THERAPEUTIC HYPOTHERMIA IN RECOVERING CARDIAC ARREST PATIENTS

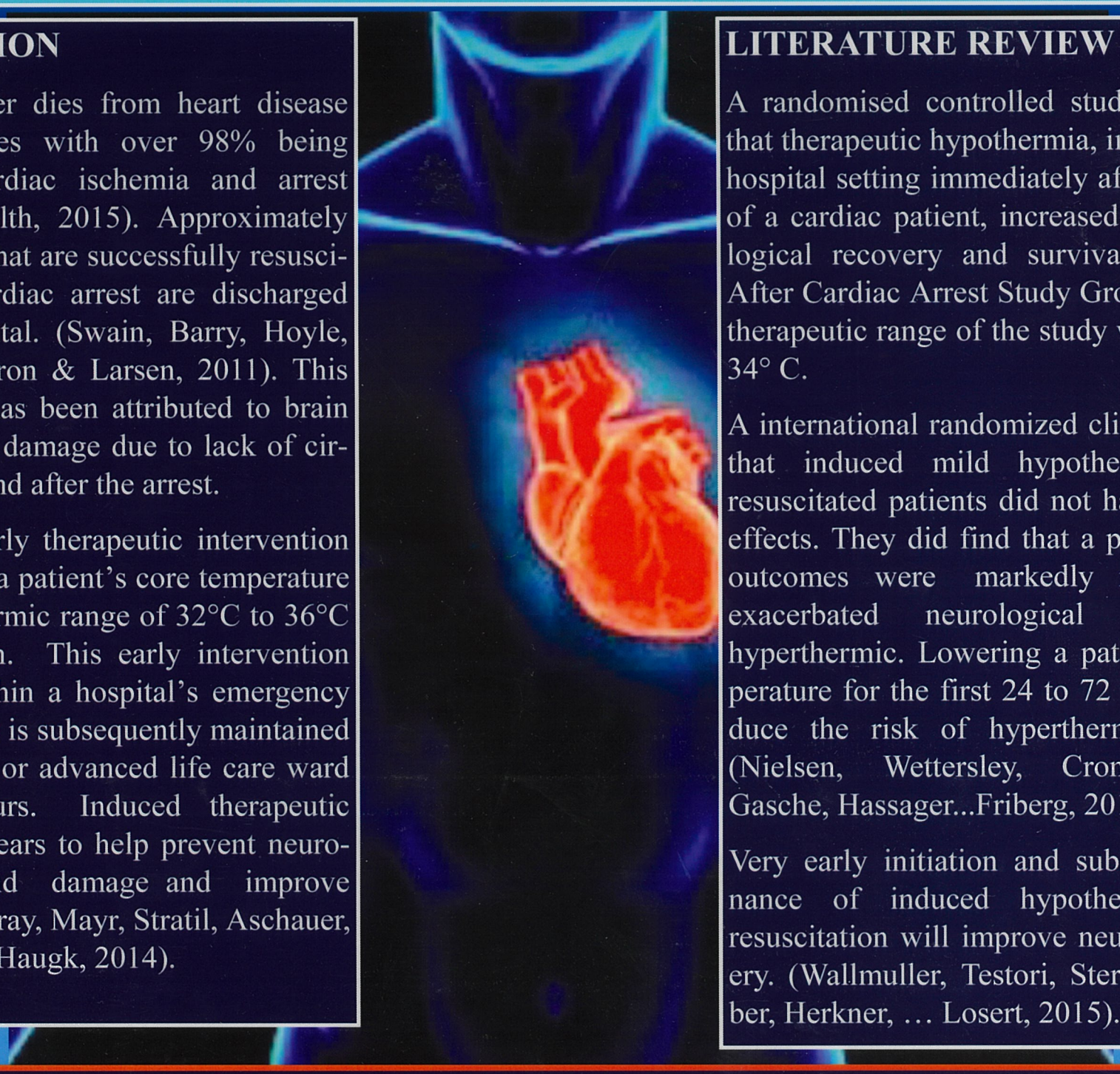
Bronwyn Heatlie

Is induced therapeutic hypothermia beneficial, in terms of neurological recovery and overall survival rate, to adult patients successfully resuscitated from an out-of-hospital cardiac arrest?

INTRODUCTION

A New Zealander dies from heart disease every 90 minutes with over 98% being attributed to cardiac ischemia and arrest (Ministry of Health, 2015). Approximately 11% of patients that are successfully resuscitated from a cardiac arrest are discharged alive from hospital. (Swain, Barry, Hoyle, Haywood, Cameron & Larsen, 2011). This poor prognosis has been attributed to brain tissue injury and damage due to lack of circulation during and after the arrest.

An important early therapeutic intervention is by controlling a patient's core temperature within a hypothermic range of 32°C to 36°C post resuscitation. This early intervention would occur within a hospital's emergency department. This is subsequently maintained in a cardiac unit or advanced life care ward for up to 72 hours. Induced therapeutic hypothermia appears to help prevent neurological injury and damage and improve survival rates. (Uray, Mayr, Stratil, Aschauer, Testori, Sterz, & Haugk, 2014).



