no intervention proving a significant reduction in the incidence of brain injury in arrest survivors: however in recent years induced therapeutic hypothermia 20TH) has been used to improve the neurological outcome of comatose patients who had return of spontaneous circulation (ROCS) after resuscitation following Eden cardiac arrest (Holder camp; Magic 2006). Although it is an evidence- based method, it has its own limitations and complications.

The purpose of this assignment is to look at the current practice in own area, supporting national and international recommendations, review current literature and evidence- based nursing implications in caring for those patients. The physiological benefits of hypothermia, multidisciplinary approach of clinically cooled patients, practice development issues around these patients and scope of advanced nursing practice will also be discussed. 2.

Photographically changes during cardiac rest and return of spontaneous circulation Under normal circumstances, the brain takes 15% of the cardiac output and consumes 20% of total body oxygen supply (Gorillas, Anthony & Frock, 1999). During cardiac arrest the blood supply to the brain decreases

or stops, which leads to less or no oxygen supply to the brain causing loss to consciousness. This hypoxia state in the brain can cause depletion of glucose and adenosine troposphere store (the brain’s source to energy) (Satan Bringer, Bittier, et al. 2002).

In hypertensive state or no blood supply state to the brain, membrane deplorable, calcium influxes, ultimate is released leading to acidosis and lipase, proteases, and nuclease are activated contributing to cerebral edema (Warner 1 997, Safari ; Bringer 2003). During the spontaneous return of circulation (CROSS), further damage to the brain can occur This is called repercussions injury which causes series of process involving release of iron, free radicals, nitric oxide, catecholamine, renewed excitatory amino acid and calcium shifts (Warner I egg, Safari ; Bringer 2003).

These series of process will result in mitochondrial damage, DNA fragmentation, and cell death (Warner 1 997, Safari camp; Bringer 2003). This process will continue for days (Safari ; Bringer 2003). This process Of injury and subsequent recovery varies depends upon the severity of injury (Gorillas et al. 1993). The severity of injury can vary from reversible injury with full recovery to global irreversible injury leading to brain death (Gorillas et al. 999), The severity of injury is dependent on the length of chemic state and the duration of reduced blood flow (Girl et al. 1999). 3. Physiological benefits of therapeutic hypothermia There are several research have been conducted on methods to improve urological outcome after cardiac arrest including pharmacological approaches, methods to improve cerebral circulation and oxygenation and induced therapeutic hypothermia(Bernard,

Gray, guest et al, COCA). Induced therapeutic hypothermia was used in the treatment of head injury since asses.

Hypothermia can he divided in to mild (33′ C to 35″ C), moderate (28 C 20th' C), and severe C) based on core body temperature (Mary Holder, 2006). Studies have indicated that mild to moderate hypothermia (32″ C 30th 0 C) has a neurological protective mechanism within the brain that can improve a patient's outcome after a sudden cardiac arrest. There are several theories exist on the effect of hypothermia on cerebral tissues and its benefit after cardiac arrest.

Jonathan Adler (2011) has described that the possible mechanisms Of actions are " decreased temperature reduces cerebral metabolism there by decreases the release Of harmful chemicals(glutamate and dopamine Which could lead to tissue damage), preservation of blood brain barrier, decreases the cerebral oxygen demand and prevention Of cerebral edema Which Will reduce the intra cranial pressure'. Hypothermia after cardiac arrest study group (2002) and Bernard et al. 2002) also suggested the same theory.

Adler (2011) also states that in the heart, the hypothermia may decrease the area of injury, promote blood refold to the epicureans, decreases myocardial metabolic demand, and preserve intracellular high-energy phosphate stores. 4 Guideline for induced therapeutic hypothermia after cardiac arrest The University Hospital of Listener's (LULL) guideline for TIT (2010) is in cooperated with other ICC care bundle i. E. Control of ventilation, Hemorrhagic optimization, blood glucose control and sedation optimization.

The Guideline did not include all cardiac arrest patients for the treatment of Induced therapeutic hypothermia.

