



IAEM Clinical Guideline 4

Emergency Department Management of Patients with Implantable Cardioverter Defibrillators

Version 1

June 2014

DISCLAIMER

IAEM recognises that patients, their situations, Emergency Departments and staff all vary. These guidelines cannot cover all clinical scenarios. The ultimate responsibility for the interpretation and application of these guidelines, the use of current information and a patient's overall care and wellbeing resides with the treating clinician.



GLOSSARY OF TERMS

Implantable cardioverter defibrillator (ICD): An ICD is a small device placed in a patient's chest or abdomen to help control irregular heartbeats or life-threatening arrhythmias by using electrical pulses or shocks.

ICD device interrogation: This process assesses if the ICD lead wires going into the heart are functioning normally; checks the battery level and assesses if there have been any abnormal heart rhythms detected by the ICD.



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INTRODUCTION

The Irish Heart Foundation (IHF) ICD Patients' Group requested that this guideline would be developed to improve care for patients with ICDs who present to EDs. An IHF survey in 2011 identified problems with access to ICD interrogation services and called for better awareness of ICD issues among ED staff. The ICD Patients' Group concerns were directed through the HSE National Advocacy Unit and prompted collaboration between the national Emergency Medicine Programme, the Academic Committee of the Irish Association for Emergency Medicine and the Irish Heart Foundation to develop this guideline. This guideline has undergone consultation with the ICD patients' group.

These guidelines have been developed to act as a resource for medical and nursing staff and other members of the multidisciplinary ED team to guide them through the principles of the ED management of patients with implantable cardioverter defibrillators. These guidelines are not intended to replace clinical judgement.



BACKGROUND

(1) Prevalence of ICD use:

The use of permanent pacemakers (PPM) and implantable cardioverter–defibrillators (ICDs) continues to increase worldwide with over 3 million pacemakers and 250,000 ICDs in use. The rate of device implantations is related to aging of the general population and expanding indications.

The Irish Heart Foundation estimates that about 2000 people in Ireland have an ICD. One Irish hospital alone has reported implanting 1076 biventricular/ICD or ICD systems between 2000 and 2007.

As more patients receive pacemakers/ICDs, it is imperative that clinical staff working in EDs understand the medical issues that may lead to ICD-related presentations to the ED and how ICD-related issues should be managed in patients who require emergency care.

(2) Reasons for patients' ED attendances:

The most frequent reasons for ED attendance identified in a series of 86 ED visits by patients who had received ICD implantation in Taiwan were defibrillator discharge, acute coronary syndrome, congestive heart failure, hardware-related problems (infection and generator-related problems) and non-cardiac or device-related symptoms.

PARAMETERS OF THE GUIDELINE

Target audience: Emergency Medicine doctors, nurses and other clinical staff and on-call clinicians from other hospital specialties who assess patients in the ED.

Patient population: patients with an ICD who present to an ED.



GUIDELINE RECOMMENDATIONS

- Contents:
- (1) ED Preparedness;
 - (2) Patient Assessment and Management:
 - (a) Cardiac arrest;
 - (b) ICD shocks in non-arrested patient;
 - (c) Arrhythmia/Palpitations/Syncope without shocks;
 - (d) Systems review/examination for a patient with an ICD;
 - (e) Suspected ICD-related sepsis;
 - (f) Non ICD-related presentations:
 - (i) Surgical Procedures;
 - (ii) Risk of bacteraemia;
 - (iii) Advanced Imaging;
 - (iv) Other procedures;
 - (g) Pre-hospital Care;
 - (h) Sudden unexplained death.
 - (3) Patient follow-up / discharge communication.



(1) ED PREPAREDNESS

- a) ACLS protocols should guide the initial management of patients with ICDs;
- b) All EDs should have a cardiac magnet to disable ICDs if required;
- c) All patients presenting with ICDs should have immediate access to a monitored treatment bay;
- d) Each ED should confirm with their local Cardiology service the availability of ICD interrogation on site 09.00-17.00 Monday to Friday and weekend/out-of-hours/off-site testing arrangements. This may require inter-hospital collaboration.
- e) Each ED should confirm with their local Cardiology service those ICD makes which can be tested on site and those that require alternative arrangements including transfer.
- f) ED staff should receive training in the care of patients with ICDs.

Patients who have registered with the Heart Rhythm Ireland (HRI) database are given a Heart Rhythm ID card about 3 weeks post-implant to carry on their person containing details relating to their ICD device.



(2) PATIENT ASSESSMENT AND MANAGEMENT

(a) Cardiac arrest:

- Treat patient as per ACLS guidelines;
- Consider need to place magnet over ICD until hemodynamically stable;
- When patient's condition allows, interrogate ICD to determine whether shocks occurred or whether these were appropriate or not.

