Thoracic spinal cord stimulation for low back pain in a patient with permanent pacemaker

Sir,

Spinal cord stimulation (SCS) for chronic pain management involves placement of epidural electrodes, which could theoretically evoke device-to-device interference in patients with a permanent cardiac pacemaker (PPM).[1]

We report a case of a 52-year-old female patient with double-chamber Medronic Kappa KDR903® device with sensor accelerator-DDDR (Medtronic Inc., Minneapolis, MN, USA/compatible with bipolar diathermy) due to complete heart block, who underwent SCS implantation for treatment of severe chronic low back pain. Several oral analgesic regimens, non-invasive (hydro/physiotherapy) or minimal invasive (electro- acupuncture [EA]) treatment methods had been tested previously unsuccessfully or with extremely short duration of pain relief (24–36 h pain-free period after EA). Therefore, after consultation with a cardiologist, due to patient's history, she was deemed to be a good candidate for SCS.

SCS implantation was carried out in the operating theatre under monitored anaesthesia care (MAC) with the patient in the prone position. Standard intraoperative monitoring included continuous electrocardiograph, intermittent non-invasive blood pressure monitoring (every 5 min), capnometry trend (CO_2 sensor was attached inside the oxygen mask), and pulse oximetry. MAC was achieved by intermittent intravenous midazolam administration (0.05–0.1 mg/kg).

An electrode lead was inserted with its tip at T9 level under real-time X-ray guidance (C-arm fluoroscopy unit). Correct electrode positioning produced paraesthesiae in low back during intraoperative test stimulation corresponding to patient's pain location. Initially, SCS device was programmed at a pulse rate of 80 Hz, a pulse width of 210 μs and an output voltage of 1.2 mV. Pacemaker sensitivity and possible device interference were tested in detail by a Medtronic technician perioperatively. During the trial period, SCS output voltage was increased to the maximum level tolerated by the patient to reveal any possible interference; and no interference was noted. After that, SCS was reset to the clinically chosen parameters mentioned before. Moreover, SCS amplitude was programmed to prevent possible overstepping of the tested safe upper energy level.

After 2 days, permanent SCS implantation ensued following the above-mentioned safety measures. After 1 week, an X-ray revealed that the electrode tip had slipped from level T9 to T11. Therefore, SCS was reprogrammed to produce paraesthesiae in patient's pain location at a higher pulse width of 330 μs, whereas the rate and output voltage remained (80 Hz/1.2 mV). Re-interrogation of the pacemaker continued to reveal no interference. One week later, the patient was discharged and SCS device could be switched on and off and the energy level could be increased and decreased by the patient (within preset safe limits).

Post-implantation follow-up (at 3–6–12 months) revealed significant pain relief, improvement of basic movement's performance and quality of life as these were documented according to appropriate scales used.

This is a report of a safe and effective SCS implantation in a patient with PPM. Despite the theoretical risk of device-to-device interference in such a setting, there are several literature studies describing cases without any interference.[2-4] The only report of PPM-SCS interference was a case where both devices were used in the unipolar mode and PPM function was inhibited when SCS stimulation amplitude exceeded 1.9–2 mV.[4] Other literature reports of inter-device interference describe cases of simultaneous use of implantable cardioverter defibrillators (ICDs) and SCS, and due to the different behaviour of ICDs compared to PPMs they are not discussed further.[4,5]

According to relevant literature, it seems that there are minimal chances of inter-device interference when both devices use bipolar mode.[2]

Despite the fact that in our case, SCS and PPM were used simultaneously with safety and effectiveness, individual testing under careful monitoring is mandatory.

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Conflicts of interest

There are no conflicts of interest.

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REFERENCES

1. Kapural L. Spinal cord stimulation for intractable chronic pain. Curr Pain Headache Rep 2014;18:406.
2. Kosharskyy B, Rozen D. Feasibility of spinal cord stimulation in a patient with a cardiac pacemaker. Pain Physician 2006;9:249-51.
3. Hoelzer BC, Burgher AH, Huntoon MA. Thoracic spinal cord stimulation for post-ablation cardiac pain in a patient with permanent pacemaker. Pain Pract 2008;8:110-3.
4. Ooi YC, Falowski S, Wang D, Jallo J, Ho RT, Sharan A. Simultaneous use of neurostimulators in patients with a preexisting cardiovascular implantable electronic device. Neuromodulation 2011;14:20-5.
5. Molon G, Perrone C, Maines M, Costa A, Comisso J, Boi A, *et al.* ICD and neuromodulation devices: Is peaceful coexistence possible? Pacing Clin Electrophysiol 2011;34:690-3.

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