Lead Extraction: Post-Operative Care (CSICU)

Site Applicability

PHC – CSICU

Practice level:

Basic Skill: RN's in CSICU

Need to Know:

Cardiac devices and/or leads may require surgical removal due to infection (sepsis or endocarditis), superfluous or failed leads. Over time, fibrotic tissue develops and entraps the implanted lead in the vein and cardiac chambers. Lead extraction is defined as the removal of a lead with the assistance of specialized equipment (i.e. laser) regardless of the time since implant. The laser sheath fiberoptically delivers laser energy to the distal end of the sheath to release the lead from the encapsulating fibrotic tissue, permitting advancement of a sheath without excess force or tearing of the tissue.

Major complications observed during lead extraction including life-threatening events; occur in less than 1% of patients. Minor complications include arrhythmias, arm swelling, thrombosis of implant veins, infection, hypotension, air embolism and pneumothorax.

Patient preparation and anesthesia is similar to patients undergoing open-heart surgery. A set of external transcutaneous pacing pads will be applied to the chest wall in the event of bradycardia during the removal procedure. The average procedure time is approximately 1 to 3 hours, although extremely technically difficult extractions may run longer.

For patients with serious, systemic infections caused by infected leads, antibiotic therapy is required for 5 to 7 days before re-implantation of a new permanent pacemaker can occur. After the lead extraction (with no re-implantation) the patient may have a heart rate that is too low to sustain their cardiac output and blood pressure and may require inotropes and β stimulators to support their heart rate. In these cases patients will remain in CSICU and will require close monitoring of hemodynamic stability and potential complications. Patients with a heart rate that is able to sustain cardiac output and blood pressure may transfer to the ward receiving IV antibiotic therapy until lead re- implantation.

The infected lead extraction patient will require a 4 to 6-weeks course of antibiotic therapy to truly eradicate the infection. A PICC line will be inserted 1 to 2 days after the procedure either in CSICU by IV therapy or in the radiology department after their leads and devices (or pulse generator) are removed

and is usually on the same side as the removed device. The preference is for new devices to be implanted on the opposite side of the extraction.

If the patient receives a new AICD then the vendor will be in the OR to interrogate and test the device. A new pacemaker will not be tested or interrogated unless there were issues identified during the case.

Patients usually arrive in the CSICU extubated on oxygen via simple face mask unless they were in the OR for an extended period of time or had an extremely complicated course. They will be fairly drowsy but may still have pain; management is done by using both IV opioids and oral analgesics. They usually arrive without a urinary catheter but may have a Davol drain to the operative site.

Pacemaker-dependent patients will require temporary pacing during antibiotic treatment.

Conventional temporary passively placed transvenous pacing systems are frequently associated with the risk of losing capture and under-sensing, and restrictions to patient mobility.

An **external permanent pacemaker** is a treatment option for patients requiring long-term antibiotics that are pacemaker dependent.

The implant procedure is very similar to standard permanent implantation, with the exception of all single lead systems, and the lack of need to form a pocket.

Protocol

Assessment & Intervention:

Initial Assessment:

Equipment may include:

- Central venous catheter
- Femoral venous sheath
- External permanent pacemaker
- Transvenous pacing – check connections and settings
- Peripheral Intravenous
- Davol Drain

Ongoing Assessment:

Assess as in B-00-13-10025– Cardiac Surgery Post-Operative Care, but also include:

1. Complete a 'head-to-toe' assessment Q 4H including an end-of-shift assessment
2. Vital signs [HR, BP, CVP, RR, SaO_2, urine output and all intake (intravenous or other)]
   - On admission
   - Q 15 minutes x 4 or longer if unstable; then
   - Q 30 minutes x 4 or longer if unstable; then
   - Q 1H until discharge from unit or according to physician's order

Ongoing Interventions:

Intervene as outlined in B-00-13-10025 – Cardiac Surgery Post Operative Care

Report any abnormal findings (based on either accepted norms or on norms identified by surgeon) to covering physician

