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Health and Community Services

Operational Policy for Nurse Led Cardioversion Service

March 2021

DOCUMENT PROFILE

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Contact Details	Angela Hall, Arrhythmia Nurse Specialist

CONTENTS LIST:

1. INTRODUCTION

1.1 Rationale and Overview

Cardiac arrhythmias are extremely common and atrial fibrillation (AF) alone affects 2% of the population (1,11,12). Cardiovascular disease remains the most common cause of death in Britain and is responsible for 17% of the entire healthcare budget (2). The prevalence rises with age but more recent information suggests there is now a 1 in 3 lifetime risk of developing AF (15). Also, as a consequence of improved early management of heart attacks and heart failure, many patients are surviving with complex heart rhythm problems, compounding emergency admissions and bed occupancy (3). In addition, many AF patients require long term pharmacological treatment including anticoagulation and rate and / or rhythm controlling medicines. AF patients have a costly morbidity in stroke and heart failure which is a considerable burden on economic and health resources (1).

The nurse led cardioversion service will comply with strategies highlighted in hospital wide approaches to reduce bed occupancy and waiting times and enable more integrated care. The patients experience will be enhanced from time of referral through to discharge by means of a dedicated professional organising and delivering best practice. An integrated care pathway has been devised to aid this process.

This service was introduced in 2012, although commonplace throughout the UK. Existing services will enable local practice to be guided using their experiences as an aid to service development.

1.2 Aims and Objectives

The key aims are to:

● To facilitate the effective and efficient management of resources and deliver care in accordance with the Cardiology and H&SS service development plans whilst providing and developing procedure and arrhythmia guidelines and policies.

● Establish the Arrhythmia Nurse Specialist as the named coordinator.

● Provide reassurance and specialism support to patients and families.

● Co-ordinate and streamline current and existing services to improve process, provision for appointments, anticoagulation service and admission procedure.

● Establish pre-admission clinic weekly alongside Cardiology clinic ensuring patient suitability, investigations complete and to save admission / bed time. This is now (2020) often done remotely with telephone calls and use of digital applications to monitor and record single lead ECGs (prior to procedure and following), where possible. This also frees up valuable outpatient clinic appointments and reduces face to face visits when this can be achieved safely by an alternative approach.

● Update the Cardiac Integrated Care Pathway (with the aim of moving to electronic records when available).

● Standardise care with the Arrhythmia Nurse providing information and support from pre-assessment, to admission and through to discharge.

● Nurse led Cardioversion procedure (following proven clinical competence see 3.3).

● Free up Consultant Cardiologist time, reduce waiting times and enable lists to continue through periods of absence (annual / study leave or sickness).

● Reduce bed occupancy time through timely discharge by the Arrhythmia Nurse.

1.3 Environment

Provisions are made to accommodate patient admissions for Cardioversion in the Day Surgery Unit. Pre-assessment will have been completed prior to their admission (either face to face or remotely). Cardioversion takes place in an anaesthetic room in the Day Surgery Theatre; the patient then moves to recovery. Once suitably awake, transfer is arranged back to the ward area.

2. PATIENT FLOW

Patient admissions are organised by the Cardiology Secretary. Sufficient numbers are allocated per list which is in line with Day Surgery agreements for capacity. If an isolation room is required for infection control, this will be organised prior to their admission (see Infection Control Policy).

2.1 Referral Process

The Nurse Led Cardioversion Service provides a service dedicated to the assessment and treatment of haemodynamically stable patients who have atrial fibrillation or atrial flutter who require direct current cardioversion. Referrals may be made by any member of the Medical Team and assessed for suitability by the Arrhythmia Nurse Specialist. Any queries will be discussed with the Clinical Lead, the Consultant Cardiologists.

2.2 Referral Criteria

The inclusion and exclusion criteria are based on the guidelines from NICE (2006, 2014) (4,10), the European Society of Cardiology (2006, 2010, 2012, 2016, 2020) (5,11,12,14,15) and St Georges Hospital (2009) (6) with agreement by our local Consultant Cardiologists.

