COMMENTARY
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Is It Safe to Perform Therapeutic Endoscopic Procedures in Patients with Implanted Electronic Cardiac Devices?

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See "Endoscopic Electrosurgery in Patients with Cardiac Implantable Electronic Devices" by Myong Ki Baeg, Sang-Woo Kim, Sun-Hye Ko, et al., on page 176-181.

INTRODUCTION

As the use of cardiac implantable electronic devices (CIEDs) such as pacemakers and implantable cardioverter-defibrillators is increasing, management of those device-wearing patients with electrosurgery has attracted growing attention, not only in the area of gastroenterology, but also in other fields, including dermatology[1] and urology.[2] For gastroenterologists, there have been concerns about electromagnetic interference (EMI) occurring in CIED patients during small bowel capsule endoscopy[3] and therapeutic endoscopy.[4]

With the advancement of the field of therapeutic endoscopy, endoscopy using electrosurgical devices is mounting up, and currently recognized as a safe and essential tool for modern endoscopy. The rate of electrosurgical procedures in patients with CIEDs is also increasing. Electromagnetic currents generated during electrosurgery may interfere with a CIED. However, a reliable protocol that can be followed in such a situation is not yet established.

In this issue of *Clinical Endoscopy*, Baeg et al.[5] reported the results of their retrospective analysis of endoscopic electrosurgery in patients with a CIED. Fifty-nine procedures including gastric and colonic snare polypectomy (n=45), gastric and colonic endoscopic submucosal dissection (n=6), and endoscopic retrograde cholangiopancreatography with endoscopic sphincterotomy (n=8) were reviewed. The authors monitored vital signs and oxygen saturation, but did not pay schematic attention on special cares such as real time electrocardiographic (EKG) monitoring in CIED patients before, during, and after the procedure. Apparently, no patient showed any symptom or adverse event, according to the medical records. Among 31 pacemaker interrogations with procedure recordings, two cases of multiple tachycardia events were noted, but the EKG pattern returned to normal immediately after the procedure was completed. Two possible program changes were noted later on cardiology outpatient clinic visits among 44 patients with pacemaker, but the authors were not sure whether these changes were definitely related to electrosurgery.

It is possible that a CIED may sense and incorrectly interpret electrical signals produced during electrosurgery as intrinsic cardiac activity. Theoretically, inappropriate reprogramming of the device, inhibition of the pacing system, or inappropriate antitachycardia pacing or shocks by the CIED may occur during the electrosurgery procedure.[6]

There are several published recommendations regarding endoscopic electrosurgery in patients with a CIED but they are not evidence-based, and adequate study related to this important issue is still lacking. The guidelines for the perioperative management of CIED patients undergoing electrosurgery from the American College of Cardiology Foundation and the American Heart Association (ACCF/AHA)[7] differ from

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those of the American Society for Gastrointestinal Endoscopy (ASGE).[8] The ACCF/AHA recommend that the pacemaker should be reprogrammed to an asynchronous mode in which regular uninhibited pacing continues by pacemaker with no sensing capability throughout the entire procedure. However, according to ASGE, reprogramming is recommended only when a prolonged electrocautery procedure such as treatment for gastric antral vascular ectasia or radiation proctitis is anticipated in pacemaker-dependent patients. Pacemaker-dependent patients are not able to sustain adequate hemodynamic stability or cardiac rhythm without assistance from the pacemaker. Thus, it is critical to consider pacemaker dependency, and consultation to a cardiologist is a prerequisite in pacemaker-dependent patients during preprocedural evaluation.

Experts recommend that the operator should have information on the type and exact location of the CIED, its programmed settings, the underlying disease process requiring CIED placement, and whether the patient is device-dependent before the procedure.[8] During the procedure, it is necessary to monitor vital signs and EKG rhythm continuously in addition to pulse oxymetry. Additional recommendations include intermittent delivery of the lowest effective amount of electrosurgical current for the shortest possible duration, ideally no more than 5 seconds at a time. Bipolar or multipolar accessories are preferred to monopolar devices whenever available. Argon plasma coagulation is one of the monopolar devices and should be used with minimal feasible power and brief, intermittent bursts. Grounding pads should be applied as close as possible to the treatment site trying to make sure that the current does not pass near or through the CIED. Cardioverter-defibrillation equipment should be readily available.

There are concerns about EMI by electrosurgical currents being used during endoscopy in CIED patients. Most patients with pacemaker may undergo routine electrosurgical endoscopic procedures, and serious adverse events related to therapeutic endoscopic procedures in CIED patients have not been reported.[9,10] However, the endoscopist must be aware of the risk factors and take precautionary steps to minimize the risks. Universal guidelines based on objective data rather than on consensus statements are essential because the chance of encountering CIED patients is increasing for endoscopic procedures.

Conflicts of Interest

The author has no financial conflicts of interest.

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