

CARDIOVERSION OPERATIONAL POLICY

Approved by: **Trust Executive Committee**

On: **24 April 2018**

Review Date: **April 2021**

Corporate / Directorate **Acute Medicine**

Clinical / Non Clinical **Clinical**

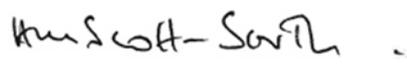
Department Responsible for Review: **Cardiology**

Distribution:

- Essential Reading for: **Cardiologists
Anaesthetists
Cardiology nurses
Clinical directors
All matrons and head nurses**
- Information for: **All clinical staff**

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Signature: 
Chief Executive

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Burton Hospitals NHS Foundation Trust

POLICY INDEX SHEET

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POLICY INDEX SHEET
REVIEW AND AMENDMENT LOG

Version	Type of change	Date	Description of Change
1		2012	New Policy
2		July 2015	
3		January 2018	Replacement of NOAC with DOAC Addition of Edoxaban Rewording of patient information leaflets Addition of midazolam usage
4		April 2018	Minor amends to formatting

CARDIOVERSION POLICY

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BURTON HOSPITALS NHS FOUNDATION TRUST

CARDIOVERSION OPERATIONAL POLICY

1. DEFINITION OF ATRIAL FIBRILLATION

Atrial fibrillation (AF) is the most common form of cardiac arrhythmia affecting over 6 million Europeans (Camm et al, 2012). The prevalence of AF in England is estimated to be around 1.5 to 2% in the general population, rising to greater than 15% in the age group of those aged over 75 years (NICE, 2014).

AF is linked with many cardiac conditions such as hypertension, coronary artery disease, heart failure and valvular disease as well as medical conditions such as obesity and sleep apnoea (Olshansky and Arora, 2015).

It is estimated that the number of patients with AF in 2030 in Europe will be 14 to 17 million with the number of new cases with AF per year at 120,000 to 215,000. Given that AF is associated with significant morbidity and mortality this increasing number of individuals with AF will have major public health implications (Zoni-Berisso et al, 2014)

For 2008 it was calculated that AF accounted for 5.7 million days in hospital beds and a total direct cost to the NHS of £2.2 billion. AF patient days spent in hospital beds cost the NHS over £1.8 billion. Non-bed in-patients costs were £124 million and out-patient costs completed the total at 205 million (The Office of Health Economics, 2009).

Treatment strategies include ventricular rate control or restoration of sinus rhythm by Direct Current Cardioversion (DCCV). DCCV is a cost effective approach to the management of AF (Catherwood et al 1999). Restoration of sinus rhythm in patients with symptomatic or haemodynamically significant AF can improve cardiovascular dynamics, functional status and quality of life (Camm et al, 2010). The likely success of DCCV depends on the duration of the AF; therefore rapid DCCV will increase the chances of restoring sinus rhythm. As recommended by NICE (2014) cardioversion is performed as part of a rhythm-control treatment strategy and if successful restores sinus rhythm.

2. AIMS OF THE DCC SERVICE

- Referral for new onset AF or Atrial Flutter who meet NICE guidance for AF
- Ensure appropriate anticoagulation, educating and counselling patients with regard to risks and benefits
- Patients adequately and appropriately informed of treatment plan
- Specialist nurse competent to undertake the extended role of DCCV
- Effective communication with patient, primary care and multi-disciplinary team
- Development of protocols to support practice
- Timely procedure
- Appropriate setting
- Discharge planning and follow-up

- This is a nurse led service, performed from start to finish by identified nurses who have been especially prepared for the role. This will ensure the patient receives improved continuity of care by professionals who are clinically competent and familiar with the procedure
- Benefits of nurse led service are:
 - a) Earlier appointments/streamlined protocol driven service
 - b) Established monitoring of patients throughout referral.

3. CLINICAL, OPERATIONAL AND SERVICE MANAGEMENT RESPONSIBILITIES

Clinical Accountability

- Each clinician, regardless of whether they are a nurse, technician or doctor, will practice within his/her Code of Professional Conduct and Trust Policies and procedures. More specifically, each clinician is professionally accountable for any care he/she provides within this operational policy
- All care, decisions and patient outcomes must be documented within the patients' records, in accordance with Trust Policy
- The lead cardiologist for cardioversion service will take overall medical responsibility for the cardioversion service, providing that it conforms to all of the instructions and arrangements laid out within this operational policy. Should he have concerns relating to patient safety he may recommend suspension of the service.

Operational responsibility

- The Cardiology Management Lead will take overall responsibility for the operational management of the service
- Once sessions have been identified as specialist nurse or doctor led, it will be that person's responsibility to ensure their session is covered
- In the event of "last minute" sick leave the session will be cancelled.

Service management responsibility

- The Clinical Lead for cardioversion (CLCS) together with the nursing lead for cardioversion, will assume responsibility for monitoring the quality and efficacy of the service, together with monitoring service activity and regularly reviewing the capacity / demand needs.

4. MANAGEMENT OF REFERRALS

Criteria for referral to DCC Service

- Referrals will be made by Consultant Cardiologists, Staff Grade or other Consultants for patients whom they deem suitable for attempted DCC
- The referral process will be via V6
- New onset AF or flutter, confirmed with 12 lead ECG
- U/E, LFT and TFT to be requested prior to referral

- Ventricular rate control initiated by doctor, prior to listing, ideally with beta blockers and referral for commencement of anticoagulant made
- Echocardiogram, where appropriate, will also be requested prior to referral to DCC Service if not already performed in cardiology clinic
- Echo criteria: Echocardiogram performed within the past two years.

Referral Process

- Referrals will be sent to the Lead Nurse for cardioversion via V6.
- On receipt of the referral the patient will be entered onto the cardioversion database
- A letter and appropriate patient information will be sent to the patient confirming that they have been added to the cardioversion wait list. Information will include instructions on how to inform the DCCV service of INR results, dependent on whether they are known patients of the Trust's Warfarin Service or not.

Managing active DCCV waiting list

This is the responsibility of the Lead Nurse supported by clerical staff.

- The majority of INR results will be pulled from the Trust's computer system, however, patients who are required to phone their weekly INR results will be asked to contact the Lead Nurse/administrator on ext: 3150 (answerphone available)
- All results will be entered on to the DCCV database, which will be managed by the Lead Nurse/Administrator
- All patients on Warfarin or other Coumarin will be required to have at least 4 consecutive weeks of INRs which are greater than 2 before being put forward for cardioversion
- Once patients are within target range the Lead Nurse will arrange for the patient to be informed of their proposed cardioversion date
- Telephone contact established with patient to discuss the procedure
- Confirm that INR is within target range for minimum of 4 consecutive weeks
- Patients taking DOAC medication (Apixaban, Rivaroxaban, Edoxaban or Dabigatran) can be listed for procedure 4-6 weeks following commencement of medication
- DOAC doses will be appropriate for age, weight and renal function according to BNF
- Identify any allergies
- Discuss procedure with the patient; ensure the patient is well informed including instructions on when to fast
- List current medications
- Patients who are on Digoxin are required to stop medication three days prior to procedure
- Patient informed not to take Diuretics on the morning of the procedure.
- Diabetic patients – advised in letter to contact Lead Nurse for DCCV, appropriate advice given for these patients
- Discuss risks and benefits of DCCV, if appropriate (Appendix 1)

- Discuss social circumstances and transport arrangements in preparation for DCCV if appropriate.

