



British Society for Dermatological Surgery (BSDS) & British Heart Rhythm Society (BHRS) Guidance on Implanted Devices & Dermatological Surgery

Contents

Page

1. Introduction
2. Summary & PPM
3. ICD & ILR
4. Cardiac physiology reports & bookings
5. References & Table: Types of electrosurgery with relevance to commonly used Dermatological equipment
6. Flowchart

Glossary: Permanent Pacemakers (PPM), Implantable Cardiac Defibrillators (ICD), Implantable Loop Recorders (ILR), Electromagnetic Interference (EMI)

Introduction:

At present there is no specific national safety guidance available for clinicians who perform cutaneous surgery on patients with cardiac rhythm devices. The lower risk of skin surgery procedures and the electrosurgical devices that are typically used means some of the generic guidance is not so applicable to local anaesthetic skin surgery and may have significant resource implications. This guidance has therefore been developed to complement and clarify the detailed advice published by the BHRS¹ and MHRA² that was devised primarily for the general theatre and endoscopy setting, rather than the outpatient procedure room or clinic setting in which skin surgery is often performed.

Skin surgery procedures are some of the commonest performed in the UK. A typical Dermatology department conducts well over 2000 procedures per year, and found 2% of these patients had implanted cardiac devices.³ Therefore any advice can have significant ramifications for patient pathways and appropriate use of resources, as well as safety.

We reviewed the published literature, contacted the Medicines & Healthcare products Regulatory Agency (MHRA), and conducted a national survey of members of the BSDS to determine if electromagnetic interference had been reported in practice in the context of skin surgery. We found no reported or published instances of any adverse events. Nevertheless definite risks still exist. It is possible that adverse events have occurred but either not been noticed immediately or not been reported. Precautions must still be taken.

Disclaimer:

This is a guide only and clinical judgement should ultimately determine the degree of risk, particularly for complex patients. Advice from a multidisciplinary team may also be helpful.

Limitations of Guidance:

This document has been prepared on behalf of the BSDS and is based on the most relevant data and expert opinion available when the document was prepared. A full systematic literature review has not been conducted. It is recognised that under certain conditions it may be necessary to deviate from the guidelines and that the results of future studies may require some of the recommendations herein to be changed. Failure to adhere to these guidelines should not necessarily be considered negligent, nor should adherence to these recommendations constitute a defence against a claim of negligence. Limiting the review to English language references was a pragmatic decision but the authors recognise this may exclude some important information published in other languages.

Summary of key points (also see flowchart)

- 1. Monitor the patient clinically and with pulse oximeter whilst using bipolar electrocautery in short bursts >5cm away from a PPM.**
- 2. In addition to (1) switch off any ICD immediately pre-op and back on immediately post-op.**
- 3. Booking clerk or clinician to contact cardiac physiology pre-op:**
 - a. to request device report (see below)
 - b. to arrange visit to theatre immediately pre-and post-op if ICD
 - c. to request cardiac physiology have someone on standby on the procedure date if the surgical site is within 5 cm of the pacemaker box
 - d. to allow an opportunity for ILR data to be downloaded pre-op if required.
- 4. If a PPM is under regular routine review by cardiac physiology then no additional pre- or post-op checks are usually required.**
- 5. If the patient has an ILR record the procedure in the patient's event diary**

Background

Electrocautery passes electricity through tissue to cause coagulation, damage, or cutting. It can interfere with the usual running of some implanted devices by EMI. Queries about these devices may cause concern, or there may be a risk to the safety of the patient or staff.

Pacemakers (PPM)

All pacemakers

Pacemakers may regulate heart rhythm in a variety of ways, but of most relevance is when the patient is 'pacemaker dependent' i.e. they have no natural pacemaker of their own, or their heart rate without the pacemaker is too low (leading to any of: lightheadedness, fainting, shortness of breath, chest pain, weakness, fatigue, collapse). In some cases the device could mistake the electrocautery current for heart activity and stop pacing temporarily. This effect is unlikely if using bipolar electrocautery, particularly if away from the device. Also short pulses can be used to minimise the effect of this

problem even if it does occur, as the device should resume pacing immediately after the electrosurgery pulse stops. If the patient's pulse remains steady through the electrosurgery pulse, it is obviously not having this effect in any case. Although theoretically possible, any reprogramming of the device by electrosurgery EMI is not considered a real risk.

Pacemakers within 5cm of surgical site

If the surgical site is within 5 cm of the pacemaker box (although the risk is still low with bipolar) **the pacing team should be informed of the date that the patient is coming in to have someone on standby.** In the unlikely case that the bipolar diathermy does inhibit the pacemaker (i.e. if the patient becomes symptomatic during electrosurgery use or if some inhibition is noted via pulse oximeter) the team will come and re-programme the device to an 'asynchronous' mode for the duration of the procedure.