2.2.1 Inclusion Criteria

● Atrial fibrillation or atrial flutter on the ECG

● Warfarinised for a minimum of 3 consecutive weeks with INR >2.0 (no change with prosthetic valves) OR

● Minimum of 3 weeks anticoagulation with direct oral anticoagulant (Dabigatran, Apixaban or Rivaroxaban). If taking Rivaroxaban consider switching to an alternative anticoagulant. If 2 or more doses have been missed, postpone until three weeks of uninterrupted anticoagulation has taken place.

2.2.2 Exclusion Criteria

● Haemodynamically unstable patients

● Emergency unplanned cardioversions

● Sinus rhythm on ECG

● High risk of thromboembolism due to no or inadequate anticoagulation

● Severe uncorrected electrolyte imbalance

● Digoxin toxicity

● Drug related toxicity: antiarrhythmic drugs (Class 1 QRS ≥140msec or Class 3 QTc >480Msec)

● Thrombus noted in echocardiogram

● Systemic infection

● Under 17 years of age

2.3 Routes of Referral

Patients will typically be referred by their GP to the Cardiology Team. Medical colleagues from in-patient areas can also refer, as can the Cardiac Nurse Specialists. Patients can be directly referred to the Arrhythmia Nurse Specialist. Suitability for cardioversion or other treatment options will be determined (see Appendix 1 and 2). Admission and theatre lists will be prepared by the Cardiology Secretary. Pre-assessment is booked by the Cardiology Secretary.

3. SERVICE DESIGN – Medical and Nursing Responsibility

This service is designed as a nurse led service with Cardiologist support. This facilitates the Arrhythmia Nurse to follow the patients' journey from pre-assessment through to discharge.

3.1 Clinical Lead

The Clinical Lead for Nurse Led Cardioversion Service is Dr Andrew Mitchell, Consultant Cardiologist. A second Consultant Cardiologist has been appointed who can also act as Clinical Lead with responsibility oversight.

3.2 Operational Lead

The Operational Lead responsibility for the service lies with the Arrhythmia Nurse Specialist. Arranging to cover absence including annual leave or study leave will be the Arrhythmia Nurse Specialist responsibility and has to be agreed with the Clinical Lead and Line Manager (Lead Nurse)). All policies, protocols, competencies, guidelines and documentation must be agreed with the Clinical Lead.

The Arrhythmia Nurse provides education for the users of the service as well as conducting clinical audit.

3.3 The Nurse Led Service

The Arrhythmia Nurse must satisfy the following criteria:

- 1st level Registered Nurse at Grade 6 (or above) with a qualification in cardiac care and practical cardiovascular nursing experience in an acute care setting
- current ILS plus manual defibrillation skills or ALS qualified with updates as per Resuscitation Council Guidelines (7)
- documented defibrillation skills
- maintain a minimum number of practical procedures per year (at least ten)
- have completed the relevant competencies for Direct Current Cardioversion
- phlebotomy skills (ideal but not compulsory)

3.4 Medical Cover

Medical cover must be available when cardioversion takes place whereby the Associate Specialist, Consultant, on call middle grade for medicine or Cardiac Clinical Fellow is available to attend if complications arise. Arrangements are to be

made prior to the start of the cardioversion list. An anaesthetist will be present throughout cardioversion.

In the event of cardiac arrest, the usual protocol should be followed (see Resuscitation Policy).

There should be prior agreement and formal cover by the anaesthetist who is responsible for general anaesthesia and maintenance of the airway. Arranging for cover will be the responsibility of the Head of Anaesthetics Dept.

4. PATIENT MANAGEMENT

4.1 Pre Assessment

If taking warfarin, patients INR tests should be available and their yellow booklet updated. At least 3 consecutive weeks of therapeutic INR (≥2.0) is mandatory before undertaking cardioversion. Liaising with the anticoagulation department will take place accordingly.