5. DC CARDIOVERSION PROCEDURE

Competency framework for nurses participating in nurse led cardioversion:

- To ensure the quality of the service, only those nurses who have been assessed as meeting all the criteria outlined in the attached competency framework (Appendix 2) are permitted to perform nurse led cardioversion
- The Cardiologists are responsible for assessing each nurse against this framework and the CLCS has the responsibility for making the overall decision as to whether they are deemed competent and safe to perform cardioversions
- Only nurses who are assessed and deemed competent and are willing to undertake the procedure will be identified as able to perform nurse led cardioversions.

Day of cardioversion procedure:

All patients who attend for cardioversion will be assessed on the morning pre-procedure.

Specialist nurse assessment includes:

- Patient will be admitted to the Treatment Centre
- Establish baseline ECG, TPR, O² saturations, BP, blood glucose level if appropriate
- Bloods should be taken for U&E, and INR (warfarin)
- Blood should be taken for U&E (DOAC)
 - If the patient is on Digoxin proceed if K⁺ ≥4.0
 - If no Digoxin proceed if K⁺ ≥3.5
- Patients who have taken DOAC medication should confirm that they have taken this consistently from date of prescription and have not missed any doses. If they have missed a dose the procedure will be postponed and re-arranged in 4 weeks
- Patients on DOAC will sign indemnity on the integrated care pathway
- Discuss risks and benefits of cardioversion for informed consent or confirm patient understands risks and benefits of the procedure and consent
- Consent patient for cardioversion

- Specialist Nurse or Doctor will check INR levels; U&Es and ECG and consent patient
- The anaesthetist will assess the patient in accordance with routine practice
- The cardioversion will be performed in the operating theatre. The minimum professionals present will be the specialist nurse or doctor, the anaesthetist, an Operating Department Practitioner
- If cardioversion is undertaken in an emergency situation outside of the normal elective pathway midazolam sedation may be used. In such cases the Trust Midazolam Policy should also be followed.
- During lists undertaken by the specialist nurse the Cardiologist of the week or nominated SpR on-call will be contactable in an emergency via their bleep number
- The patient is attached to a cardiac monitor and baseline observations of pulse, blood pressure and heart rhythm are taken
- The patient is given a general anaesthetic and the cardioversion is performed in accordance with the algorithm outlined in Appendix 3.

Patients identified at the assessment as not being suitable for DCCV will be discussed with the cardiologists.

- **This may be due to the patient having reverted back to sinus rhythm**
- **Overt heart failure**
- **Patient unwell**
- **Unhappy to sign**
- **Patient lacks capacity to understand consent**
- **Patient unable to understand consent/ procedure due to language issues – will need to be re-booked with interpreter.**

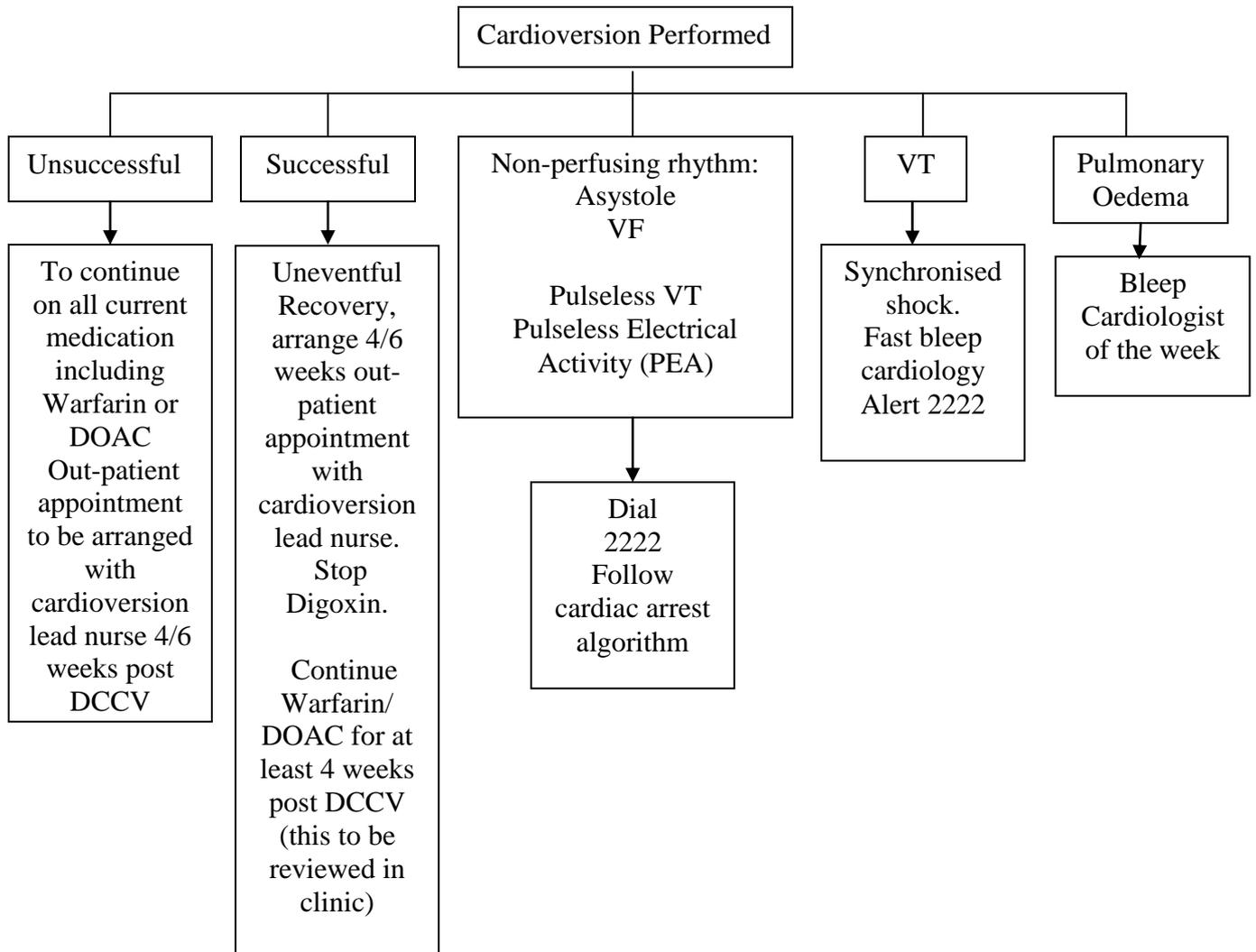
Day of cardioversion procedure

Patients taking medication

Please refer to Appendices 4a and 4b for information leaflets for those patients who are on warfarin / direct oral anti-coagulants who will be undergoing electrical cardioversion.

The biphasic defibrillator MUST be set on sync. (synchronised)

The possible clinical outcomes and the need for medical intervention are outlined below:



6. POST-PROCEDURE RECOVERY

- Once the procedure is completed the patient will be transferred to theatre recovery for close observation by appropriately trained nursing staff
- Monitor BP, P and oxygen saturations, in recovery, every 5 minutes until patient awake and BP stable
- Following observation and once stable the patient will be transferred to the ward area
- BP, P and oxygen saturations monitored in the ward area, every 15 minutes, until stable and BP returns to base line.
- A further ECG will be performed post procedure
- Patient will be offered fluids and a snack
- If systolic BP less than 100 mmHg perform lying/standing BP. If any deficit continue to monitor patient's BP every 10 minutes. If any concerns relating to lying/standing BP contact Cardiologist of the Week.