- Refer to specific protocols (e.g. CVC, shortness of breath, transvenous pacing) for nursing interventions
- Assess pacemaker rhythm and ensure new device is functioning well. If pacemaker not sensing or capturing notify surgeon and/or pacemaker clinic and initiate supportive measures if patient symptomatic
- Remove femoral venous sheath with physician order as outlined in B-00-13-10063
- For infected patients confirm arrangement for PICC line placement in Radiology

Transfer and Discharge

How long the patient stays in CSICU will depend on why the leads were extracted and how much laser was required in the OR. When they are stable, they will be moved to the cardiac surgery ward (5B). Davol can be removed when drainage is less than 5 mls/24hour.

Patients that receive an external permanent pacemaker will remain in CSICU overnight for recovery and then may be transferred to CICU or 5B

If leads were removed because of a fracture or lead failure the patient will usually go home in 1-2 days.

Occasionally a patient will be discharged directly from CSICU. Make sure that they are given all the applicable patient teaching information which might include: the device specific information sheet, shock plan and driving restrictions form. All patients should also receive information about when and where their next follow up appointment should occur**.**

Transfer:

Prior to Transfer:

- Ensure saline lock in situ and patent
- Remove arterial line and central line no less than 30 minutes prior to transfer
- Ensure dressings are clean, dry and intact
- Transfer via wheelchair with oxygen if required to maintain SpO_2 92% or above

Patient Education:

- Explain routines and need for assessment
- Explain post-operative course (e.g. pacemaker check, wound management, transfer to ward)
- If new pacemaker was inserted during lead extraction, ensure patient has device manufacturer's booklet and temporary identification card (ensure complete) to take home.

Documentation:

Use the following records to document assessment and interventions:

- IC037 Critical Care flow sheet
- NF035 Nurses' Notes
- IC004 ECG Flow Sheet
- NF384 Patient transfer form
- Medication Administration Record

Related Standards & Resources:

1. B-00-13-10017 – Physical Assessment (Critical Care Areas)
2. B-00-13-10025 – Cardiac Surgery: Post-Operative Care
3. B-00-13-10063– Cardiac Cath Lab: Post Procedure Care
4. BD-00-12-40045 – CVC: Non-Tunneled Central Venous Catheters: Basic Care and Maintenance
5. B-00-13-10089 - Lead Extraction, Post op care of the patient undergoing (ward)
6. BD-00-07-40063 – Pacemakers: Temporary Transvenous Pacemakers, Management of (Adult)

References:

1. Sidebotham, D., McKee, A., Gillham, M., Levy, JH. (2007). *Cardiothoracic critical care.* Philadelphia, PA. Butterworth-Heinemann Elsevier.
2. Wilkoff, BL., Love, CJ., Byrd CL., Bongiorni, MG., Carrillo, RG., Crossley, GH. (2009). Transvenous lead extraction: Heart Rhythm Society expert consensus on facilities, training, indications, and patient management. *Heart Rhythm: The Official Journal of the Heart Rhythm Society. 6(7),* pp.1085-104.
3. 2017 HRS expert consensus statement on cardiovascular implantable electronic device lead management and extraction Fred M. Kusumoto, MD, FHRS, FACC et al; Heart Rhythm, Vol 14, No 12, December 2017 (retrieved October 2, 2018)
4. Transvenous Lead Extraction: A Step-by-Step Approach Varahan, S, et al. University of California, San Diego http://www.innovationsincrm.com/cardiac-rhythm-management/2011/january/42-transvenous-lead-extraction-step-by-step , retrieved October 2, 2018

Persons/Groups Consulted:

Clinical Nurse Specialist, Heart Rhythm and Transcatheter Heart Valve Programs

Clinical Nurse Leader CSICU

Nurse Educator Heart Centre 5B

CSICU Nursing Staff SPH

Revised By:

Nurse Educator CSICU SPH

Approved/Reviewed/Revised:

August: 2006

Revised: February 2011

November, 2018