Phrenic Nerve Stimulation in a Patient with a Dorsal Column Stimulator

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Case Report

• A 76-year-old female presented with recurrent muscle spasms across her left upper abdomen resembling a “hiccup.”

• This began the evening her permanent DCS was placed.

• Her DCS was turned off and she was started on metaxalone.
• She had undergone a successful trial with the Nevro system and did not experience diaphragmatic contractions.

• Of note, the patient had a cardiac resynchronization therapy device with defibrillating capabilities (CRT-D) in place, which was interrogated before and after the trial with no interference reported.
• Placement of the permanent DCS was uneventful.

• Her CRT-D was again interrogated before and after the permanent DCS placement with no interference reported.

• Due to the timing of the DCS implantation and the onset of symptoms, it was thought that the spasms were somehow related to the new device.

• Removal of the device was considered.
But how could a DCS cause these hiccups?
• Prior to device removal we contacted Cardiology.

• Although rare, a lead from a CRT-D can lead to PNS with resultant diaphragmatic contractions resembling hiccups.

• The patient was sent to the electrophysiology clinic where the voltage on her left ventricular lead was reduced and her symptoms resolved completely.
Discussion

• To our knowledge, there are no reports in the literature of a DCS causing diaphragmatic contractions.

• Injection of local anesthetic in the epidural space has been reported to cause persistent hiccups by an unknown mechanism\(^{(1)}\).

• PNS is a well-known complication of CRT-D\(^{(2,3)}\), occurring in 33-37% of patients, and is a limiting factor when implanting left ventricular leads from coronary veins\(^{(4)}\).
• There are several ways the cardiologists can reduce the occurrence of PNS \(^{(5, 6, 7)}\).

• Sometimes the coronary sinus lead may need to be repositioned or the voltage reduced.

• In the case of our patient, the electrophysiology team was able to reduce the voltage in the left ventricular lead and her symptoms resolved completely.
• Historically, there has been concern regarding the combination of a DCS and pacemaker due to the possibility of false inhibition of the pacemaker.

• There are case reports describing the safe use of a DCS in patients with a pacemaker (8).

• Additionally, there are studies that suggest that a DCS and pacemaker could be used together safely; however, individual testing is mandatory in each patient (9).
Conclusion

• Always consider other devices and potential interactions.

• The pacemaker device company and electrophysiology team may be valuable resources.

• Ultimately, due to the time, risks and expense of placing a DCS, it is imperative to specifically consider a patient’s CRT-D as the cause of diaphragmatic contractions prior to removing a DCS, even when the temporal relationship of the DCS and onset of new symptoms may suggest otherwise.
References