If patient has had a Midazolam sedation cardioversion:-

- Monitor BP every 15 minutes for 30 minutes
- If BP stable after 30 minutes decrease to every 30 minutes for 1 hour
- If BP stable after 1 hour decrease to every hour, for 4 hours, until discharge
- If any concerns relating to patient's condition, discuss with Cardiologist of the Week.

7. ASSESSMENT AND MANAGEMENT FOR DISCHARGE FROM HOSPITAL

This will be carried out by the cardiology nurse.

- The person who carried out the procedure should explain the outcome of the cardioversion to the patient
- If the cardioversion was successful, Digoxin should be stopped. All other medications should continue
- Following the cardioversion procedure book out-patient appointment.
- If out-patient appointment already made confirm patient is aware of date.
- Give copy of ECG to patient
- Nurse discharge letter to be given to patient
- All patients are advised not to drive, operate machinery or make important decisions for 24 hours post anaesthetic/sedation and must be accompanied home by another adult. Give advice sheet
- The patient is deemed fit for discharge when he/she satisfies all the agreed discharge criteria
- The pathway documentation is completed and data entered on to the computer system
- Lead nurse for cardioversion service ensures GP letter is completed on V6 on the day of procedure
- Please refer to Appendix 4c for patient discharge information post cardioversion

8. EVALUATION OF THE QUALITY, COST-EFFECTIVENESS AND EFFICACY OF THE SERVICE/AUDIT

The specialist nurse, in partnership with the general manager for cardiology, will collate data relating to the DCCV service. Data will be collected and disseminated from the cardioversion database. The following data will be included:

- Cardioversion activity – number of procedures performed
- Mean number of procedures per session
- Number of cancelled sessions and reasons why
- Number of people on the cardioversion waiting list
- Average length of wait for the procedure
- Number and percentage of successful cardioversions
- Analysis of patients cancelled due to complications
- Analysis of medical intervention required
- Patient satisfaction survey findings
- Success rate at follow-up
- Waiting time from decision to cardiovert to actual cardioversion
- Time taken once INR therapeutic to cardioversion date.

9. EMERGENCY DEPARTMENT CARDIOVERSION

There will be occasional situations whereby patients attend the emergency department with an arrhythmia that requires urgent electrical cardioversion. This may be an atrial or ventricular tachyarrhythmia.

The patient will require urgent electrical cardioversion due to the following:

- Shock – hypotension (systolic blood pressure <90 mm Hg), pallor, sweating, cold, clammy extremities, confusion or impaired consciousness
- Syncope – transient loss of consciousness due to global reduction in blood flow to the brain
- Myocardial ischaemia – typical ischaemic chest pain and/or evidence of myocardial ischaemia on 12-lead ECG
- Heart failure – pulmonary oedema and/or raised jugular venous pressure (with or without peripheral oedema and liver enlargement).

The patient will be managed in a resuscitation bed, or the most suitable monitored majors bay.

All patients must be attached to a cardiac monitor and the defibrillator.

All patients will have high flow oxygen and intravenous access.

The senior EM clinician will assess the patient's suitability for EM delivered sedation – if the patient is not suitable for an emergency physician to sedate then a middle grade or consultant anaesthetist will be called to manage the patient airway and administer appropriate anaesthetic agents.

The arrhythmia will be treated according to ALS guidelines and following resolution of the underlying arrhythmia the patient will be referred to the cardiology and medical teams on call.

10. CARIOVERSION GOVERNANCE STRUCTURE

Clinical Lead for Cardioversion Service

Responsible for:

- Clinical standards
- Clinical audits pertaining to the service
- Governance of appropriateness of cardiology procedures
- Standards of consent and aftercare of patients having cardiology procedures
- Governance of patients' feedback (shared with unit manager).

Responsible to:

- Clinical Director for specialist Medicine.

Reports to:

- Division of Medicine and Diagnostic Services via Divisional Board
- Cardiology colleagues via Cardiology Team Meetings.

Cardioversion Nursing Lead

Responsible for:

- Equality of access
- Waiting lists and procedure booking
- Governance of patients' feedback (shared with the Lead Clinician)
- Governance of adverse events (clinical and non-clinical)
- Patient dignity and privacy
- Patient comfort
- Decontamination standards
- Nursing standards
- Essence of care standards.

Responsible to:

- Sister for the Business Unit (i.e. Cardiology)

Reports to:

- Unit Lead clinician
- Cardiologists via Cardiology team meetings
- Directorate Matron
- Divisional Assistant General Manager.

11. CONSENT

General Policy

Consent must be obtained for all patients in accordance with the Trust Consent Policy.

Specific Protocol

Consent must not be obtained inside the procedure room. Ideally nurse led consent will be obtained on the day prior to the procedure.

Withdrawal of consent

- Patients may withdraw consent at any time (providing they have capacity to make this decision)
- Assessment of capacity in this situation may be difficult when the patient has received sedation and/or analgesia. The cardiology nurse/anaesthetist within the procedure room should assess capacity and agree whether the patient is capable for withdrawing consent.

Information for patients

- Patient information sheets must be available for all procedures conducted within the unit
- Patient information will be produced as per Trust Patient Information Policy and stored on the central database
- These information sheets must be reviewed annually and altered accordingly by the Unit's Patient and Public Involvement representative.
- Any archived versions will be stored on the central database
- Information sheets must incorporate changes following patient feedback once this feedback has been reviewed by the Cardiology Team Meetings and deemed relevant.

12. PATIENT SAFETY

General Policy

All adverse events must be reported and acted upon in line with Trust Incident Reporting Policy.

All adverse incidents will be reported to operational manager.

Specific Protocol

- Management of the unwell patient (appendix 5a)
- Transfer of unwell patient from Treatment Centre to Main Site (appendix 5b).

Recording of adverse events

- All adverse events will be entered in the Adverse Incident database.

Reviewing of adverse events

- A quarterly summary of adverse incidents will be obtained from the Governance Support Unit and reviewed on a three-monthly basis at the Cardiology Team Meetings
- The Cardiology Team will be responsible for taking additional actions based on this review which has not already been instigated by the Trust Clinical Governance process
- All adverse incidents will be reported to lead cardiologist for DCCV.

13. EQUALITY OF ACCESS

General policy

All patients will be treated in accordance with the Trust Access Policy.

Specific protocol

Information sheets

- These should be available in common community languages (>5% population)
- The need for these information sheets will be identified by the referrer and by booking staff on PAC.

Interpreting services

All patients needing interpreting services will be identified prior to the day of the procedure and interpreters booked using the Trust's interpretation services

14. WAITING LIST MANAGEMENT

Specific protocol

- The cardioversion nursing lead will be responsible for the management of the cardioversion waiting list and report any issues to the management lead
- Targets for waiting times for cardioversions will be as follows:
 - Routine referrals will be seen as soon as possible following one month of therapeutic anticoagulation. First definitive treatment must take place within 18 weeks of referral/clock re-starting following a legitimate period of active monitoring
- Robust mechanisms must be in place to ensure that patients who are being actively monitored are managed in line with National 18 weeks guidelines
- If patient is cancelled by the hospital they must be given another appointment for their DCCV within 28 days unless a decision made to refer back to cardiologist.

List utilisation

- Patients who are likely to breach the above waiting times will be identified and issues must be escalated to the management lead in order for action to be taken to prevent waiting time breaches
- Where possible cancelled appointments will be utilised by attempting to bring other suitable patients forward.