(b) ICD shocks in non-arrested patient:

- Manage ABC (airway, breathing and circulation) as per ACLS guidelines;
- Commence Telemetry monitoring;
- Arrange immediate/urgent ICD interrogation to confirm if appropriate or inappropriate shocks have occurred:

Inappropriate Shocks:

Place magnet on ICD.

Cardiology service will re-programme ICD or if due to lead fracture switch ICD off, monitor on telemetry and arrange for ICD revision.

Appropriate Shocks:

Consider applying magnet to ICD and treat arrhythmia as per ACLS guidelines. (Appropriate shocks may be delivered quicker through the ICD.)

Remove magnet when arrhythmia controlled.

(c) Arrhythmia / Palpitations / Syncope without shocks

- Manage ABC as per ACLS guidelines;
- Commence Telemetry monitoring;
- Arrange urgent ICD interrogation to confirm if non-delivery of shocks was appropriate or inappropriate:



If evidence of **cardiac arrhythmia** (supraventricular or ventricular) **and no ICD shocks**:

Treat arrhythmia as per ACLS recommendations;

Interrogate ICD to see if the lack of shock was appropriate or inappropriate;

Consult with / admit to Cardiology.

If **no evidence of arrhythmia** and patient complaining of **palpitations**:

Consult Cardiology service for telemetry advice and to arrange follow-up

If **no evidence of arrhythmia** and patient complaining of **syncope**:

Admit for telemetry ECG monitoring and/or Cardiology follow-up.

