

Standard Operating Procedure: Electrosurgery

Issue Date	Review Date	Version
9 th April 2018	April 2023	V3

Purpose

To ensure that all peri-operative practitioners have the knowledge and experience of the principles and techniques of electro-surgery in order to identify and minimise any risk to patient and staff

Who should read this document?

This policy applies to personnel employed by University Plymouth Hospitals Trust (UPHNT) and to personnel working in satellite facilities under the remit of UPHNT

Key Messages

The Trust has a Duty of Care to ensure staff are appropriately trained and assessed in the safe use of electrosurgical equipment. This plays a vital role in providing patient care that is safe, current and evidence based.

Core accountabilities

Owner	Perioperative Clinical Educators
Review	Theatre Policy Committee
Ratification	Clinical Governance Lead
Dissemination	Senior Matron Theatres and Anaesthetics
Compliance	Theatre Policy Committee

Links to other policies and procedures

1. Skin Preparation Preoperatively THR/036/01
2. Laser Safety Policies THR/021/01
3. Diagnostic and Therapeutic Equipment Training and Competency Assessment Document (Trustnet link)
4. Medical Devices Training TRW.Med/325/04 Policy

Version History

10.5	01/10/2009	Draft copy completed and approved by TMB
V1.2	01/04/2010	Revised in to new template
V2	07/07/2014	Reviewed
V3	09/04/2018	Revised in to new template

The Trust is committed to creating a fully inclusive and accessible service. Making equality and diversity an integral part of the business will enable us to enhance the services we deliver and better meet the needs of patients and staff. We will treat people with dignity and respect, promote equality and diversity and eliminate all forms of discrimination, regardless of (but not limited to)

age, disability, gender reassignment, race, religion or belief, sex, sexual orientation, marriage/civil partnership and pregnancy/maternity.

An electronic version of this document is available on Trust Documents on StaffNET. Larger text, Braille and Audio versions can be made available upon request.

Standard Operating Procedures are designed to promote consistency in delivery, to the required quality standards, across the Trust. They should be regarded as a key element of the training provision for staff to help them to deliver their roles and responsibilities.

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Purpose and Scope

Standard

Policies and procedures are in place that facilitates the safe use of all electro surgical equipment within the perioperative setting.

Risks associated with electro surgery are identified and minimised to reduce the Potential to harm patients and staff.

All members of the peri-operative team have sufficient knowledge and experience of the principles and techniques of electro surgery.

AfPP 2011

Standard Operating Procedure (SOP)

Electrosurgery

1 Introduction

Electrosurgical devices and accessories are classed by the Medicines and Healthcare Products Regulatory Agency as 'very high risk' medical devices

It is vital therefore that associated risks are identified and minimised to reduce any potential harm to patients and staff.

The Trust recognises its responsibilities' as an employer to ensure that staff are competent and safe in the roles that they are performing. The Trust has a legal and moral duty to provide adequate training in medical devices in order to minimise the risk of harm to patients, staff and the organisation through the course of its work.

All members of the theatre team including clinicians, have a duty to ensure they are competent and have the underpinning knowledge appropriate to their role in order to use this equipment.

Senior Team Leaders are responsible for ensuring all staff are adequately trained and assessed as competent to use electrosurgical devices appropriate to their role. Perioperative Clinical Educators will facilitate / organise / support / train / assess as required.

Electrosurgical Units (commonly known as diathermy machines) were first introduced in the early 20th Century to facilitate haemostasis and / or the cutting of tissue during surgical procedures.

This is achieved by passing normal electrical current via the diathermy machine and converting it into a high frequency alternating current (HFAC).

The HFAC produces heat within body tissues to coagulate bleeding vessels and cut through tissue. At this high frequency of over 300,000Hz, the nervous system and muscles are not affected when the current passes through the body.

Electrosurgery is used in approximately 80% of all surgical procedures. It utilises complex technology, which is often poorly understood by staff. This has the potential to lead to serious injuries to both staff and patients if used incorrectly.

There are two different types of electrosurgery:

1. Monopolar

- Some areas also use Argon Enhanced Electrosurgery

2. Bipolar

- Electrosurgery uses alternating current (AC) to cut, coagulate, fulgurate and desiccate tissue.
- Cutting minimises thermal tissue damage by using electric sparks to cut in a precise and focused manner.
- Coagulation is intermittent bursts of a high voltage which enable blood vessels to be sealed whilst keeping cells intact.
- Fulguration (spray) is the non-contact form of coagulation which produces a spark gap and electric discharge arc between the probe and the tissue. It causes shallow tissue destruction.
- Desiccation is a direct contact form of coagulation. Less heat is generated, no cutting action occurs and the cells dehydrate rather than vaporise.