DNA/Cancellation

- DNA and cancellation rates will be continuously monitored
- DNA and cancellations will be managed as per Access Policy
- The reason for cancellation will be recorded.

15. PRIVACY AND DIGNITY

Specific Protocols

Patient confidentiality

- A room must be available for confidential conversations
- The use of this room must be offered to all patients prior to taking clinical or personal information from them.

Essence of care (EOC)

- The unit shall have a nominated lead for the EOC standards
- All nursing staff must be aware of EOC standards
- EOC standards must be reviewed by the Trust
- If changes in practice are required following this review these must be actioned within 3 months.

Patient feedback

Patients' experience of privacy and dignity within the unit will be surveyed as part of the unit feedback questionnaire twice yearly.

16. AFTERCARE

Specific protocol

Information sheets

- Written information for post-procedure care and advice will be available for this procedure.

Helpline

- All patients who have general concerns are asked to contact the Cardiology Nursing Lead/deputy on ext: 6410/3150.

17. PATIENT FEEDBACK

General policy

Patient complaints

- Patient complaints will be handled using the Trust complaints Policy and Procedure
- The Cardioversion Nursing Lead/ Lead Cardiologist for DCCV will be responsible for dealing with complaints related to the cardioversion service.

Specific Protocol

Patient Complaints

Any appropriate actions must be taken within an appropriate time scale. The Cardioversion Nursing Lead will be responsible for auditing such actions to ensure they occur.

Patient feedback

- Patients' feedback will be sought by two methods:
 - A suggestion box will be placed within the cardiology unit which will be emptied weekly
 - Patient questionnaires given to all patients attending the unit twice a year
- Feedback will be summarised by the Cardiology Nursing Lead for presentation to the CLCS
- Action deemed to be necessary from patient feedback will be actioned within three months
- Patient feedback will be kept anonymous. However, if a patient requests information regarding changes made as a result of their feedback, their details will be kept by the Cardiology Nursing Lead who will contact the patient once action has been taken.

18. TRAINING

All nursing staff performing cardioversions must be signed as competent by a Cardiologist. Regular teaching sessions are organised for administration, trained nurses and support staff. Medical trainees are assessed for technique.

- Assessments of competence to perform cardioversions will include formal direct observation by a Cardiologist or cardiology trained nurse who has been signed off as competent to work unsupervised by a cardiologist
- Only staff who are deemed competent to recover patient from general anaesthesia/sedation should undertake to do so
- Only staff who are deemed competent to obtain consent should undertake to do so
- No unsupervised cardioversions will be permitted until the trainee has been signed off as competent by a cardiologist in that specific technique
- Nurses who deliver cardioversions must undertake at least 10 procedures per year in order to maintain their competence
- Nurses performing cardioversion must be signed off by the CLCS.

Appendix 1

Benefits and Risks

Benefits

Overall improvement in the pumping function of the heart. Returning the heart to its normal rhythm should reduce the sensation of palpitations, breathlessness, fatigue and increase exercise tolerance.

Risks

Superficial skin damage is the most common complaint following cardioversion. This does not cause any long-term damage and normally resolves within 36 to 48 hours.

The most common complication of cardioversion is failure to restore normal heart rhythm. The success of cardioversion depends on the medical condition. Research shows cardioversion immediately restores the heart's normal rhythm in nine out of 10 people with arrhythmia. However, some people find that their arrhythmia returns again within a few days, and up to half of people treated with cardioversion have arrhythmia again within the first year. If the arrhythmia does return after treatment, the patient will usually have to take anti-arrhythmic medicines for four weeks before and four weeks after having a repeat cardioversion.

There are other possible complications of cardioversion. The patient could have an unexpected reaction to the anaesthetic. This is a problem for any procedure where anaesthesia is required and isn't specifically related to cardioversion. The patient will be given medicines to help if this happens, but it's extremely uncommon for such a short procedure.

The patient may develop other problems with their heart rhythm during cardioversion, for example, their heart may beat unusually slowly or fast. The patient will be given medicines to help if this happens.

There is an extremely small risk of having a heart attack or stroke after cardioversion. This happens when a blood clot which has formed in the heart is released during cardioversion, and then blocks the blood vessels in the heart or brain. Blood clots are more likely to form if the patient has had arrhythmia. Anticoagulant medication will be given prior to the procedure to reduce the risk of blood clots forming and will be continued for at least four weeks post procedure.

Appendix 2

Nurse-Led Cardioversion Clinic Competency

Competency Nurse Led Cardioversion

Competency Statement The practitioner able to:	Positive Indicator	Date achieved and signature
ECG Monitoring and Interpretation		
<p>Demonstrates the ability to distinguish normal from abnormal ECG trace and refer to another member of the multi-disciplinary team e.g. rhythm strips</p> <p>Demonstrates the ability to analyse the ECG and respond appropriately e.g. 12 lead ECG rhythm strip</p>	<ul style="list-style-type: none"> • Describes basic cardiac anatomy, the conduction system and the normal PQRST complex. • Recognises basic cardiac arrhythmias i.e. AF • Examines the ECG recognising abnormalities and their potential causes 	
Blood Sampling and Cannulation		
<p>Demonstrates the ability to collect blood for sampling in accordance with protocol e.g. venepuncture, venous cannulation</p>	<ul style="list-style-type: none"> • Describes access routes appropriate for collection of blood samples • Assimilates knowledge of blood sampling and cannulation techniques and safety considerations 	
Blood Sample Analysis		
<p>Demonstrates the ability to interpret the blood sample results and refer if necessary to multi-disciplinary team.</p>	<ul style="list-style-type: none"> • States the normal ranges and recognises abnormality in blood sample results i.e. INR and Potassium levels • Demonstrates the ability to analyse/interpret diagnostic tests prior to cardioversion according to protocol. i.e. INR, Potassium levels • Discuss implications of abnormal blood sample results • Critically analyse the appropriateness of treatment • Explains results/condition of patient necessary for elective cardioversion within stated protocols/guidelines e.g. therapeutic INR 	

Resuscitation		
Demonstrates the ability to perform Advanced Life Support, utilising Resuscitation Council (UK) Guidelines	<ul style="list-style-type: none"> Analyses patient's condition and applies appropriate measures in accordance with the Resuscitation Council (UK) Guidelines 	
Elective Cardioversions		
To perform elective synchronised DC cardioversion	<ul style="list-style-type: none"> Demonstrates the ability to prepare patient for elective cardioversion e.g. explain the basic procedure to the patient Lists equipment necessary for elective cardioversion Demonstrates the ability to prepare equipment in the environment for cardioversion Describes procedure of elective cardioversion with anatomy and physiology Demonstrates the ability to interpret diagnostic tests prior to cardioversion according to protocol e.g. INR , Potassium level Explains results/condition of patient necessary for elective cardioversion within stated protocols/guidelines e.g. therapeutic INR Demonstrates the ability to correctly position paddles and perform elective synchronised cardioversion Applies understanding of safety and complications surrounding elective cardioversion Demonstrates the ability to evaluate effective management of elective cardioversion e.g. managing cardioversion clinics, auditing of results/processes Evaluates the process of elective cardioversion with respect to external factors e.g. local/governmental policy 	

Recovery		
Demonstrates the ability to safely recover a patient from general anaesthetic	<ul style="list-style-type: none"> • Demonstrates the ability to maintain a patient's airway following the administration of a general anaesthetic • Able to identify and demonstrate safe use of equipment used within the recovery environment • Demonstrates correct documentation of vital signs on anaesthetic record chart • Able to identify and analyse abnormalities of a patient's condition post anaesthetic and causes for this • Demonstrates appropriate timing and transfer of a patient from the recovery ward to the cardiology unit. 	