Patients will be seen by the Arrhythmia Nurse for pre-assessment either face to face or remotely via telephone / remote ECG monitoring prior to cardioversion. Clinic slots to be fully utilised. Document 'did not attend' if no response. If pre-assessment cannot be attended, telephone contact can be utilised to gather basic patient information and direct admission may be permitted but only once inclusion criteria has been confirmed. In this situation, an ECG may be obtained through the Clinical Investigations Department if alternative methods of ECG monitoring are not possible (e.g. remote applications such as the Kardia device).

Blood results will be checked, ECG taken and vital signs recorded to include blood pressure, pulse, oxygen saturations, respirations, height and weight. Patient notes will be available at this time and updated. Computerised records (TrakCare) will be updated accordingly.

If at any time the ECG shows sinus rhythm, the patient will not proceed for cardioversion. This will be recorded. Copies of the ECG will be forwarded to the referring person.

4.2 Patient Assessment

Patient assessment includes:

- History taken using an Integrated Care Pathway.
- Check risk factors including all blood results.
- Determine need for further / repeat investigations and discuss with Cardiologist if Unsure.
- Ensure inclusion and exclusion criteria have been met and refer back to Doctor if

any problems are discovered during pre-assessment.

- Full and separate assessment of patients will be done by the anaesthetist on Admission.
- If patients have a pacemaker or ICD, liaise with Clinical Investigations. Patients with an ICD to have a Cardiac Physiologist in attendance – more effective to use ICD to cardiovert patients. (If the device programs have been altered, the Cardiac Physiologist will discuss with the patient and re-program). The pacemaker is to be checked after shock delivery.
- If taking Digoxin, stop 48 hours pre-procedure (consider re-starting if needed).
- If at any point the patient becomes unwell, the covering doctor will be called for review. Normal procedures will then take place for admission if necessary.
- Provide patient support and information about the procedure.
- Reassure patients and families and answer questions. Inform them of the inability to drive for 24 hours afterwards and the need to be accompanied on discharge.

4.3 Nurse Led Consent

Nurse consent must adhere to the H&SS policy on consent and only applies to patients requiring direct current cardioversion. Nurse led consent can be initiated once clinical competence satisfied and deemed competent by the Consultant Cardiologist. Complications and risks to be documented on the consent form and Vicarious liability accepted by H&SS. The Nursing and Midwifery Council (2008) states ‘the individual performing a procedure should be the person to obtain consent’ and that nurses must ‘accurately record all discussions and decisions relating to obtaining consent’ (8). Matters relating to mental capacity, clear communication and patients rights are set out clearly in the NMC guidelines on nurses and midwives obtaining consent (8). Consent may be taken using traditional paper forms or through online consent (via Concentric Health, digital consent) as used for other Cardiology procedures now (from 2020).

5 PROCEDURE FOR CARDIOVERSION

5.1 Admission

The provision of beds will have been organised in advance. This will be in Day Surgery until further notice. The care of the patients will remain the responsibility of the ward nurse throughout their admission. Patient notes and ICP should be used and the pre-procedure checklist and patient preparation should be commenced.