Each of these processes generates smoke plume which contains:

- Chemical by-products (e.g. acrylonitrile and hydrogen cyanide) which can be absorbed by the skin and lungs
- Carbonised tissue, blood particles and viral DNA particles
- Infectious viruses and viable bacteria have also been noted

To reduce associated health hazards, especially designed smoke evacuation systems should be used where available and high-filtration masks donned for all surgical procedures.

Argon Enhanced Electrosurgery

This is where the electrosurgery incorporates a stream of argon gas to improve the surgical effectiveness of the electrosurgical current.

Mono-polar

Monopolar electrosurgery is the eminence of the HFAC from the generator (diathermy machine) via an active electrode through the patient's own body tissues and returned back to the generator via a return electrode / patient return plate.

Bipolar

In bipolar surgery the active and return electrodes are both located at the site of surgery, usually within the instrument tip (usually forceps)

Active Electrode

Is an electrosurgical instrument / accessory that concentrate's the electric (therapeutic) current at the surgical site.

Return Electrode

A conductive plate / pad (dispersive electrode) that recovers the therapeutic current from the patient during electrosurgery, dispersing it over a wide surface area and returns it to the generator. Plates are usually rigid and made of metal or foil covered cardboard; pads are usually flexible.

Ultrasound

Ultrasound equipment is used to cut or coagulate tissue using high frequency sound waves by converting electrical energy into mechanical energy.

Ultrasound instruments are not normally associated with electro-surgery products but the principles relating to electro-surgery are also applicable to ultrasound.

Microwave

Microwave equipment may be used to ablate tissues in cardiac or gynaecology surgery. Specific training is required to operate the equipment.

Laser

Refer to the local laser policies

3 Regulatory Background

The purpose of this SOP is to ensure there is a safe system in place that facilitates the use and maintenance of electrosurgical equipment. The benefit to patients is maximised and that best practice is applied.

This SOP has been written in compliance with relevant legislation and guidance:

- The Health and Social Care Act (2008)
- The Medicines and Healthcare Product Regulatory Agency (MHRA)
- DB 2006 (05) 'Managing Medical Devices'
- BS EN 60601 'Medical Electrical Equipment – Safety & Performance'
- The Provision and Use of Work Equipment (1998)
- The Electricity at Work Regulations (1989)

Documentation

- 4.1 The tracking label from the electrosurgical plate **must be** retained for the patient's perioperative record.
- 4.2 The skin condition prior to plate application **must be** documented in the perioperative record.
- 4.3 The name of the practitioner applying and removing the plate **must be** recorded.
- 4.4 The type of electro-surgery being used **must be** documented.
- 4.5 The application site **must be** documented.
- 4.6 The integrity of the skin condition **must be** documented after removal of the plate.

4.7 Pacemakers

- 4.7.1 Pacemakers may be affected by electrosurgical activity.
- 4.7.2 It is imperative that the anaesthetist is aware that the patient has a pacemaker and advice is sought from the Cardiac Pacing Department.
- 4.7.3 Bipolar electro-surgery is recommended as the short current pathway reduces the likelihood of current interfering with the pacemaker.
- 4.7.4 If monopolar electro-surgery is used with such patients the current pathway should be kept as short as possible.
- 4.7.5 Electro-surgery **must be** stopped immediately if an arrhythmia occurs.

4.8 Preparation of Electrosurgical Equipment

- 4.8.1 All equipment **must be** suitable for the task to be undertaken.
- 4.8.2 The electrosurgical plate is pre-gelled, single use only and self-adhesive and either packed singly or in packs of five.
- 4.8.3 Be aware that different generators use different plates.
- 4.8.4 The plate **must not be** applied until patient positioning or examination has been completed.
- 4.8.5 The position of the plate should be sited over a vascular, muscular area and as

close to the operating site as possible in an area with no skin blemishes, lesions or scars. Excessive hair should be removed.

4.8.6 The plate **must not be** placed over any body piercing or close to ECG electrodes.

4.8.7 The plate **must not be** placed close to the site of a metallic implant as it may cause unintended surgical effects.

4.8.8 Plates **must be** placed under direct vision; drapes **must be** removed and reapplied if the plate has not already been sited prior to draping.

4.8.9 The plate **must** remain in direct and complete contact with the patient's skin to ensure a safe return pathway for the current.

4.8.10 Skin preparation solutions **must not** come in contact with the plate, and plates **must be** replaced if contamination occurs. Pooling of flammable liquids in cavities or under the electrode **must be** avoided.

5 Procedure to Follow

Prior to use

The equipment should only be used by members of the perioperative team who are appropriately trained and deemed competent.

5.1 The equipment **must be** inspected and safety features tested before each list and in accordance with manufacturers' guidelines.