PERFORMING SYNCHRONISED DC CARDIOVERSION (must be completed with the clinical assessor)

Signature of clinical assessor

COMPETENCY STATEMENT

I feel competent in this expanded role, having undertaken appropriate learning development and accept the responsibility

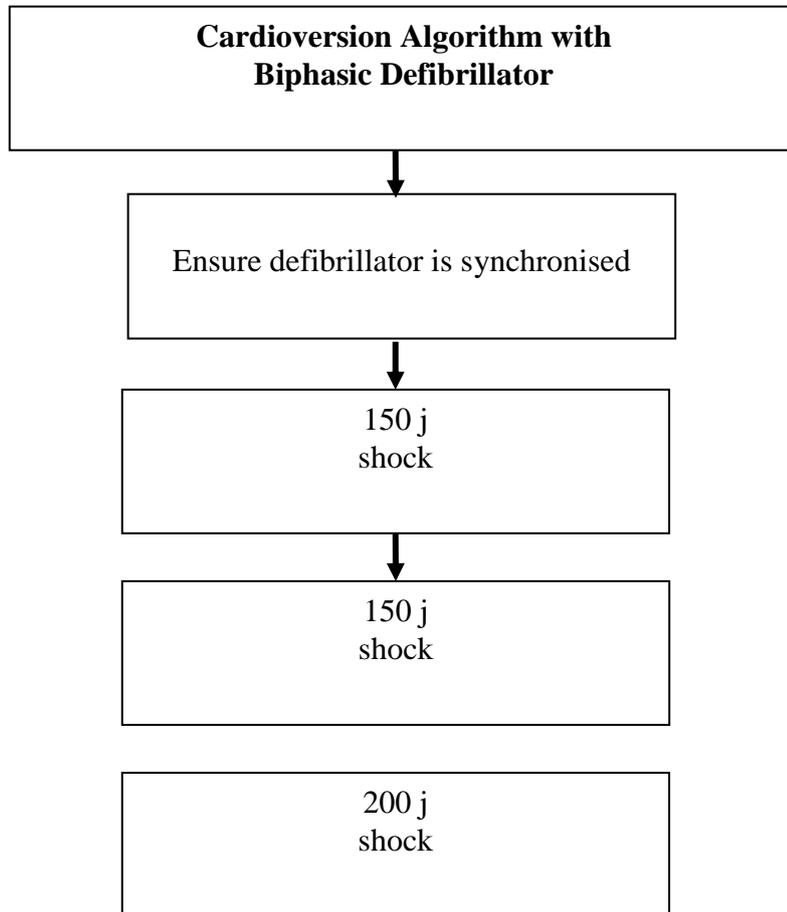
Name Signature Date

Evidence of competency reviewed and verified by:

Name Signature Date

Appendix 3

Cardioversion Algorithm with biphasic defibrillator.



Electrical Cardioversion

A Guide for Patients Taking Warfarin

Department of Medicine

Last updated January 2018
Review Date January 20

INTRODUCTION

This leaflet explains some of the aims, benefits and risks of Electrical Cardioversion. We want you to be informed about this procedure to enable you to be fully involved in decisions regarding your treatment. Please ask about anything you do not understand or wish to have explained in more detail.

WHAT IS AN ELECTRICAL CARIOVERSION?

Cardioversion is a procedure that is used to try to correct an arrhythmia (abnormal heart rhythm) by delivering an electrical shock through two electric pads on the chest. As a day case procedure, it is performed under a general anaesthetic. Although the procedure itself only lasts for seconds, you will be under anaesthetic (asleep) for 10 to 15 minutes.

Common rhythms that require cardioversion include atrial fibrillation and atrial flutter.

WHY AM I HAVING THIS PROCEDURE?

The reason that you need a cardioversion is that your heart is beating irregularly at present. There are many reasons why this irregularity has occurred but the important thing is to try and restore your heart to a normal rhythm which should improve the heart's efficiency. In the majority of cases cardioversion successfully restores the heart to a regular rhythm. In the opinion of your doctors, as the risks are minimal, it is well worth trying.

INTENDED BENEFITS OF THE PROCEDURE

Returning the heart to its normal rhythm should reduce the sensation of palpitations, breathlessness, fatigue and increase exercise tolerance.

WHO WILL PERFORM MY PROCEDURE?

This procedure will be performed by a cardiology-trained nurse or a cardiology doctor with extensive experience in performing the procedure. The anaesthetic will be administered by a trained anaesthetist.

ALTERNATIVE PROCEDURES THAT ARE AVAILABLE

The main alternative to the procedure is leaving the heart in its abnormal rhythm (usually atrial fibrillation or flutter), and instead controlling its rate with tablets and administering Aspirin or Warfarin to reduce the risk of stroke. There is also a procedure called 'Catheter Ablation' which is effective for some patients but generally only used after cardioversion has failed, following discussion with your Cardiologist.

IS THE PROCEDURE PAINFUL?

The procedure itself is not painful as you will be asleep. Some patients suffer slight skin burns or soreness to their chest where the sticky pads have been placed. This may be slightly uncomfortable but nursing staff will provide advice and if necessary pain killers and cream to rub on which will help relieve any pain.

WHAT ARE THE RISKS OF HAVING ELECTRICAL CARIOVERSION?

As with any procedure there are risks involved in having a cardioversion. It is normal to worry about these risks however it is best to try and weigh up the risks and the benefits together. Your cardioversion nurse will help you do this.

- Having a stroke caused by a blood clot is the most serious risk of electrical cardioversion although this is rare. The procedure could dislodge a clot inside your heart. This risk is significantly reduced by taking Warfarin to thin the blood and dissolve any clots which may be present. With Warfarin the risk of this happening is less than 0.1% or in other words less than 1 in 500 people.
- There is a very small risk of the procedure itself causing a more serious life threatening abnormal heart beat, although this is so rare that there are no available statistics.
- It is possible to have a reaction to the medication we give you to put you to sleep. Your anaesthetist will assess your risk of this happening and discuss this with you. However, it is not always possible to predict an allergic reaction.
- It is fairly common to experience some mild chest soreness or slight skin burns. This is not a serious side effect at all and can easily be treated (see 'Is the procedure painful'). There will be no long term damage to the skin.

ARE THE EFFECTS OF THE ELECTRICAL CARIOVERSION PERMANENT?

The procedure is usually successful on the day but the results may not be permanent. The success of your procedure often depends on the cause of your abnormal heart beat.

Keeping a normal heart beat after cardioversion is more likely if your heart is structurally normal. If your heart is structurally abnormal there is an increased risk of AF reoccurring. If you do have heart disease then there is an increased risk that your abnormal heart beat will come back. We estimate that 40 – 50% of people will still have a normal rhythm 12 months after their direct current cardioversion.

BEFORE THE PROCEDURE

For this cardioversion treatment to be as safe as possible, it is important that your blood has been adequately thinned for four weeks before the procedure (this is why you are taking Warfarin). When the heart beats irregularly small clots may form. To reduce the possibility of dislodging these clots, it is important to take a measured amount of Warfarin. Warfarin thins the blood so that any tiny clots may be absorbed. Warfarin must be continued for at least 4 weeks following your cardioversion and your consultant will review this, with you, at your follow-up appointment.