Resources

Personnel	• Arrhythmia Nurse Specialist. • Medical cover (to be available if needed). • Anaesthetist. • Cardiac Physiologist if patient has an ICD. • Recovery Nurse.
Equipment	• Biphasic defibrillator with external pacing facility. • ECG monitoring. • Resuscitation facilities. • Emergency drugs and IV fluids.
Procedure	• Baseline observations (pulse, blood pressure, oxygen saturations). • 100% oxygenation prior to cardioversion. • Continuous ECG monitoring. • Patent, secure IV access. • Skin preparation (remove transdermal patches, clip hair, and remove jewellery and hearing aids, dry skin). • Anaesthetic (short acting) to be prescribed, administered and controlled by Anaesthetist along with airway protection. • Attach pads to patient, ensure good connection and no air bubbles and connect to defibrillator (one pad below right clavicle and second over cardiac apex, mid axillary line – alternatively AP position) once patient is sedated If patient has a pacemaker place pads 12-15cm from pacemaker unit and cardiac physiologist to interrogate before discharge. • Confirm AF/atrial flutter present on ECG. • Select ‘Synchronisation’ and check monitor. • Select correct energy level (see 5.2). • Remove all oxygen and check staff are clear of bed area. • Charge defibrillator and repeat safety check. • Deliver synchronised DC shock. • Assess rhythm and determine if repeat shock needed. • Obtain rhythm strips before and after each shock. • A maximum of three shocks may be attempted. • It may be appropriate to use manual paddles with direct, firm pressure if cardioversion has been unsuccessful following the first or second shock (then apply ‘salmon

	strips' to above positions, change defibrillator paddles connection, ensure 'synch' still applied and perform safe cardioversion). • Alternatively, if a third shock is required, consider changing to a new set of pads and different position after the second shock. • Continue administering oxygen until conscious and record vital signs and oxygen monitoring until stable
Special considerations	• Cardioversion via ICD must have shared responsibility with Cardiologist and Cardiac Physiologist • Dextrocardia patients require a mirror image procedure

5.2 Shock Energy

Atrial Fibrillation and Atrial Flutter	1 - Start at 200 J	If still AF/flutter, give up to three shocks. Consider 2nd / 3rd shock with manual and direct pressure using hand held paddles if first shock unsuccessful. Consider changing to Anterior / Posterior position (9) (4th shock occasional circumstance use external paddles)

Using Philips HeartStart MRx Defibrillator

5.3 Recovery

Patients should be cardiovascularly monitored until awake and can maintain their own airway. The patient can then be transferred to the ward. All observations and interventions to be documented in the ICP.

5.4 Discharge

ECG post cardioversion must be obtained at least one hour after cardioversion. All patients will be assessed by the Arrhythmia Nurse before discharge. The outcome to be discussed and advice regarding follow up, anticoagulation (to continue unless advised to stop) and possibilities for future treatment if indicated. Any change to medications can be authorised by the Arrhythmia Specialist Nurse (as a qualified nurse prescriber). Prescription will then be written and medications supplied if needed.

All interventions and outcomes to be documented in the ICP and discharge letter (copy for notes, GP and patient).

Follow up appointment will be sent to the patient for approximately 1 months-time. This can be altered according to the patient's needs.

6 AUDIT

Audit will be ongoing but with a summary annually. Key performance indicators will include:

- Waiting time from referral to admission
- Hours of bed occupancy time
- Number of successful cardioversions performed
- Number of shocks required and energy delivered
- Position of pads
- Patient satisfaction
- Redness of skin
- Complications requiring medical assistance
- Blood results – anticoagulation level at time of cardioversion
- Medications at time of cardioversion (anti-arrhythmics, rate control, anticoagulation)

7. DEVELOPMENT AND CONSULTATION PROCESS

7.1 Consultation Schedule

Name and Title of Individual	Date Consulted
Sister Lee-Ann Penn, Cardiac Nurse Specialist	1st November 2011
Dr Andrew Mitchell, Consultant Cardiologist	1st November 2011
Geoff White, Lead Practice and Development	1st November 2011
Sister Dorothy Perks, Clinical Manager CCU	12th November 2011
Dr Graham Prince, Consultant Anaesthetist	14th November 2011
Geoff Benning, Clinical Practitioner	15th November 2011
Dr Andrew Mitchell, Consultant Cardiologist	Review – August 2013
Dr Andrew Mitchell, Consultant Cardiologist	Review – June 2016

Dr Andrew Mitchell, Consultant Cardiologist	September 2018

Dr Andrew Mitchell, Consultant Cardiologist	March 2021
Dr Pierre Le Page, Consultant Cardiologist	March 2021
Kellyanne Kinsella, Arrhythmia Nurse Specialist	March 2021