The inclusion criteria for TIT (LLC guideline, 2010): * witnessed ventricular fibrillation or nonperforming ventricular tachycardia comatose (Guess) within 6 hour of post cardiac arrest, k systolic blood pressure not below go mob Hag on interlopes support * age over 18 years, * an estimated interval of less than minutes from the patient’s collapse to the first attempt at resuscitation by emergency medical personnel mechanically ventilated * An interval of no more than 60 minutes from collapse to return of spontaneous circulation (ROCS) Studies have shown that above-mentioned tangent’s neurological outcome has improved significantly with IT H.

An advisory statement by the Advanced Life Support Task Force of the International Liaison Committee on Resuscitation (LILAC) (2003) has stated that the IF cardiac arrest survivors are the most benefited from TIT. The effects of TIT on non-cardiac in hospital arrests are unknown therefore; LILAC does not recommend TIT for those patients. However, it does suggest that the use of TIT on patients who are comatose after in-hospital arrest with cardiac etiology may be beneficial. The intensive care society (CICS) (BIBB) has also advised the same inclusive criteria as LILAC including other cardiac rhythms and in-hospital cardiac arrest, as studies have shown improvement in their neurological outcome.

The Cochrane database systematic review (2009) suggested that the results of their review support Loco’s recommendations. The exclusion criteria (LULL guideline, 2010): major head trauma * recent major surgeries systemic

infection/sepsis * patients in coma from other causes k coagulate or on anti-coagulant therapy * pregnancy k refractory hyperemia(Sass 85% On 100% of 02 and IPPP) The LILAC (2003) strongly advices to avoid TIT on patients with life threatening arrhythmias and severe carcinogenic shocks. It also has some reservations on using TIT On pregnant patients and patients with primary coagulate until further data are available.

Hypothermia causes mild platelet dysfunction, which Will lead to bleeding (Holder camp; Magic, 2006). Therefore, TIT is considered as contraindication for patients with coagulate or on anti-coagulant treatment. Adler (2011) in his literature review stated that although TIT after pulses electrical activity (PEA) and in-hospital arrests are not studied fully, it could be used on these patients at the discretion of the treating practitioners. The practitioner should consider the most likely cause of cardiac arrest. He also suggested that the patients who had isolated respiratory arrest camp; patients with valid do not resuscitate order should not be treated with TIT. 5.

The LULL guideline’s goal of Induced Therapeutic Hypothermia The ultimate goal of the Lull’s guideline (2010) is to return the patient to a state of normal neurological function with a stable cardiac rhythm and normal hemorrhagic function. The guideline also advices to achieve a target temperature of 32 - 34″ C in 4 hours of return to spontaneous circulation, avoid cooling to C. TIT should not be allayed for CT scan, cardiac catheter or other interventions. Maintain therapeutic hypothermia at 320-34 ‘ C for 12-16 hours then passively re-warm at a rate of 0. 5″ C every hour, If active re-warming is required, stop active re-warming when the temperature reaches 35. 5’ to avoid overshoot (LULL guideline, 2010).

The CICS (2008) advices to start cooling as soon as possible and continue for 12-ours period. More evidence is needed to determine the optimum duration of cooling treatment in human beings as the previous studies are conducted on animals. (Adler, 2011). Tracheal intubations is necessary, as TIT is used patients Who's GAS is (LULL deadline, 2010). Provide positive ventilation support to achieve nonromantic and arterial saturation Of 94-98 CICS, 2008). TOO much oxygen during the initial stages of repercussions exacerbates neuronal damage through production of free radicals and mitochondrial injury (Richards E. M, Fiske G. , Rosenthal R. E, et al, 2007).

Excessive ventilation can affect cerebral blood flow by decreasing Apace and causes circulatory instability due to high intricacies pressure (CAL algorithm, 201 1), Sedation and chemical paralysis (if needed) are usually necessary as cooling can be unpleasant experience (ILL Guidelines. 010). Shivering is the natural body attempt to maintain temperature homeostasis, which can compromise the hypothermia state as it produces heat interfering cooling process (Adler, 2011). Shivering can increase body oxygen demand between and 100%, which can compromise patients respiratory status (Holder and Magic, 2006), Monitor papillary response to light (guidelines), Raise the head of the bed at 30′ as nonrestrictive mechanism (Adler, 2011). Elevating the head end of the bed will help to prevent aspiration, there by reduce the risk of aspiration pneumonia (Holder and Magic, 2006).

