The Hong Kong Society of Critical Care Medicine

The Hong Kong Society of Critical Care Medicine (HKSCCM) was established in 1983. Our objectives are:

1.To improve co-operation, liaison, and comradeship of all the health care workers involved in the practice of critical care medicine in Hong Kong.
2.To advance knowledge in Critical Care Medicine in Hong Kong.
3.To provide expert advice, as and when required, to other organisations on matters pertaining to critical care medicine in Hong Kong.
4.To liaise with similar organisations overseas and to promote exchange of expertise and information.

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香港危重病學會

THERAPEUTIC HYPOTHERMIA

What is therapeutic hypothermia?

Therapeutic hypothermia is a form of treatment by which the body temperature is lowered to below normal. It is done after cardiac arrest to lessen the injury to the brain by reducing its metabolic rate.

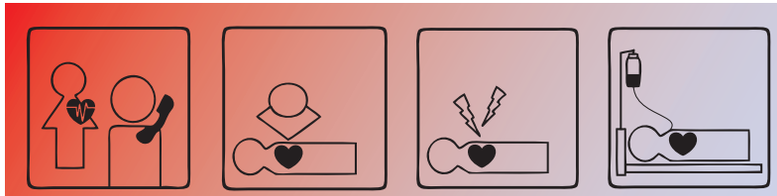
Chain of events in cardiac arrest

Cardiac arrest means that the heart stops pumping out blood normally. Without heart beat, blood does not flow around the body and oxygen does not reach the brain and other organs. Cardiac arrest is a medical emergency and help must be called for immediately. Cardiopulmonary resuscitation (CPR) should be started, including chest compression with or without mouth-to-mouth or bag ventilation. If the heart is found to be beating very fast or irregularly and the origin of the heart beat is not from a normal site, e.g. pulseless ventricular tachycardia or ventricular fibrillation, electric shock treatment (defibillation) will be given.

If eventually the pulse returns after CPR but the patient is still not fully waking up, it means that the brain may have been injured during the period of cessation of blood flow (ischemic injury). Therapeutic hypothermia can be started to reduce the metabolic rate of the brain, and it has been found to be able to reduce brain damage when blood flow resumes. We call this additional damage during resumption of blood flow "reperfusion injury".

Who will benefit from therapeutic hypothermia?

Patients who have had cardiac arrest due to pulseless ventricular tachycardia or ventricular fibrillation may benefit from therapeutic hypothermia. However, not all cardiac arrest patients will benefit from this treatment, including those who have coma due to some other causes like severe infection, heart failure, etc. Patients who has had CPR for more than 45 minutes may not benefit from therapeutic hypothermia because these patients will often have very poor conditions and may even die.



Chain of events in cardiac arrest: Calling for help, Cardiopulmonary resuscitation, Electric shock, After care

How to apply therapeutic hypothermia?

Usually, we lower the body temperature by a combination of methods, for example, using ice packs, cooling mattress, cooling blanket. We can also insert a very cold catheter into the blood vessel (cooling catheter), or infuse ice-cold saline into the vein. The body temperature is kept to 32-34 degrees Celsius for 12 - 24 hrs. Some potential side effects may include irregular heart beat as a result of the underlying heart condition and the low body temperature, increased risk of infection and possible mild impairment of blood clotting ability.

What is the expected outcome of therapeutic hypothermia?

Cardiac arrest is an extremely grave condition. Even with therapeutic hypothermia treatment, many patients after cardiac arrest will not survive or will have significant impairment in functions. The final outcome depends a lot on the duration of cessation of blood flow during cardiac arrest when the brain receives no oxygen supply.

Where can I get further scientific information?

The following are two major studies on therapeutic hypothermia:

1. The Hypothermia after Cardiac Arrest study Group. Mild therapeutic hypothermia to improve neurologic outcome after cardiac arrest. N Engl J Med 2002:346:549-556
2. Treatment of comatose survivors of out-of-hosptial cardiac arres with induced hypothermia. N Engl J Med 2002;346:557-63

You may also refer to the guideline of the American Heart Association.

What were the results of previous studies on therapeutic hypothermia?

From previous studies, therapeutic hypothermia reduced death rate from 55% to 41%, and increased percentage of survivors with satisfactory functions from 39% to 55%.

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Written by Dr Anne KH Leung (Queen Elizabeth Hospital), Diagram designed by Ms Yu Ka Yan (Queen Elizabeth Hospital), Pamphlet edited and designed by Dr Arthur CW Lau (Pamela Youde Nethersole Eastern Hospital)

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