THE USE OF HYPOTHERMIA IN NEUROSURGERY

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Hypothermia is not a new neuroprotective method. Its use has been started a couple of decades ago. However contemporary technology is on such a high level and the use of hypothermia respects the context of newest patophysiological knowledges, especially the use of new methods of multimodal monitoring (ICP, CPP, $SVjO_2$, $ptiO_2$).

There are several ways of hypothermia use. The most common surface cooling mattress way is relatively slow acting but safe method. Then we can use intravenous cold liquids, cooling the femoro – femoral shunt, or the use of cooling catheter loaded to subclavian vein or v.cava.

The most of earlier clinical studies (Clifton 1993 a 2001, Marion 1997, Shiozaki 1998) worked with surface cooling and a moderate hypothermia (32ºC) for a relatively short time (48 hours). All these studies agree with the positive influence on an ICP, mostly correlated with the increase of CPP. On the other hand this deeper hypothermia is followed by bradycardia, heart rhythm disturbances, hypercoagulation, pneumonia and mineral disturbances. Maybe due to these negative aspects of moderate hypothermia its use in patients after brain injury remains controversial. Therefore new algorithms using mild hypothermia (around 34ºC) for a longer time (3 – 7 days) were used (Polderman, 2008). It has been shown that this way of use is lacking the negative side effects, while positive effects on ICP and CPP are preserved.

The use of hypothermia after sever head injury has been doubted in the recent years by the last major randomized control trials (Clifton, 2011, Maekawa, 2015, Andrews, 2015). On the other hand, there are still supporters of this method because it is still a powerful tool to decrease otherwise intractable intracranial hypertension. Moreover, it has been shown recently that only very mild hypothermia of 35 ºC may do the job without major complications. The role of hypothermia for patients after the resuscitation has been proven and is supported by the anesthesiological community.