MAGNETIC RESONANCE IMAGING IN PATIENTS WITH NEUROSTIMULATION SYSTEMS

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INTRODUCTION:

The association of neurostimulation systems (NSS) to the advances in radiological imaging techniques in some cases generates situations of uncertainty in decision taking. Magnetic resonance imaging (MRI) and implantable neurostimulation systems are the clearest example of this. The present study investigates the safety of patients with a spinal cord NSS subjected to MRI. Such NSS are used not only to treat chronic pain but also to manage primary tremor, tremor in Parkinson's disease and epilepsies that are refractory to medical treatment or prove highly disabling.

MATERIAL AND METHODS:

Based on a protocol previously defined in consensus with the MRI Center, and following the obtainment of informed consent and approval by the hospital ethics committee, 25 patients were subjected to a total of 25 MRI studies using two 1.5T clinical-use systems (MRi/LX- GE Healthcare and Magnetom-Sonata, Siemens). The imaging studies were indicated for different disorders affecting the brain, spine, etc.

In accordance with the study protocol, we assessed different data: patient identification, age, sex, date of imaging study, diagnoses, date of NSS implantation, type and location of the generator, electrode characteristics (number, type, location), programming, NSS interventions made (affecting the electrode and generator), anatomical region explored by MRI, exposure time, and the characteristics of each technique.

Each patient was appointed on the same day by the Services of Anesthesia (Pain Management Unit) and Radiology (MRI). Before the imaging study, the NSS generator was disconnected by the Pain Management Unit, and MRI exploration was carried out in the presence of a physician belonging to the aforementioned Unit. During exploration the patient was able to communicate verbally with the physicians at all times, and moreover could activate a hand-held anti-panic system.

After completion of the study, the NSS generator was reconnected by the Pain Management Unit, with a reading of the possible changes in telemetric characteristics, and post-MRI programming.

In addition, patient satisfaction was assessed, together with any changes in disease symptoms in the weeks after the study.

RESULTS:

The 25 patients studied (11 males and 14 females) were aged 32-72 years; 14 with a Synergy generator and 11 an Itel III system. There were no serious complications.

The only complication recorded during MRI was generator warming. The post-MRI changes were as follows: changes in stimulation perception (1 case), imperceptible activations (2 cases), changes in programming (3 cases), and inability to perform telemetry or activate the NSS (1 case).

Patient-reported satisfaction was maximum in all cases (score 5/5). There were no post-MRI neurological complications.

DISCUSSION:

With our imaging protocol, MRI in patients with NSS at spinal cord level produced few and non-serious complications, without patient injury or changes in the system. Patient-reported satisfaction was moreover maximum in all cases.

We therefore consider that patient safety is guaranteed when our study recommendations are followed.