Please check in your anticoagulation book; the INR reading should be between 2.5 and 3.5 for the past four weeks. If this is not the case, or you have any other questions, please contact the cardioversion Sister (see contact details on page 16)

- If you are taking **Digoxin** please stop taking this drug 3 days before your planned cardioversion.
- **Do not eat or drink after 12 midnight** prior to your procedure.
- On the morning of your cardioversion procedure you can take, with a small amount of water, all your usual morning medications **except:**
 - Diuretics eg: Bendroflumethiazide, Metolozone, Furosemide, Bumetanide
 - Tablets to control diabetes
- If you are an insulin dependent diabetic then a specific plan will be discussed with you prior to your procedure date (please contact the cardioversion sister for this information).
- It is important that you **DO NOT** smoke for two days before your appointment.
- Please remove any make-up and nail varnish before your appointment.
- **DO NOT** bring large sums of money or jewellery with you because we are unable to accept any responsibility for loss or damage to your property.
- **YOU MUST** arrange for a responsible adult to accompany you home and to stay with you for 24 hours following your cardioversion. **YOU SHOULD NOT** drive yourself home or use public transport on your own.
- You might want to bring a book or magazine with you as you may have a wait during your stay with us

WHAT TO EXPECT ON THE DAY OF YOUR PROCEDURE

- The trained professional undertaking the procedure will see you and s/he will ask you to sign a consent form.
- You will be asked to strip off to the waist and to put on a gown.
- Monitoring leads will be attached to your shoulders and chest to watch your heart rate, and defibrillator pads will be placed on your chest and back.
- We will place a probe on your finger to monitor the oxygen levels in your blood and a cuff on your arm to monitor your blood pressure.
- The Cardiac Nurse Practitioner or sister will escort you to theatre where the procedure takes place.
- The anaesthetist will place a small needle (cannula) in the back of your hand so that the anaesthetic can be given.
- An oxygen mask will be put over your mouth and nose.

- We will give you a sedative through the tube in your arm (cannula) and you will gradually relax and fall asleep
- You will be asleep for a short period of time. While you are under the anaesthetic the cardioversion will take place.
- Once the anaesthetist is happy you are asleep you will be given up to three low-energy electric shocks.
- You will recover in theatre and when you are feeling better will be transferred to the ward.
- Another heart trace will be carried out to confirm your heart rhythm.
- The whole procedure will take about 20 minutes.
- You will be discharged from hospital a couple of hours later following the procedure. You will need to arrange transport home and ensure that there is someone to stay with you for the first 24 hours.

DURING THE PROCEDURE

You will be 'asleep' for approximately 10 – 15 minutes during the procedure; therefore, you will not feel the cardioversion electrical shock.

AFTER THE PROCEDURE

Your pulse and blood pressure will be monitored until you are awake fully. You may feel slightly drowsy and you will need a responsible adult to take you home.

You might feel some skin soreness following the procedure from where the 'electric' pads have been. It is possible that your skin becomes reddened too. The degree of skin discomfort experienced following a cardioversion is variable. Before you leave the Unit you will be provided with some cream which can be applied to the skin areas if necessary, to ease your symptoms.

When you feel more awake you will be offered something to eat and drink.

On discharge from the Treatment Centre you will be given an out-patient appointment to see your doctor.

For 24 hours after your anaesthetic it is recommended that you **DO NOT:**

- Drive a vehicle or ride a bike
- Drink alcohol
- Operate any machinery

TIPS FOR MAINTAINING GOOD HEART HEALTH

Limit your alcohol intake. Drinking more than the government guideline amount of alcohol elevates your risk factors for stroke by causing damage to the heart muscle, affecting heart rhythm and increasing blood pressure.

Guidance for men and women is no more than 14 units per week.

Eat a healthy diet. A good diet can help you maintain a healthy heart and reduce your stroke risk factors. Eating healthily will:

- Help lower your blood pressure
- Help reduce your cholesterol
- Help you control your weight
- Help reduce the risk of other conditions such as diabetes.

The Government's 'eatwell' plate below illustrates how different elements can be balanced in your daily diet.



Find what help you manage stress. Getting stress under control can help with AF and anxiety. It is important for you to understand what works for your body i.e. exercise, relaxing reading a book or watching a favourite movie. Anxiety can trigger an AF episode and knowing that you have an irregular heartbeat can trigger anxiety. This is a cycle that may worsen AF, so it is important to address stress and anxiety to keep it from affecting your AF.

Become more physically active. Being inactive means our bodies become unfit and we are more likely to develop poor health related complaints. By improving your physical fitness you can help reduce symptoms such as tiredness, shortness of breath etc. Taking gentle to moderate levels of exercise is safe for people with AF. In general, 'if it feels ok it is ok'.

Aerobic exercise has many benefits for your heart. It also strengthens the heart and lungs and improves the body's ability to use oxygen. Simple examples of aerobic exercise are: walking, cycling and jogging. Anything that increases your heart rate steadily and keeps it raised for a

period of time. Maximum benefit can be achieved by gradually working up to an aerobic session of at least 20 to 30 minutes, at least three to four times a week.

CONTACT NUMBERS

Sister Sam Timbrell can be contacted on 01283 566333 ext: 6412 or 01283 566333 and ask switchboard to bleep 465.

Or

A Cardiac Nurse can be contacted on 01283 566333 ext: 4191 (Coronary Care Unit)

Some useful links:

<https://www.bhf.org.uk/heart-matters-magazine/nutrition/heart-healthy-diet>

<http://www.heartrhythmalliance.org/afa/uk/atrial-fibrillation>

<http://www.nhs.uk/Livewell/Healthyhearts/Pages/Healthyheartshome.aspx>

Electrical Cardioversion

A Guide for Patients Taking Direct Oral Anti-coagulants (DOAC)

(Apixaban, Dabigatran, Edoxaban or Rivaroxaban)

Department of Medicine

**Last updated January 18
Review date January 20**

INTRODUCTION

This leaflet explains some of the aims, benefits and risks of Electrical Cardioversion. We want you to be informed about this procedure to enable you to be fully involved in decisions regarding your treatment. Please ask about anything you do not understand or wish to have explained in more detail.

WHAT IS AN ELECTRICAL CARDIOVERSION?

Cardioversion is a procedure that is used to try to correct an arrhythmia (abnormal heart rhythm) by delivering an electrical shock through two electric pads on the chest. As a day case procedure, it is performed under a general anaesthetic. Although the procedure itself only lasts for seconds, you will be under anaesthetic (asleep) for 10 to 15 minutes.

Common rhythms that require cardioversion include atrial fibrillation and atrial flutter.

WHY AM I HAVING THIS PROCEDURE?

The reason that you need a cardioversion is that your heart is beating irregularly at present. There are many reasons why this irregularity has occurred but the important thing is to try and restore your heart to a normal rhythm which should improve the heart's efficiency. In the majority of cases cardioversion successfully restores the heart to a regular rhythm. In the opinion of your doctors, as the risks are minimal, it is well worth trying.

INTENDED BENEFITS OF THE PROCEDURE

Returning the heart to its normal rhythm should reduce the sensation of palpitations, breathlessness, fatigue and increase exercise tolerance.

WHO WILL PERFORM MY PROCEDURE?

