The risk posed by earphones & bone vibrators for patients with programmable shunts

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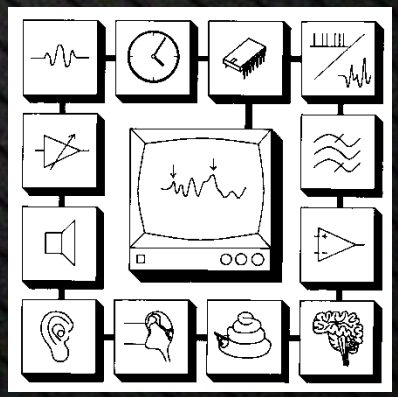

Background

- Some of our patients have hydrocephalus and consequently, a ventriculo-peritoneal (VP) shunt
- There are two types:
  - Non programmable shunts
  - Programmable (PVP) shunts, adjusted using an external magnet
  - typical field strengths: 9mT (90G) is needed for a Strata™ II valve and 8mT (80G) for a Codman Hakim valve
- Other domestic & medical devices contain magnets
- At least one incidence of an unintended VPV shunt re-programming was reported (Fujimura et al 2018)
- What about audiological transducers?

Magnetic field strengths at the surface of devices (provisional)

• iPad smart cover	206mT
• Bose QuietComfort phones	24mT
• Apple earbuds	20mT
• TDH-49*	25mT
• TDH-39*	20mT (3mT at cushion edge)
• ER-3A inserts	no data yet
• Radioear B72*	7.4mT
• Radioear B71*	5mT
• Radioear B81	no data yet
• Otodynamics otoport probe	0.1mT

* No risk at 5cm distance

Magnetic field strengths at the surface of devices (provisional)

- Phonak EasyPhone activator 315mT
- Cochlear BAHA5 0.1mT
- Cochlear BP110 3.6mT
- Oticon Ponto Plus Power 4.9mT
- Meditronic Sophono 80mT (3.5mT at 5mm)

Reference: Pierson et at 2017

Draft BSA guidance

- Prior to audiology assessment all subjects or their carers should be asked if they have a PVP shunt
- Advice: Do not place the following transducers on or near an ear with a PVP shunt valve:
  - Supra-aural earphones
  - Bone conductors
- Inserts can be used if the transducer part remains at least 5 cm from the mastoid containing the shunt at all times (maybe cover transducer with bubble-wrap)
- Air & Bone conduction testing *can* be performed on the ear contralateral to the PVP shunt valve

Is there anything we can do?

- IERASG and/or ISA should inform members of the potential risks (this presentation)
- IERASG and/or ISA could lobby shunt manufacturers and medical device legislators, encouraging them to:
  - Use a different technology to adjust PVP shunts, or
  - Desensitise PVP shunts and employ a more powerful magnet for adjustment