Arterial line is laced for the constant monitoring of blood pressure and for the easy access of arterial blood gases. EGG monitoring is essential as TIT can cause dysphasia (most commonly pericardia) (CICS 2008). Studies have shown that EGG changes including J wave development, IF, Barbuda

syndrome & Parliament’s angina can occur when cooling(Pie, Pierson , Lehman , camp; Hewitt , 2007). If the heart rate more often but there is no hemorrhagic instability TIT can be continued (Adler, 201 1). Trial and ventricular fibrillation are Other common side effects of TIT as it has negative chronographic effects on pacemaker tissues Holder and Mackinac, 2006).

Circulatory instability is quiet common in cardiac arrest patients, therefore interlopes are started to keep mean arterial pressure rooming (recommended for cerebral perfusion). Often blood pressure remains elevated during hypothermia due to vasoconstriction effect. If the patient needed interlopes support, central venous line is also placed (CICS, 2008). Serum electrolytes are monitored regularly as hypothermia commonly causes hypothermia, which can be worsen by insulin administration, therefore serum potassium level is maintained between to Ames/l (LULL guidelines(2010) & Adler, 2011). Magnesium level is maintained to upper border of normal range because of its role in alleviation of neurological injuries(Lull_ guideline (2010), Holder & Magic, 2006).

Patients are started on sliding scale insulin as studies have proven that TIT can cause hyperglycemia (CICS 2008). No studies have proven control of serum blood glucose level improves neurological outcome in cardiac arrest patients. Nevertheless, evidence shows that glucose control has reduced hospital mortality in critically ill patients with protected peripheral and central nervous system (Van den Burgher G, Hooters P, Weeks et al 20011 Urinary categorization to monitor acute fluid balance as cooling causes cold dieresis (Pyle K. , et al 2007). Valid challenge or resuscitation is given to replace the fluid loss and increase right heart tilling pressure (CICS 2008).

Instigators tube for free drainage is placed. Feeding is not advisable during cooling and rearming period due to reduced gut function and paralytic illus. (Adler, 2011). Stress ulcer prophylaxis (intravenous administration Of Rendition Or Maypole) is started as part of intensive care bundle (LULL guidelines, 2010). Venous thrombi embolism prophylaxis is started based on the clotting Status Of the patient (LULL deadlines, 201 GO. Patients promotion time, INNER and APT should be monitored closely as hypothermia may impair clotting system (Adler J. 2011). Continuous temperature monitoring, ideally two sites-core and axial are advised (LULL guidelines, 2010).

Exposing the patient to moderate hypothermia can suppress the immune response and cooling can mask the body natural response to infection (i. E. , increased body temperature) (Holder &: Magic M. B. 2006). Measures such as regular skin care, frequent change of position, sterile catheter care, and use of ventilator care bundle will help to minimize infection. In spite of all these measures if the patient develops infection, cooling should be stopped (LULL guideline & Holder and Magic, 2006). The patient is allowed to rearm. Blood culture is sent and prophylactic antibiotic is started as per unit policy. 7. Cooling Methods According to the guidelines, polar air or arctic sun cooling device is used to cool the patient In the absence of cooling devices, bedclothes are removed.

The patient is covered with single sheet only, Cold air fan, ice packs to head, axial and groins, cold saline infusion of 20-mils/keg over minutes at 4 Co IA peripheral line are used to reach target temperature (32 34 c) with in ours time period. All the studies and guidelines also suggest the above said

methods to cool the patients. A literature review by Rich, Holler, Mueller Et al (2009) stated that the effective method of cooling the patients to reach the target temperature yet to be studied. It also States that the difference bet', even earlier cooling (pre-hospital) and late cooling (in-hospital) is not yet studied. The target temperature needs to be maintained With in target range for 12-16 hours. Holder and Magic (2006) address that this can be challenging, as the body trial reaction is to shiver and warm up.

Passive rearming is started after 12-16 hours of cooling by removing cooling blankets (JILL guidelines, 2010). CICS (2008) advices to re-warm the patients after 12-24 hours of cooling. The goal is to re-warm the patient 0. 5 c every hour. If passive re-warming delays active re- warming can be started but it should be stopped when the temperature reaches 35. 5 c to avoid rebound hyperthermia as this can cause cerebral edema. Adler (2011) states the re-warming phase is the crucial period. As body starts to warn-I up peripheral visualization occurs which leads to hypertension. During rearming period, intra cellular and intramuscular electrolytes shift can occur; therefore, precaution should be taken to avoid hyperthermia (Adler 2011).