This procedure will be performed by a cardiology-trained specialist nurse or a cardiology doctor with extensive experience in performing the procedure. The anaesthetic will be administered by a trained anaesthetist.

ALTERNATIVE PROCEDURES THAT ARE AVAILABLE

The main alternative to the procedure is leaving the heart in its abnormal rhythm (usually atrial fibrillation or flutter), and instead controlling its rate with tablets and administering a DOAC Apixaban/ Dabigatran/Edoxaban or Rivaroxaban to reduce the risk of stroke.

There is also a procedure called 'Catheter Ablation' which is effective for some patients but generally only used after cardioversion has failed, following discussion with your Cardiologist.

IS THE PROCEDURE PAINFUL?

The procedure itself is not painful as you will be asleep. Some patients suffer slight skin burns or soreness to their chest where the sticky pads have been placed. This may be slightly uncomfortable but nursing staff will provide advice to you about taking pain killers which will help relieve any pain.

WHAT ARE THE RISKS OF HAVING ELECTRICAL CARDIOVERSION?

As with any procedure there are risks involved in having a cardioversion. It is normal to worry about these risks however it is best to try and weigh up the risks and the benefits together. Your Cardiologist / Cardioversion nurse will help you do this.

- Having a stroke caused by a blood clot is the most serious risk of electrical cardioversion although this is rare. The procedure could dislodge a clot inside your heart. This risk is significantly reduced by taking anti-coagulants (DOAC) (Apixaban, Dabigatran, Edoxaban or Rivaroxaban) to thin the blood and dissolve any clots which may be present. Taking anti-coagulants (DOAC's) the risk of this happening is less than 0.1% or in other words less than 1 in 500 people.
- There is a very small risk of the procedure itself causing a more serious life threatening abnormal heart beat, although this is so rare that there are no available statistics.
- It is possible to have a reaction to the medication we give you to put you to sleep. Your anaesthetist will assess your risk of this happening and discuss this with you. However, it is not always possible to predict an allergic reaction.
- It is fairly common to experience some mild chest soreness or slight skin burns. This is not a serious side effect at all and can easily be treated (see 'Is the procedure painful'). There will be no long term damage to the skin.

ARE THE EFFECTS OF THE ELECTRICAL CARDIOVERSION PERMANENT?

The procedure is usually successful on the day but the results may not be permanent. The success of your procedure often depends on the cause of your abnormal heart beat.

Keeping a normal heart beat after cardioversion is more likely if your heart is structurally normal. If your heart is structurally abnormal there is an increased risk of AF reoccurring. If you do have heart disease then there is an increased risk that your

abnormal heart beat will come back. We estimate that 40 – 50% of people will still have a normal rhythm 12 months after their direct current cardioversion.

BEFORE THE PROCEDURE

For this cardioversion treatment to be as safe as possible, it is important that your blood has been adequately thinned for six weeks before the procedure (this is why you are taking Apixaban/ Dabigatran/Edoxaban or Rivaroxaban). When the heart beats irregularly small clots may form. To reduce the possibility of dislodging these clots, it is important to take a measured amount of these medications. This medication thins the blood so that any tiny clots may be absorbed. It is vitally important that you take this medication regularly and **DO NOT** miss any doses.

Once you have been on this medication regularly for 6 weeks you will then be listed for your procedure.

- If you are taking **Digoxin** please stop taking this drug 3 days before your planned cardioversion.
- **Do not eat or drink after 12 midnight** prior to your procedure.
- On the morning of your cardioversion procedure you can take, with a small amount of water, all your usual morning medications **except**:
 - Diuretics eg: Bendroflumethiazide, Metolozone, Furosemide, Bumetanide
 - Tablets to control diabetes
- If you are an insulin dependent diabetic then a specific plan will be discussed with you prior to your procedure date (please contact the cardioversion sister for this information).
- It is important that you **DO NOT** smoke for two days before your appointment.
- Please remove any make-up and nail varnish before your appointment.
- **DO NOT** bring large sums of money or jewellery with you because we are unable to accept any responsibility for loss or damage to your property.
- **YOU MUST** arrange for a responsible adult to accompany you home and to stay with you for 24 hours following your cardioversion. **YOU SHOULD NOT** drive yourself home or use public transport on your own.
- You might want to bring a book or magazine with you as you may have a wait during your stay with us

WHAT TO EXPECT ON THE DAY OF YOUR PROCEDURE

- Your bloods will be taken on the day of your procedure to check kidney function. Provided these are in the correct range the procedure will go ahead.
- An ECG will also be performed and an assessment will be undertaken by the nurse.
- The anaesthetist will also assess you prior to the procedure.
- The trained professional undertaking the procedure will see you and s/he will ask you to sign a consent form.
- You will be asked to strip off to the waist and to put on a gown.
- Monitoring leads will be attached to your shoulders and chest to watch your heart rate, and defibrillator pads will be placed on your chest and back.
- We will place a probe on your finger to monitor the oxygen levels in your blood and a cuff on your arm to monitor your blood pressure.
- The Cardiac Nurse Practitioner or sister will escort you to theatre where the procedure takes place.
- The anaesthetist will place a small needle (cannula) in the back of your hand so that the anaesthetic can be given.
- An oxygen mask will be put over your mouth and nose.
- We will give you a sedative through the tube in your arm (cannula) and you will gradually relax and fall asleep
- You will be asleep for a short period of time. While you are under the anaesthetic the cardioversion will take place.
- Once the anaesthetist is happy you are asleep you will be given up to three low-energy electric shocks.
- You will recover in theatre and when you are feeling better will be transferred to the ward.
- Another heart trace will be carried out to confirm your heart rhythm.
- The whole procedure will take about 20 minutes.

- You will be discharged from hospital a couple of hours later following the procedure. You will need to arrange transport home and ensure that there is someone to stay with you for the first 24 hours.

DURING THE PROCEDURE

You will be 'asleep' for approximately 10 – 15 minutes during the procedure; therefore, you will not feel the cardioversion electrical shock.

AFTER THE PROCEDURE

Your pulse and blood pressure will be monitored until you are awake fully. You may feel slightly drowsy and you will need a responsible adult to take you home.

You might feel some skin soreness following the procedure from where the 'electric' pads have been. It is possible that your skin becomes reddened too. The degree of skin discomfort experienced following a cardioversion is variable. Before you leave the Unit you will be provided with some cream which can be applied to the skin areas if necessary, to ease your symptoms.

When you feel more awake you will be offered something to eat and drink.

On discharge you must continue all your medication unless advised otherwise by the nurse.

Apixaban, Dabigatran, Edoxaban or Rivaroxaban must be continued for at least 4 weeks following your cardioversion and your consultant will review this, with you, at your follow-up appointment.

On discharge from the Treatment Centre you will be given an out-patient appointment to see your doctor.

For 24 hours after your anaesthetic it is recommended that you **DO NOT:**

- Drive a vehicle or ride a bike
- Drink alcohol
- Operate any machinery

TIPS FOR MAINTAINING GOOD HEART HEALTH

Limit your alcohol intake. Drinking more than the government guideline amount of alcohol elevates your risk factors for stroke by causing damage to the heart muscle, affecting heart rhythm and increasing blood pressure.

Guidance for men and women is no more than 14 units per week.

Eat a healthy diet. As someone with AF there are a number of stroke risk factors that you can reduce by eating a healthy diet:

- Help lower your blood pressure
- Help reduce your cholesterol
- Help you control your weight
- Help reduce the risk of other conditions such as diabetes.