Defibrillators (ICD)

ICD often look and feel similar to a pacemaker, and are usually in the same site. There is a greater danger as these devices are constantly sensing for odd electrical activity which might indicate an imminent cardiac arrest. They then administer a shock directly to the heart via internal electrodes. Again the device could mistake the electrosurgery current for heart activity and shock the patient inappropriately. These therefore need to be switched off immediately before, and back on immediately after, procedures involving electrosurgery. The cardiac physiology technicians will do this in the operating theatre by prior arrangement. The device should be off for the minimum time possible i.e. only the period when electrosurgery is needed, not during LA infiltration, or recovery. **It is critical that the WHO checklist is followed to prevent devices from inadvertently being left switched off. When booking surgery it is important to ask the patient, study the case-notes, and contact the cardiac physiology department that looks after the device, to ensure what you may presume to be a pacemaker is not also a defibrillator.** The booking team should also obtain from the cardiac physiology team a summary of every device and the reason it was implanted.

Loop Recorders (ILR)

These are devices implanted usually in a similar site to record a constant running ECG whilst in place, when cardiac arrhythmias are suspected but have been difficult to prove (e.g. syncope, falls, palpitations). They are not a risk to patient or staff as they will merely show some extra electrical activity from the electrosurgery in their recording data, and neither are the devices at particular risk from the electrosurgery itself. The patient keeps a diary of any symptoms that they feel during the time the device is implanted, so they should merely add a note saying they had a procedure with electrosurgery at that time, to help the technicians to interpret the findings correctly. **The follow-up centre should be informed that a procedure is planned, to give them the opportunity to download the stored data from the recorder beforehand.**

Other devices

Other implanted pumps and brain stimulators etc may also be present. Be vigilant and seek advice from the relevant department if found.

Intra-operative monitoring

Continuous ECG using a cardiac monitor has previously been suggested, but is not usually helpful in the out-patient skin surgery setting. The monitor itself readily picks up EMI from the electrosurgery which obscures the patient's heart rhythm at the very moment the surgeon wishes to see the effect. Also with the surgeon busy, no anaesthetist, and not always a scrub nurse, the monitor may not actually be checked during the procedure, even if attached. Although it might be useful for the resuscitation team to view the aberrant rhythm quickly if an ICD patient suffered cardiac arrest whilst their device was switched off, this is extremely unlikely if the proper precautions are taken. Also many

out-patient or day case surgery units may have an Automated External Defibrillator (AED) on the crash trolley, the use of which does not require viewing the heart rhythm (and the cardiac monitor leads may actually get in the way). The cardiac monitor is also slow to fit and prone to lead connection problems, which can delay surgery. **Instead a pulse oximeter can be used for heart rate monitoring, is quick and unobtrusive to fit, often can be monitored audibly by the surgeon themselves if necessary, and is not susceptible to EMI from electrosurgery.**

Device reports from cardiac physiology team

A summary of every device and the reason it was implanted is needed:

- To identify ICD+PPM devices
- To ensure device status and indication known (especially if patient from out of area or moved since implantation)
- To ensure device is not nearing end of life/battery change
- To give the cardiac physiology team an opportunity to arrange a device check pre-op if required
- To give clinician definitive information on the indication for the device (this will not usually affect their peri-operative management, but gives an awareness of level of risk)

Organisation of bookings

- **Booking clinician** to ask patient “where are you normally seen for your PPM/ICD?” when completing the electronic surgical booking form (to help obtain accurate device/indication report - may be another hospital)
- **Booking admin team** to contact cardiac physiology to obtain device/indication report prior to dating, and give to booking clinician for comment
- **1 week minimum notice** needed for cardiac physiology team for **routine ICD patient bookings** (otherwise by special arrangement if possible)
- **Call cardiac physiology team at end of case prior to ICD patient** to allow time to attend department (and update them during surgery if procedure duration changes)

Authors

Dr Adam Bray, Consultant Dermatologist, Dermatological & Mohs Surgeon. BSDS Guidance Lead. adam.bray@uhbristol.nhs.uk

Mr Gareth Davies, Lead Cardiac Devices Physiologist, Bristol Heart Institute.

Dr Beth Wright, Speciality Registrar, Dermatology.

University Hospitals Bristol NHS Foundation Trust.