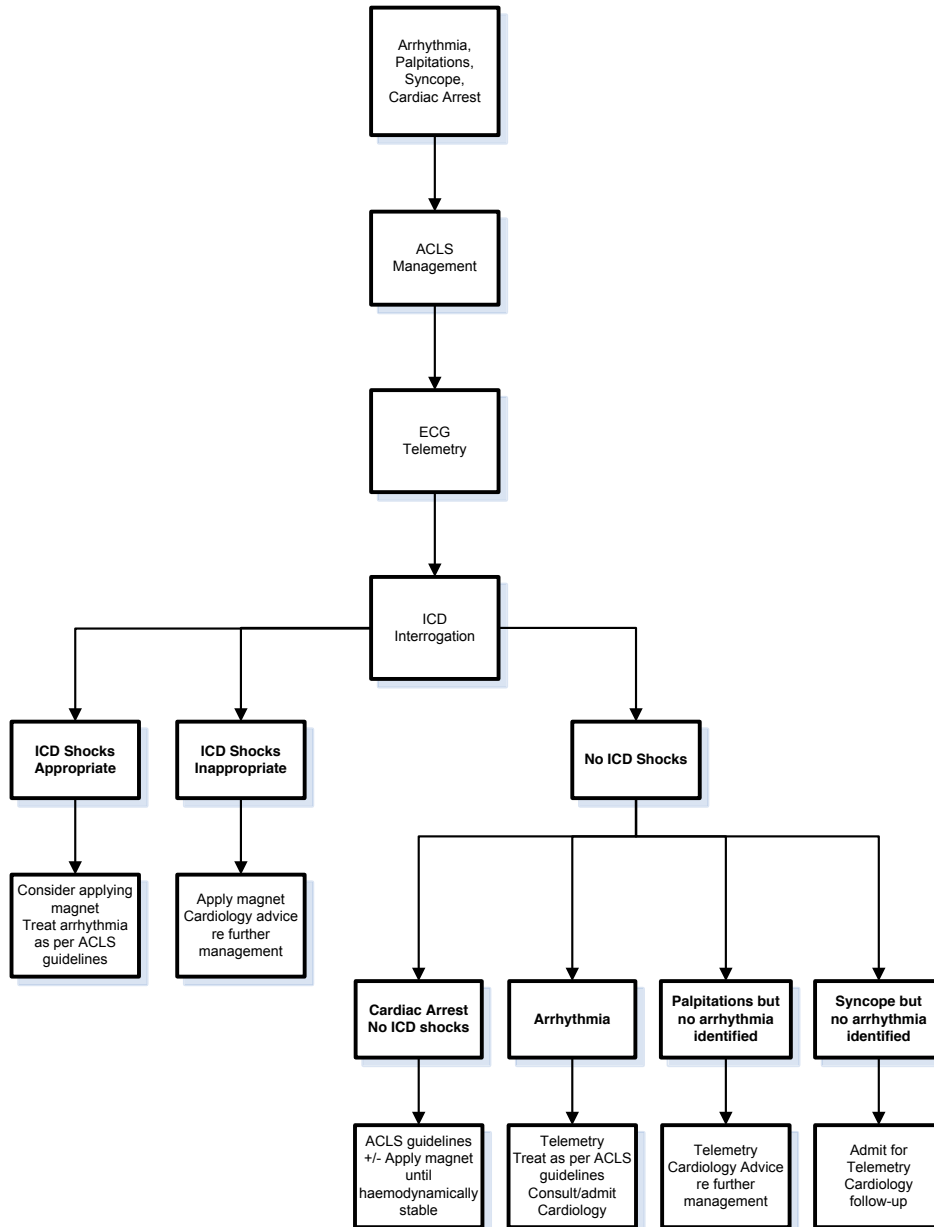


Figure 1: Algorithm for Patient Assessment and Management– Arrhythmia/Palpitations/Syncope/Cardiac Arrest – (Algorithm adapted from Stevenson, W et al. Clinical assessment and management of patients with implanted cardioverter-defibrillators presenting to non-electrophysiologists. *Circulation* 2004;110:3866-3869.)

(d) Systems review/examination for a patient with ICD History:

Systems review/examination for a patient with ICD History

<p>Patient History</p>	<ul style="list-style-type: none"> • Symptoms of electric shock, chest pain, shortness of breath, palpitations, syncope etc. • Clarify ICD History/ indication e.g. history of recurrent ventricular arrhythmias, year of insertion, treating cardiologist etc.
<p>Physical Examination:</p>	<ul style="list-style-type: none"> • Obtain vital signs and initiate continuous ECG monitoring. • Check for signs of cardiac failure • Check for jugular venous distension (may be a sign of cardiac tamponade); • Listen for new cardiac murmurs or rubs.
<p>Clinical Investigations:</p>	<ul style="list-style-type: none"> • 12 lead electrocardiogram (ECG)/telemetry; • Serum urea and electrolytes including magnesium; full blood count; • Cardiac markers (if indicated); • β Natriuretic Peptide (BNP) (if indicated/available); • Chest X-ray; • Consider cardiac echocardiogram (if advised following Cardiology consultation).

(e) Suspected ICD-related sepsis

Suspected ICD-related sepsis	
Patient Assessment	<ul style="list-style-type: none"> History of fever, wound discomfort etc. Examine the implant site for signs of infection, migration, or trauma;
Management	<ul style="list-style-type: none"> Take blood cultures before treating with PO / IV antibiotics as per hospital Microbiology/Infectious Diseases guidelines/consultation; If ICD site infected, Cardiology consult to consider ICD system removal.

(f) Non ICD-related presentation:

- Surgical interventions that may require diathermy - turn off ICD for surgery, keep on telemetry during procedure and switch ICD on afterwards.
- Risk of bacteremia related to trauma or medical / surgical procedure - cover with IV /PO antibiotics as appropriate peri-procedurally and after trauma for first 6 months after ICD / leads revision.
- Advanced Imaging: MRI can interfere with ICD functioning and in general ICD patients should not undergo MRI. CT imaging, fluoroscopy, nuclear medicine and plain X-ray are not associated with ICD problems.
- Other procedures – obtain Cardiology consultation regarding appropriate management.



(g) Pre-hospital care:

The clinical management of patients in an ambulance setting (i.e. pre-hospital care) is governed by the Pre-Hospital Emergency Care Council (PHECC) clinical practice guidelines (CPGs) for pre-hospital practitioners. The current CPGs include the management of ICD-related issues in patients requiring cardiac life-support. If there are no ACLS practitioners available for a patient in cardiac arrest, the patient should be managed with normal BLS protocols including the use of an AED.

(h) Sudden unexplained death:

All sudden unexplained deaths with an implanted ICD should get a mandatory ICD interrogation.



(3) PATIENT COMMUNICATION AND DISCHARGE/FOLLOW UP CARE

- a) Clinicians should explain any medication changes to patients.
- b) Clinicians should ensure that all ICD patients have appropriate self-care advice prior to hospital discharge.
- c) An ED discharge summary should be sent to the General Practitioner of all patients discharged from the ED and all admitting teams should send a discharge letter to the patients' GP that includes an outline of clinical investigations undertaken and planned follow-up care.
- d) All patients should have follow-up advice from their implant centre and patients should have the option of telephone or in-person follow-up. Patients may be referred back to their implant centre for assessment as necessary.



SUMMARY

- Advanced Cardiac Life Support (ACLS) protocols should guide the initial resuscitation management of patients with ICDs.
- All EDs should have a cardiac magnet to disable ICDs if required.
- Automatic External Defibrillator (AED) can be used as normal as per BLS protocols.
- It is safe to touch a patient with an ICD fitted even if it is firing.
- Defibrillation pads should not be placed directly over ICD units.
- The ICD should be interrogated as soon as possible.
- Ensure that all ICD patients have appropriate self-care advice and discharge summary prior to hospital discharge.