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10. GLOSSARY OF TERMS

ECG	Electrocardiogram – a recording of the electrical activity of the heart
INR	International Normalised Ratio, indication of anticoagulation
Cardioversion	Procedure to convert an abnormal rhythm to a regular rhythm by means of delivering an electric shock
ICP	Integrated Care Pathway
Digoxin toxicity	Result of over accumulation of digitalis glycosides in the body. Kidney insufficiency can be a contributory factor. Symptoms include nausea, vomiting, visual changes and palpitations. Life threatening arrhythmias are possible with high levels.
ICD	Implantable cardioverter-defibrillator

Antiarrhythmic drugs

Class 1	Sodium channel blockers, subdivided into three groups depending on their effects on the action potential duration 1a duration is increased (e.g. Procainamide) 1b duration is decreased (e.g. Lidnocaine) 1c duration is unchanged (e.g. Flecanide)

Class 3	Prolongs the QT interval and lengthening the cardiac action potential by blocking potassium channels and therefore prolonging repolarisation (e.g. Amiodarone)
Trak Care	States of Jersey General Hospital computerised records and tracking system
MRSA	Methicillin Resistant Staphlococcus Aureus
Dextrocardia	Rare condition where the heart is on the right side of the body
Synchronised	Synchronise the defibrillator to 'R' wave on wave form. This is so that the electrical impulse is released when the heart is contracting and not during the resting phase of the heart beat, therefore reducing risk of VF occurring

11. SUMMARY OF CHANGES. REVIEW JUNE 2016.

1.1 Risk of developing the arrhythmia now 1 in 4 lifetime risk.
2.1 Referral process. Patients can be referred directly to the Arrhythmia Nurse Specialist. Patients are discussed with the Clinical Lead.
Registrar changed to Associate Specialist.
2.2 Guidelines (and referencing) updated.
2.2.1 Amendments made to anticoagulation. More patients now take direct oral anticoagulants namely Dabigatran, Apixaban and Rivaroxaban.
2.3 All patients are not necessarily referred to the Consultant. Direct referrals can be received.
3.4 Medical cover is arranged prior to the cardioversion list in the absence of the Consultant Cardiologist. This may include the Associate Specialist, Clinical Fellow or on call middle grade for medicine.
4.1 If the patient cannot attend pre-assessment, they may attend Clinical Investigations for their ECG and telephone consultant can proceed.
MRSA swabs are not taken routinely on patients attending for cardioversion unless there is a history or suggestion of MRSA (confirmed with Infection Control).
5.1 Cardioversion procedure has been updated following review of statistics and success rates using new defibrillators without the option of escalating energies. After an initial 200J shock, if atrial flutter or fibrillation persists, it may be appropriate to perform further cardioversion using manual paddles and firm pressure for the second / third shock.
5.2 Shock energy is unchanged but amendments made as 5.1.
7.1 Medications and prescriptions can be arranged by the Arrhythmia Nurse Specialist as a qualified non-medical prescriber.

SUMMARY OF CHANGES. SEPTEMBER 2018.

2.2 Updated ESC 2016 guideline added.
3.3 Resuscitation qualifications changed from ALS only to ALS or ILS with manual defibrillation.