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Thomas H, Turley A, Plummer C, on behalf of BHRS Council – January 2016

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2. **Guidelines for the perioperative management of patients with implantable pacemakers or implantable cardioverter defibrillators, where the use of surgical diathermy/electrocautery is anticipated.**

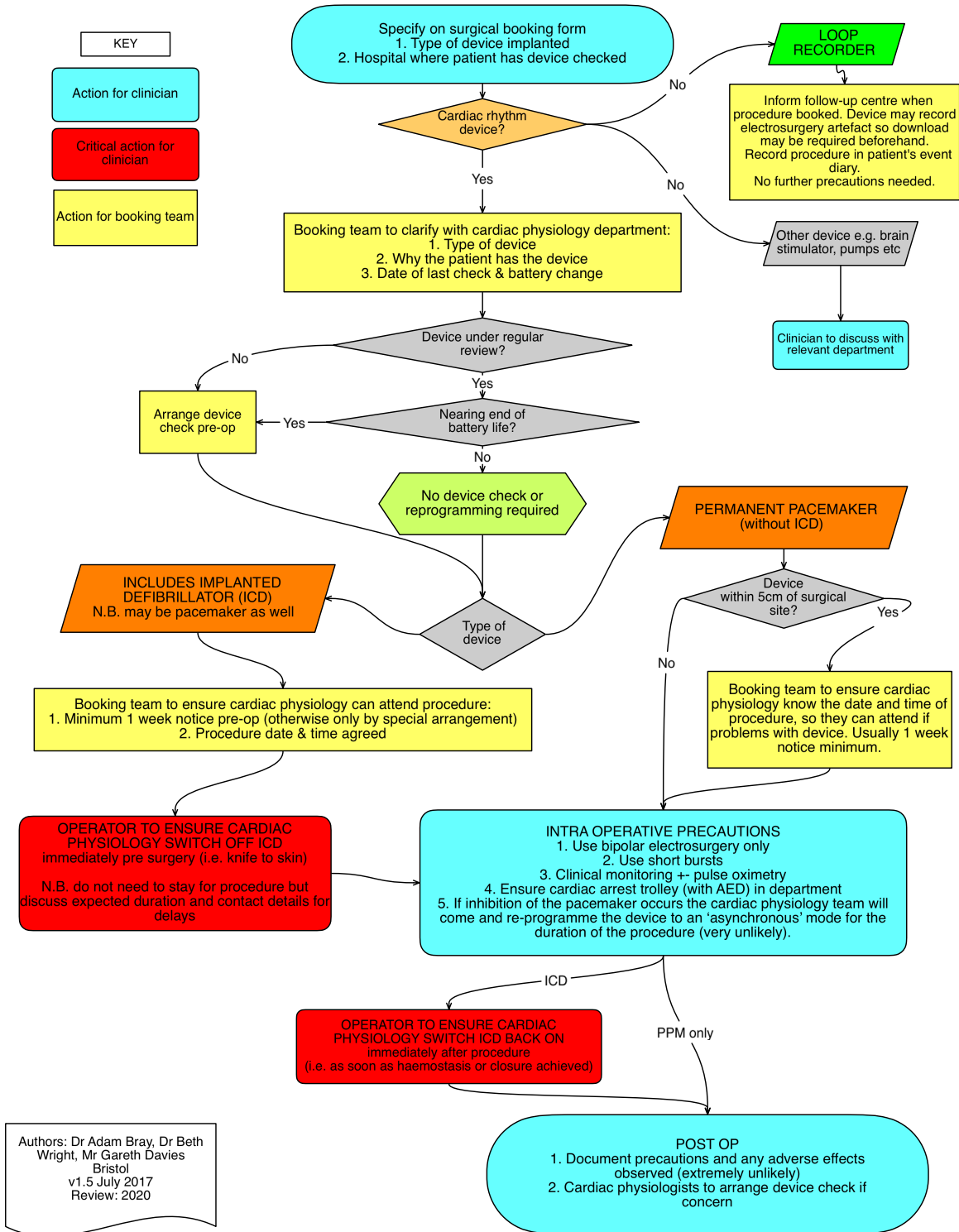
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3. **Bristol Dermatology Centre.** Personal correspondence.

Types of electrosurgery with relevance to commonly used Dermatological equipment

Type of Electrosurgery	Equipment comments	Description
Monopolar single electrode	Conmed Hyfrecator with <i>normal handle</i> probe attachment	Current passes from probe to patient and disperses through the body (possible as it is only a small amount of current and table is insulated)
Bipolar	CoaComp M unit Conmed Hyfrecator with bipolar <i>forceps</i> attachment	Current passes from 1 side of forceps to the other through a small area of the patient's tissue
Monopolar with return plate	Unusual in Dermatological surgery, commoner in main theatres	Current passes from probe through patient to a separate plate (earth electrode) connected to machine
Electrocautery	Largely replaced by other electrosurgery machines but some older units may still be used or battery powered e.g. Bovie	Using current to heat a metal probe (like a soldering iron) to cause coagulation or damage to tissue

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IMPLANTED DEVICES & SKIN SURGERY PROTOCOL
 (see accompanying guideline document for details)



Authors: Dr Adam Bray, Dr Beth Wright, Mr Gareth Davies
 Bristol
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