Therapeutic Hypothermia: Keeping cool inside

Madam, "Time is tissue." This statement holds very true when it comes to ischaemic and anoxic injuries of the brain and cardiac tissue following cardiac arrest. Longer the tissue remains in a state of ischaemia, more and more tissue death and scarring occurs due to its continual oxygen demand and ongoing metabolic activities. Once an episode of heart attack occurs, damage to the heart tissue leads to greatly reduced efficacy of the pump and increased risk of a second attack and further damage.

According to one study, one in four middle aged men in Pakistan is a patient of coronary artery disease.[1]

Until recently, the only way to reduce the tissue death in the first few crucial hours after the heart attack was by medication. It is at this junction that the concept of tissue cooling comes into play. The concept of cooling to preserve tissue and aid healing is not a new one. Doctors have known for more than a century that people who fall into icy water have a better chance of survival than other drowning victims. In some developing countries where operating rooms are not equipped with bypass machines, patients are still packed in ice during open heart surgery to stop all blood flow. In one of its most recent applications, women undergoing cancer treatments that often lead to infertility can have their eggs cryogenically frozen for later use.

Therapeutic hypothermia is believed to work by protecting critical tissues and organs such as the brain, heart and kidneys following acute ischaemic or inflammatory events, by lowering metabolism and preserving cellular energy stores, thereby potentially stabilizing cellular structure and preventing or reducing injuries at the cellular, tissue and organ level.[2]

This theory has been put into practice, in many developed countries, by inserting a temperature modulating catheter via the femoral vein and onto the heart. Here ice cold saline passes through the catheter, cooling the catheter tip to 36 degrees. Blood flowing towards the heart is cooled as it passes across the ice cold tip. Patient's body temperature reaches the therapeutic hypothermic levels quickly and stays that way for 24 hours. Demerol is given to prevent shivering response to the decrease in body temperature. The body is then rewarmed in the next 3 hours. During the cold state the patient can undergo procedures like angioplasty to unclog the blockage.[3]

This can stop the immediate or early myocardial tissue destruction process or slow it down by decreasing its metabolic activity and future scarring can be avoided.

The American Heart Association (AHA) recently revised its treatment guidelines to recommend the use of therapeutic cooling as part of the critical care procedures for patients with an out-of-hospital cardiac arrest following

ventricular fibrillation. Further studies for future indications for this type of early management are expected to be conducted in by the AHA.[2]

It is high time that steps be taken to thoroughly exploit this new found means of preventing tissue damage in order that patients may maintain a normal lifestyle with a healthy heart.

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