The sedation and paralytic agents are continued until the temperature reaches to 36″ c, According to the guidelines, normative is achieved in ours of time from the time to rearming. 8. The relatives experience When looking after critically ill patients especially the cardiac arrest patients, supporting the relatives plays a major part as this is sudden and can put their life on hold, as this is sudden and unexpected Therefore, supporting, explaining ND reassuring them are important. The relatives experience on therapeutic hypothermia on cardiac patients' is not studied until recently The presence

of relatives of critically ill patients is crucial as they influence the patient to fight to live and confirm their significance (Angstrom 2007).

The presence of relatives can encourage and re-in force their humanity, and sharing their life experience outside the intensive care unit before their illness Will help them to fight for the survival(Boredom & Seawalls, 2000). Tortes, Bullfrog & Albanian (2000) suggest that the relatives can advocate on behalf Of the attains interest. The experience in ICC_I strongly affects relatives. Their memories are about how warmth the staffs were and how well their loved one’s needs were met with sensitivity and humanity. They also expect time to time update on their loved once condition. A Swedish study conducted by Loft, Sandstorm ; Angstrom (2010) shows the unique experience of relatives of those treated with TIT after cardiac arrest. It suggested that the relatives want consolidated information in regular basis.

They want to know how the patient will look and feel during TIT, why and how long they will be unconscious and what happens it hey sustain brain injuries. This study went on to advice that the relatives need to be supported in their hope for a realistic outcome of the patient’s condition and opportunity should be given to express their own situation and worries. Supporting the critically ill patient’s relatives is the responsibility of the nurses as they spend more time with them and most of the time this area is overlooked as they are so focused on patients. 9. The role of advanced clinical practitioner and multidisciplinary approach The outcome of the TIT and improvement in patient’s condition are directly related to the standard of care provided.

Therefore, nurses understanding of importance Of treatment, protocol and physiological changes during cooling and re-warming phases are crucial. It has been observed that the lack of knowledge was compromising patient's care at times, as the nurses were not informed of TIT and its benefits. Nurses also had lack of knowledge regarding the physiological changes that can occur during cooling and rearming. They were not aware of the importance of time keeping in achieving the target temperature and maintaining the temperature for set duration and slow rearming. At times, the patients were re-warmed too quickly and patients were allowed to come hyperthermia.

The physiotherapist's interventions and nursing care were interfering the cooling phase, which raised the question of multidisciplinary approach and advanced clinical practitioners(ACNE) role in implementing TIT effectively. The role of advanced nurse practitioner in critical care setting evolved since asses. Shamrock (2011) stated that determining the exact role tooth ACNE in multidisciplinary ICC team can he challenging, nevertheless the Acnes can play a greater role in health care education, professional development and research. A study by Pyle et al (2007) proved multidisciplinary team (team of radical care clinical nurse specialist, emergency department nurse specialist, intensive, cardiologists& neurology intensive) approach of TIT protocol development was efficient and successful .

Holder and Magic (2006) in their literature review suggested that the knowledge of critical care nurses regarding the benefit of TIT & the physiological changes, which take place during cooling and re-warming phase can make positive impact on patient care and prevent the complications associated with TIT. This knowledge can only be attained by

training and teaching, which can be done by an ACNE by developing educational package. It is also important to evaluate the outcome of the TIT treatment, Which is also a role Of ACNE. A document by Harem and Judy (2011) has stated that the role of ACNE are; through attention to holistic patient and family care, including teaching, continuity Of care, patient safety and evaluation of care. Koki (2007) has clearly documented that the role of clinical nurse specialist is to help staff members understand research findings and influence them to apply in practice.

The document also stated that these specialist nurses support nurses, in professional development, thereby they play an important ole in providing high standard evidence based care, improve outcome of care, reducing the hospital cost and encouraging staff to use research to improve and support practice. It also suggested that this kind of evidence-hash care providing, allow the nurses to become the best practice change agent. This case study based article has proven that the multidisciplinary approach involving clinical nurse specialist, intensive, cardiologists and staff nurses, helped the TIT protocol to be delivered successfully. 10. Synthesis The effects to TIT on cardiac arrest patients are researched since asses.