Dostatečná nebo nedostatečná svalová relaxace?

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Základní informace

- žena 48 let
- základní dg DKMP
- v anamnéze náhrada Mi chlopně bioprotézou
- BiV-ICD

- vedena na čekací listině pro OTS jako ambulantní kandidátka

- adekvátní dárce => pacientka přijíždí z domova na akutní příjem

➢ základní fyzikální vyšetření a lab odběry

✓ deaktivace antitachykardických funkcí BiV-ICD
✓ zahájena monitorace EKG

Úvod do CA

- ✓ nalepeny externí kožní defibrilační elektrody
- ✓ periferní žilní kanyla, arteriální katétr

- ➢ midazolam, etomidát, sufentanil, pipekuronium
- ➢ orotracheální intubace
- ➢ nekomplikovaný úvod do CA

- ➢ CŽK, AVA + PAC (18 cm)
- ➢ PMK, teplotní čidla (nazofarynx, rektum)

Zahájení operace

- preparace podkoží
- po provedení sternotomie preparace tkání pod sternem

- reoperace => obtížná preparace tkání

✓ frekventní svalové záškuby v oblasti hrudníku

➢ **chirurg reklamuje nedostatečnou svalovou relaxaci**

Svalová relaxace

- během úvodu do CA podáno pipekuronium (8 mg při BW 72 kg)
- ✓ znovu ověřeno => pipekuronium bylo podáno

- ➢ detailní pohled do operačního pole

=> záškuby pouze v oblasti hrudníku, diskrétního charakteru

BiV-ICD

- výboje ICD

✓ monopolární elektrokoagulační systém

➢ elektromagnetická interference (EMI)

- informace o deaktivaci antitachykardických funkcí BiV-ICD ??

➢ znovu ověřeno (telefonicky), ale není 100% jistota

➢ **přiložit magnet ???**

Magnet a ICD

- nad ICD přiložen adekvátní magnet => bez efektu

- volán kardiolog
- deaktivace antitachykardických funkcí ICD pomocí programeru

- svalové záškuby ustaly

Poučení

- staré pravidlo „přilož magnet“
- PM => asynchronní stimulace (eliminuje riziko oversenzingu, který může vést k inhibici kardiostimulátoru)
- ICD => deaktivace antitachykardických funkcí

DNES NEPLATÍ!!!

- **u současných přístrojů je odpověď přístroje na přiložení magnetu programovatelná, a proto „magnet naslepo“ nemusí ve 100 % případů vést k očekávané reakci**

Reakce na přiložení magnetu

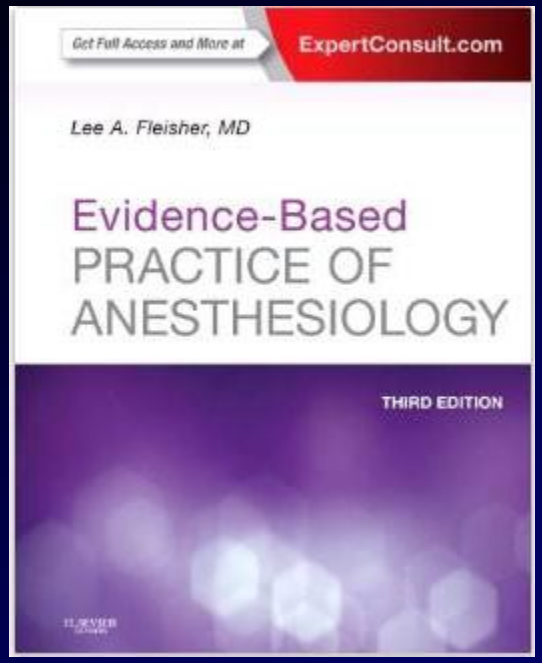

TABLE 13-2 Usual (or Default) Effects of Appropriate Magnet Placement for Most Devices