LITERATURE REVIEW

A randomised controlled study demonstrated that therapeutic hypothermia, implemented in a hospital setting immediately after resuscitation of a cardiac patient, increased positive neurological recovery and survival (Hypothermia After Cardiac Arrest Study Group, 2002). The therapeutic range of the study was set at 32°C-34° C.

A international randomized clinical trial found that induced mild hypothermia in post–resuscitated patients did not have any adverse effects. They did find that a patient's survival outcomes were markedly reduced due to exacerbated neurological damage when hyperthermic. Lowering a patient's core temperature for the first 24 to 72 hours would reduce the risk of hyperthermia developing. (Nielsen, Wettersley, Cronberg, Erlinge, Gasche, Hassager...Friberg, 2013).

Very early initiation and subsequent maintenance of induced hypothermia in post-resuscitation will improve neurological recovery. (Wallmuller, Testori, Sterz, Stratil, Schober, Herkner, … Losert, 2015).

RECOMMENDATIONS

- Initiation of mild hypothermia for post out-of-hospital cardiac arrest patients successfully resuscitated requiring advanced life support on arrival at emergency departments.
- Rapid cooling of patient core temperature to commence as early as possible post-resuscitation.
- Selecting and maintaining a constant temperature within a range of 32°C and 36°C.
- Initial rapid induction of hypothermia in the emergency department obtained using ice cold intravenous fluids or ice packs. (New Zealand Resuscitation Council, 2016).
- Water or air circulating blankets used to maintain the hypothermia within an acute medical ward setting such as ICU.
- The patient is kept at a constant hypothermic temperature for 24 to 72 hours.

CONCLUSION

Very early induction of therapeutic hypothermia in post resuscitation hospitalized care reduces and provides protection against neurological and tissue injury. This in turn will increase the patient's long term survival and recovery prognosis.

References: Hypothermia After Cardiac Arrest Study Group. (2002). Mild therapeutic hypothermia to improve the neurologic outcome after cardiac arrest. *N Engl J Med.* 346, 549 –556.
Ministry of Health. (2015). *Mortality and demographic data 2013 (provisional).* Wellington: Ministry of Health
New Zealand Resuscitation Council. (2016). *ANZCOR guidelines 11.8: targeted temperature management (TTM) after cardiac arrest.* Author.
Nielsen, N., Wettersley, J., Cronberg, T., Erlinge, D., Gasche, Y., Hassager, C. . .. Friberg, H. (2013). Target temperature management at 33° C versus 36°C after cardiac arrest. *N Engl J Med* 369. 2197 –2206.
Swain, A.H., Barry, T., Hoyle, S.R., Haywood, G., Cameron, H., & Larsen, P.D. (2011). Outcomes from out-of-hospital cardiac arrest in the Wellington region of New Zealand. Does use of the Fire Service make a difference. *The New Zealand Medical Journal.* 124 (1344), 81—90.
Uray, T., Mayr F.B., Stratil, P., Aschauer, S., Testori, C., Stertz, F., & Haugk , M. (2014). Prehospital surface cooling is safe and can reduce time to target temperature management after cardiac arrest. *Resuscitation* 87, 51—56.

BN706000

Bronwyn Heatlie
1000005445

POSTER RATIONALE

A poster has been used to distribute the information gathered from the evidence-based literature review. The rationale in choosing a poster is that it is an effective medium in which to distribute complex information succinctly and effectively in a variety of settings. These settings can include clinical forums and conferences, medical and nursing schools and also within the relevant hospital departments such as the Emergency Department, ICU and Cardiac Units. By using a poster, fairly detailed information of the main research findings can be presented in a noticeable and creative way, through use of colour and visually appealing design. It is a highly portable and assessable way of distributing the information to a wide and varied audience. A poster is also an effective aid in an oral presentation of the information as a means of reinforcing the salient points discussed. It provides a highly visual medium that effectively and logically communicates information to a wide audience. (Schneider, Whitehead, LoBiondo-Wood & Haber; 2013).

Reference:

Schneider, Z., Whitehead, D., LoBiondo-Wood, G., & Haber, J.(2013). *Nursing and midwifery research: Methods and appraisal for evidence-based practice* (4th ed.). Sydney, NSW, Australia: Mosby

BN706000

Bronwyn Heatle
1000005445

PECOT Model

PECOT Category	Information relating to question	Explanation
Population	Adult cardiac arrest patients who were successfully resuscitated but remained comatose	These are patients that are eligible to receive therapeutic hypothermia intervention post resuscitation
Exposure (Intervention)	Therapeutic hypothermia induced, where the core temperature is maintained at between 32°C and 36°C	Studies and articles considered were those that compared the intervention of therapeutic hypothermia, temperature variables and no temperature management at all.
Comparison/Control	Different induced hypothermic temperatures in post resuscitation, including no temperature management at all.	This is to evaluate which core temperatures produce the most benefit and what risks are involved
Outcome	The efficacy of the intervention of therapeutic hypothermia in terms of the reduction of long term neurological damage, recovery and overall increased survival rate	This is to establish whether therapeutic hypothermia is an effective early intervention in a patient who is has been successfully resuscitated that will ultimately increase the patient's prognosis of recovery
Time	24 hours – 72 hours	Rapid cooling initiated very early after a successful resuscitation and maintained over a period of time provides a protective mechanism for further neurological and tissue damage