5.2 All cables and electrodes **must be** checked prior to use to ensure insulation is intact

5.3 Any problems, not able to be solved by trouble shooting; **must be** reported to the team leader and MEMS as a matter of urgency.

5.4 The volume of the activation sound indicator should be maintained at an audible level.

5.5 The equipment should not be used in the presence of flammable agents e.g. alcohol, tincture based fluids

5.6 The equipment should be operated at the lowest effective power setting to achieve the desired effect for coagulation and cutting

5.7 The electrical lead should be of adequate length and flexibility to reach the appropriate electrical outlet socket with stress. Any kinks, knots or curls prior to plugging in to the socket.

5.8 The patients' skin integrity **must be** evaluated and documented in the Perioperative Care Plan.

5.9 Any jewellery worn by the patient **must** ideally be removed or covered completely.

5.10 Staff must be respectful of cultural, gender and religious customs and beliefs and where practicable accommodate individual needs.

5.11 All staff **must be** made aware via the Team Briefing / Time Out of any patient contraindication to the use of monopolar diathermy e.g. pacemaker, cochlear implant

5.12 It is recommended that where a patient is 'electronically tagged', prior contact is made with the electronic tag supplier / prison / institution in order to produce an acceptable, safe plan. (See under References)

General Electrosurgical Use

5.13 The Generator **must be** protected from spills. Fluids should not be placed on top.

5.14 The return electrode **must be** the appropriate size for the patient. E.g. paediatric

5.15 Application of return electrode **must be** done in accordance with manufacturers' guidelines, i.e. not over:

- A bony prominence
- Implanted metal prosthesis
- Area distal to tourniquets
- Scar tissue
- Hairy surface
- Pressure points / areas

In order to reduce the risk of current concentration, and therefore patient burns; the patient return electrode **must be** positioned to maximise the dissipation of the current. This will prevent Leading Edge Effect.

5.16 The return electrode **must** never be cut or trimmed.

5.17 If the return electrode needs to be repositioned, then a new one **must be** used.

5.18 Before the commencement of the procedure, it **must be** ensured that no part of the patient is touching any earthed / metal objects, such as IV drip poles or the metal rim of the operating table.

5.19 The return electrode **must be** connected to the generator prior to draping

6 Document Ratification Process

The design and process of review and revision of this procedural document will comply with The Development and Management of Formal Documents.

The review period for this document is set as default of five years from the date it was last ratified, or earlier if developments within or external to the Trust indicate the need for a significant revision to the procedures described.

This document will be reviewed by the Theatre Policy Committee and ratified by the Clinical Governance Lead.

Non-significant amendments to this document may be made, under delegated authority from the Director or senior Matron, by the nominated author. These must be ratified by the Director or senior Matron and should be reported, retrospectively, to the Theatre Policy Committee.

Significant reviews and revisions to this document will include a consultation with named groups, or grades across the Trust. For non-significant amendments, informal consultation will be restricted to named groups, or grades who are directly affected by the proposed changes.

7 Dissemination and Implementation

Following approval and ratification, this procedural document will be published in the Trust's formal documents library and all staff will be notified through the Trust's normal notification process, currently the 'Vital Signs' electronic newsletter.

Document control arrangements will be in accordance with The Development and Management of Formal Documents.

The document author(s) will be responsible for agreeing the training requirements associated with the newly ratified document with the Director or senior Matron and for working with the Trust's training function, if required, to arrange for the required training to be delivered.

8 Monitoring and Assurance

Monitoring will be undertaken by the Theatre Board, who will audit compliance of the policy.

Theatre Team leaders are responsible for auditing practice against this policy quarterly and reporting to the Theatre Board.

In addition they will be responsible for investigating any incidents reported via the Trusts Electronic Reporting system.

The Senior Team Leader (Band 7) is responsible for the implementation and compliance across their teams.

The use of audit tools to randomly monitor the staffs' understanding of selected policies.

Breaches of this Policy are to be recorded as Incidents using the Trust Incident Reporting Process.

9 Reference Material

CLI.THE.POL.453.1 Diathermy Use Policy

Association for Perioperative Practice (2011) *AfPP Standards and Recommendations for Safe Perioperative Practice*

WWW.afpp.org.uk?careers/Standards-Guidance

Association of PeriOperative Registered Nurses (2011) *Perioperative Standards and Recommended Practices*

Association of Surgical Technologists (2012) *Recommended Standards of Practice for Use of Electrosurgery*

The Provision and Use of Work Equipment (1998)

The Electricity at Work Regulations (1998)

MDA 2002 The Electrosurgery Team

MHRA 2005 High Power Electrosurgery Review update

MHRA 2006 Guidelines for Implantable Cardioverter Defibrillators (ICDs) – pacemaker perioperative management