

WORLD HEART CONGRESS

May 22- 24, 2017 Osaka, Japan



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Brain protection by adiabatic CO₂ expansion for out of hospital cardiac arrest and stroke on animal models and first fortuitous clinical case

Therapeutic hypothermia produced by evaporation of Per Fluoro Carbon in the fossa nasalis in a flow of oxygen reported in a prospective multicentre study has demonstrated a tendency to improve outcome in out of hospital cardiac arrest . When I saw the experiments on pigs at the Weil Institute of Cardiac Care Medicine (WICCM), I was immediately convinced that another approach of cooling could be abrupt decompression of gas. After multiple experiments, I demonstrated that it was possible to obtain on the same model a drop of brain temperature similar to the work previously reported at the WICCM. This work was presented in a Poster at the EHRA meeting Milano 2015. However, the simultaneous work on infrared images on severed pig heads suggested that it was possible to cool the brain by the decompression of gas inside the mouth instead of the nose which looks to be an even less invasive and faster method on the field. It was during these experiments that my wife watching TV beside me experienced on June 2011 an episode of cardiac arrest that I was able to diagnose immediately. I started Cardio Pulmonary Resuscitation followed by defibrillation performed by an old but still working defibrillator that I kept in the basement of my house when the original study of the method of “Fulguration” was completed. Before arrival of Fire Brigade I used a 900 ml bottle of compressed CO₂ gas also available in the basement of my house and delivered the cooling gas at that time in the fossa nasalis. Despite a period of 6 min of no-flow she was able to recover after 5 days of coma with absolutely no neurologic deficit. This fortuitous resuscitation used for the first time for brain cooling by decompressed gas will be used for the first pilot study supported by the Schiller Company (Switzerland). It will start soon in the city of Lugano which is already famous for its highest success rate of resuscitation (50%). The second major interest of this new technique seems to be its application in stroke also suggested by multiple animal models experiments.

Biography

Guy Hugues Fontaine has made 15 original contributions at the inception of cardiac pacemakers in the mid-60s. He has identified ARVD by serendipity in the late 70s, published 900 scientific papers including 201 book chapters. He is got place in 3 books: 216 Profiles in Cardiology since the 14th century (Hurst 2003), 500 greatest Geniuses of the 21st century (ABI) 2005 USA, the 100 Life time of Achievement (IBC) 2005 Cambridge UK. He is Reviewer of 17 journals both in clinical and basic Science. He has given 11 master lectures in China (2014). He is also working on brain and heart protection in cardiac arrest and stroke by therapeutic hypothermia.

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