Manufacturer	Pacemaker	ICD
Biotronik	PROGRAMMABLE • Battery OK: 10 AS events at 90 beats/min, then original programmed mode without rate responsiveness • Battery not OK: 10 AS events at 80 beats/min, then 11% below LRL	NONPROGRAMMABLE NO confirmation • Disables tachy therapies
Boston Scientific (formerly Guidant) (also CPI)	PROGRAMMABLE OFF MODE • Battery OK: AS pacing at 100 (90 at the intensified follow-up interval) beats/min • ERI: AS pacing at 85 beats/min	PROGRAMMABLE OFF MODE Confirmation: short beep at 60 Hz or with each detected heartbeat, depending on model • Disables tachy therapies [CAUTION]†
Medtronic Corporation	NONPROGRAMMABLE • Battery OK: AS pacing 85 beats/min • ERI: AS single-chamber pacing at 65 beats/min	NONPROGRAMMABLE NO confirmation • Disables tachy detection
Pacesetter (owned by St. Jude Medical)	PROGRAMMABLE OFF (and VARIO*) MODE • Battery OK: AS pacing depends on model • ERI: AS pacing below 90 beats/min	PROGRAMMABLE OFF MODE NO confirmation • Disables tachy therapy
St. Jude Medical	PROGRAMMABLE OFF MODE • Battery OK: AS pacing 98 beats/min gradually declining over life of battery • ERI: AS pacing below 87 beats/min	PROGRAMMABLE OFF MODE NO confirmation • Disables tachy therapy
Sorin Medical (was ELA)	NONPROGRAMMABLE • AS pacing at 96 beats/min gradually declining to 80 beats/min at ERI. After magnet removal, 8 additional AS pacing cycles (the final 2 cycles are at LRL with long atrioventricular delay).	NONPROGRAMMABLE Confirmation: Pacing rate (but not mode) changes to • Battery OK: 90 beats/min • ERI: 80 beats/min • Disables tachy therapy

AS, asynchronous; *ERI*, elective replacement indicated—the device is reporting the need for generator replacement due to battery depletion; *LRL*, lower rate limit—the minimum programmed rate for the device.

CAUTION: This table is not meant to be complete. It lists the default (or out-of-box) settings for appropriate magnet placement. Only an interrogation of the generator will reveal the true settings for any programmable device. The term *PROGRAMMABLE OFF MODE* indicates that the magnet response can be eliminated in the generator by programming. For CPI/Guidant ICDs, if the magnet mode is programmed to *ON*, appropriate magnet placement immediately disables tachy detection and therapy, and tachy therapies remain disabled for as long as the magnet remains appropriately applied. If each heartbeat produces a "beep," the device will be enabled for tachy therapy on magnet removal provided it is not damaged by electromagnetic interference while the magnet is applied. If the device emits a constant tone with a magnet applied, tachy therapy is disabled regardless of whether a magnet is present.

*VARIO mode: 32 asynchronous events—the first 16 between 100 and 85 beats/min (ERI) to indicate battery performance; the next 15 at 119 beats/min with gradually declining ventricular pacing output to demonstrate capture threshold. The final pace is no output to clearly demonstrate no capture. This sequence repeats as long as the magnet is in place.

†Any BOS/CPI/Guidant ICD that does not beep (60 Hz for most devices with "BOS" x-ray label, otherwise beep each detected/paced R wave) when a magnet is applied or if it emits a constant tone (indicating that tachy therapy is permanently disabled) should undergo an immediate device interrogation and the patient should be electrocardiographically monitored until the interrogation is complete.

Doporučení odborných společností

The Heart Rhythm Society (HRS)/American Society of Anesthesiologists (ASA) Expert Consensus Statement on the Perioperative Management of Patients with Implantable Defibrillators, Pacemakers and Arrhythmia Monitors: Facilities and Patient Management: Executive Summary

This document was developed as a joint project with the American Society of Anesthesiologists (ASA), and in collaboration with the American Heart Association (AHA), and the Society of Thoracic Surgeons (STS)

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Table 1 General principles of CIED management

- The perioperative management of CIEDs must be individualized to the patient, the type of CIED and the procedure being performed. A single recommendation for all CIED patients is not appropriate
- A CIED team is defined as the physicians and physician extenders who monitor the CIED function of the patient
- The surgical or procedural team should communicate with the CIED team to identify the type of procedure and likely risk of EMI
- The CIED team should communicate with the procedure team to deliver a prescription for the perioperative management of patients with CIEDs
- For most patients, the prescription can be made from a review of the records of the CIED clinic. A small percentage of patients may require consultation from CIED specialists if the information is not available
- It is inappropriate to have industry-employed allied health professionals independently develop this prescription