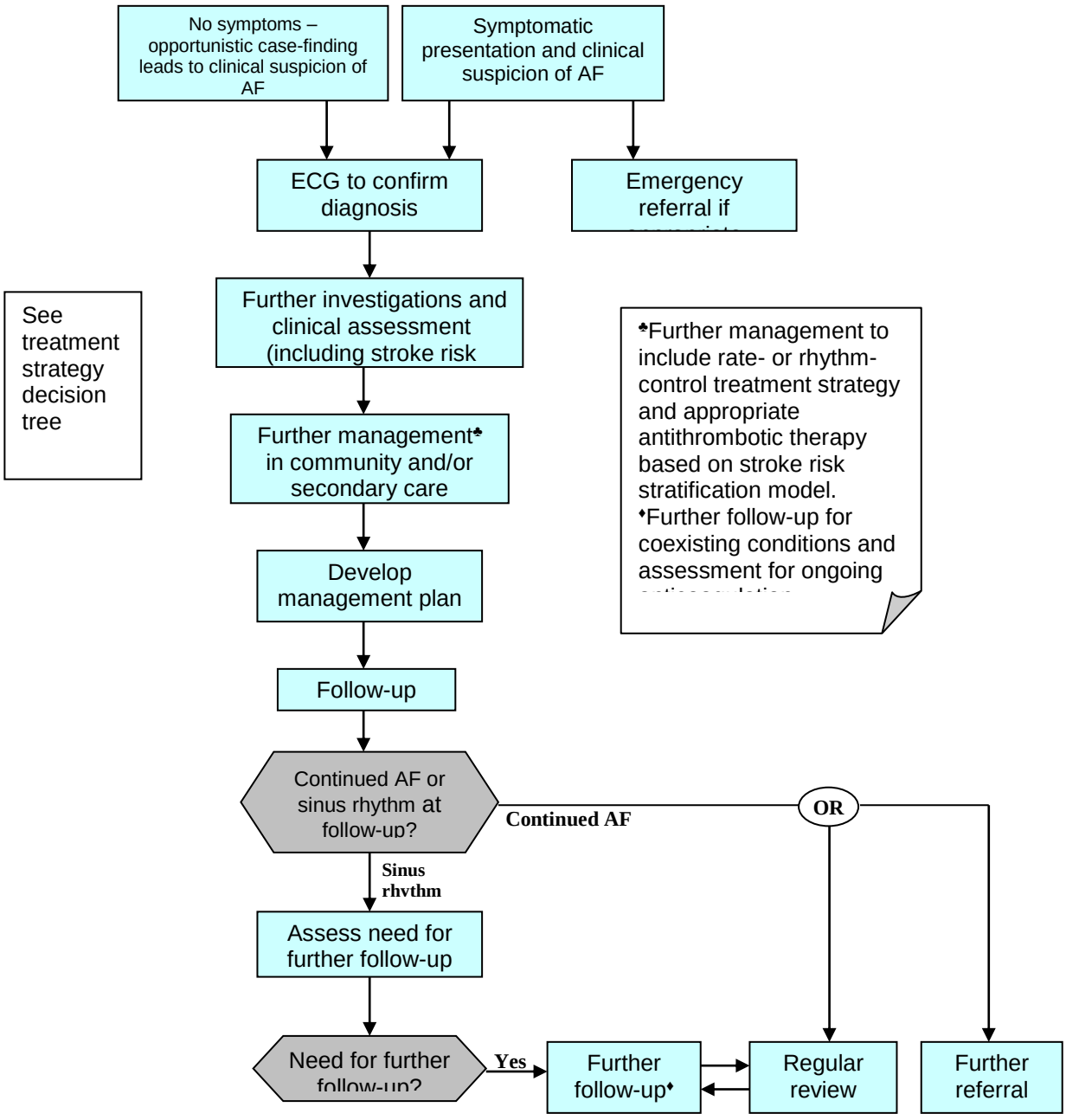
SUMMARY OF CHANGES. MARCH 2021.

1.1 Re-wording
1.2 Additional notes on the use of digital ECG applications and electronic records
2.2.1 Anticoagulation notes
4.1 Pre-assessment not always face to face now, can be remote
4.3 Consent and electronic consent
7.1 Notes applying to continuation of anticoagulation

12. APPENDICES

Appendix A: The AF Care Pathway

The following care pathway is from the NICE clinical guideline on atrial fibrillation.



Appendix B
Nurse Led Cardioversion Service Pathway – Jersey