Impact of Transcranial Electrical Stimulation on Implantable Defibrillators

Introduction: In late years high voltage, the Transcranial Mark Electrical Stimulation (BR-MSEP) device using the high-frequency pulse are developed and are used frequently as perioperative monitoring. Treatment using the electrical stimulation and the laboratory procedure diverge into many branches now. However, there are not an implantation type heart device (CIED) in individual treatment and testing and the guidelines for the real handling in examination and the clinic of the electromagnetic interference (EMI) despite ten minutes because there are various electrical stimulation methods and devices. Using muscle equivalence agar manikin, we examined the effect that BR-MSEP gave to an implantable cardioverter defibrillator (ICD).

Methods: We made muscle equivalence agar manikin with the electric characteristics similar to the muscle and changed the distance (0, 10, 20, 30cm) from ICD lead to BR-MSEP electrode, output (0, 10, 100, 200, 300, 400, 500, 600V) of BR-MSEP and evaluated the presence of the electromagnetic interference in ICD under conditions of 32 ways in total.

Result: An electromagnetic interference was found under conditions of 24 ways. If output of BR-MSEP was 100 (V) or more, we showed an electromagnetic interference from ICD lead regardless of BR-MSEP electrode position.

Conclusion: By high voltage in a used by a clinic, the high-frequency pulse stimulation setting, we are more likely to cause the inappropriateness movement by the electromagnetic interference in patients with CIED now, and, from this results, there is the risk of complications serious in certain instances. Therefore enough safety measures are necessary for the a enforcement in the CIED patients.