The Government 'eatwell' plate below illustrates how different elements can be balanced in your daily diet.



Find what help you manage stress. Getting stress under control can help with AF and anxiety. It is important for you to understand what works for your body i.e. exercise, relaxing reading a book or watching a favourite movie. Anxiety can trigger an AF episode and knowing that you have an irregular heartbeat can trigger anxiety. This is a cycle that may worsen AF, so it is important to address stress and anxiety to keep it from affecting your AF.

Become more physically active. Being inactive means our bodies become unfit and we are more likely to develop poor health related complaints. By improving your physical fitness you can help reduce symptoms such as tiredness, shortness of breath etc. Taking gentle to moderate levels of exercise is safe for people with AF. In general, 'if it feels ok it is ok'.

Aerobic exercise has many benefits for your heart. It also strengthens the heart and lungs and improves the body's ability to use oxygen. Simple examples of aerobic exercise are: walking, cycling and jogging. Anything that increases your heart rate steadily and keeps it raised for a period of time. Maximum benefit can be achieved by gradually working up to an aerobic session of at least 20 to 30 minutes, at least three to four times a week.

CONTACT NUMBERS

Sister Sam Timbrell can be contacted on: 01283 566333 ext: 6412 or 01283 566333 and ask switchboard to bleep 465.

Or

A Cardiac Nurse can be contacted on 01283 566333 ext: 4191 (Coronary Care Unit)

Some useful links:

<https://www.bhf.org.uk/heart-matters-magazine/nutrition/heart-healthy-diet>

<http://www.heartrhythmalliance.org/afa/uk/atrial-fibrillation>

<http://www.nhs.uk/Livewell/Healthyhearts/Pages/Healthyheartshome.aspx>

Appendix 4c

Patient Discharge Information Post Cardioversion

As you have had a general anaesthetic:-

- No driving for 24 hours
- No operating heavy machinery
- No making any life changing decisions
- Do NOT drink any alcohol for 24 hours

You may have some superficial skin burns on your chest/back from the defibrillator pads. This should resolve within 36 hours.

You may have a sore or tender chest, please take some simple analgesia for this i.e. Paracetamol.

Please see your nurse discharge letter for your outpatient appointment with your Consultant. Please ensure you attend for an ECG prior to your follow up appointment

Please see your nurse discharge letter for any change in your medication.

Your warfarin should be continued for at least 4 weeks post cardioversion. Please continue your warfarin until reviewed in clinic with your Consultant.

Your INR result today was:- _____

Appendix 5a

Cardioversion Service

Operational Policy

Date of policy Jan 2018

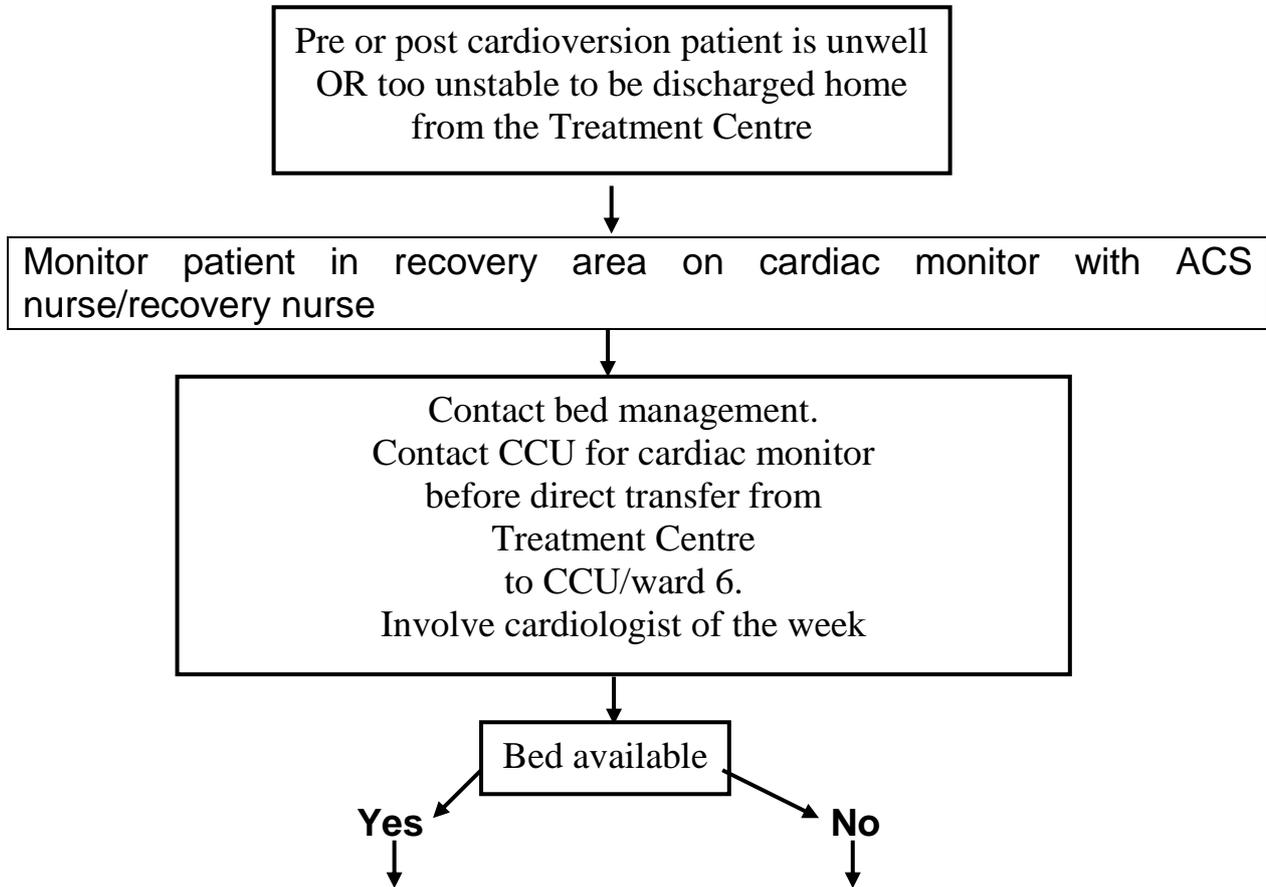
Date of review Jan 2020

Policy users Cardioversion staff
Treatment Centre staff
Medical staff
CCU staff
ED staff

1. If the patient pre/post cardioversion becomes unwell they should be assessed immediately by the Acute Cardiology Nurse / Anaesthetist / Medical doctor.
2. Perform 12 lead ECG and place patient on cardiac monitor and perform observations.
3. Contact Cardiologist of the Week (via switchboard) or contact Medical Registrar on-call (bleep 251).
4. If patient becomes unwell and requires immediate transfer to main site please follow attached flow chart (appendix 5b).
5. In the event of a cardiac arrest – support management of patient and follow cardiac arrest guidelines.

Appendix 5b

Transfer of unwell patient from Treatment Centre (cardioversion clinic) to main hospital site



Call 999 and request urgent transfer to main site, CCU monitor bed. Handover to CCU



CCU to inform bed management.
If deemed appropriate call cardiologist of the week to review patient.
Contact via switchboard or CCU 4191 / 4196

Contact bed management requesting urgent CCU bed



Call 999 request urgent transfer to Emergency Department. Call ED to inform them transferring patient over. Transfer to Resus whilst awaiting CCU bed.