Non-invasive measurements of intracranial pressure by magnetic resonance scanners.

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Abstract

Nuclear magnetic resonance (NMR) physics enriched our world with great applied technological advances especially in neurosurgery. The plain imaging and the functional or the dynamic. Here additional function can be obtained to measure intracranial pressure ICP non-invasively. I do not want to speak about ICP importance which Up-to date ICP measured by introducing a probe (electrodes or transducers) of different kinds in different places of the intracranial layers and structures, with many unwanted effects and away from real time measurements with very bad intracranial compartments feedback about their pressure gradient and dynamicity.

Keywords: MRI scanners, Neurosurgery, Nuclear magnetic resonance, Intracranial pressure.

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Introduction

The paper discuss the physics with which MRI scanners work routinely, rather a brief idea or a summary about what can be done to make MRI machine picks up the ICP non-invasively and without any given materials like contrasts. First let us know what is the fact in MRI physics that we have to consider to make us know the possibility of such claim! The soul of MRI physics utilization to bring out an image is the Proton spin Theta. This theta is the function of the proton internal energy and hence the frequency, the magnets, radiofrequency and all the protocols are revolving around this Theta. All these parameters assume that no other variables affects Theta other than the above mentioned. This assumption puts the target internal temperature out of the so sophisticated mathematical calculations to finally plot an X, Y dots that forming the final image. That is due to the concept of measurements are taken in a standard conditions (room temperature which could be 25 centigrade and one atmospheric pressure). It is well known from the nuclear physics that this Theta decreases as the internal energy of the proton increases by whatever as if subjected to external source of radiofrequency or simply if the temperature of the proton environment increased by heating. Also it is well known in classic physics that in any system temperature and the pressure are parallel in proportionality. Here the protocols that exclude the examined body temperature can re-adjusted to put the temperature as a variant with subtraction of the Tn (n for normal) which is the normal body temperature and Th (h for high) then plot a new X,Y dots for the image, this is of two benefits; the first is to measure any local or regional in brain temperature as a mode of functional MRI the second is to admit a second variant which is the pressure within this tested object with same above principles related to the heat. By this the real time measurement of different intracranial compartments as supra-tentorial and left-right hemispherical pressure gradient and so on.

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