External Permanent Pacemaker, Management of (Adult)

Site Applicability:

SPH

Practice Level:

Specialized

Registered Nurses who have completed a recognized cardiac monitoring course or equivalent and who successfully completed a written exam. Review of each nurse's competence in rhythm recognition will be conducted and documented every 2 years. Nurses must possess competency in identifying the rhythms and instituting appropriate interventions as per B-00-13-10011 - Cardiac Monitoring Protocol.

Need to Know:

Clinical Indication:

A temporary, external permanent pacemaker is used for pacemaker-dependent patients who undergo lead extraction but require a bridging period without a permanent implanted device before implant of a permanent pacing or ICD system, typically for treatment of infection.

- Cardiac devices and/or leads may require surgical removal due to infection, superfluous or failed leads. Major complications observed during lead extraction including life-threatening events occur in 0.2 to 1.2% of patients, typically bleeding or cardiac perforation. Minor complications include arrhythmias, arm swelling, thrombosis of implant veins, infection, hypotension, air embolism and pneumothorax.
- Lead extraction and/or device removal occurs in the operating room with a general anesthetic and recovery occurs in the Cardiac Surgery Intensive Care Unit (CSICU).
- After extraction of an infected lead or cardiac device, antibiotics may be required for long periods before implantation of a new pacing system.
- 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.
- The Heart Rhythm Society consensus statement recommends this approach to temporary pacing

as a safe treatment option for up to 14 days, depending on clinical status.

- Insertion of the external permanent pacemaker system will occur in the operating room at the time of lead extraction of the infected system. Patients will remain in CSICU overnight for recovery and then may be transferred to CICU or 5B as per Lead Extraction: Post Op Care protocol.

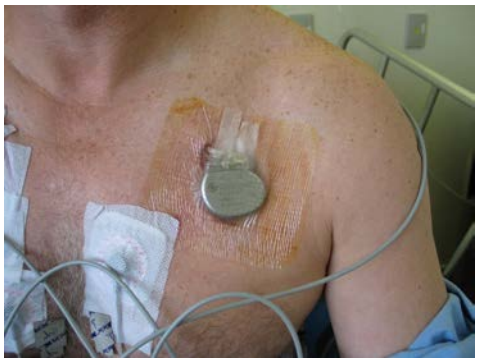
Equipment & Supplies

Venous access for insertion of the pacing lead will depend on patient anatomy, location of extracted pacing system and clinical indications.

Active-fixation pacing leads will be used and attached externally to a new permanent pacemaker generator.

The pacemaker parameters will be determined and set by the implanting physician at the time of implant using a standard manufacturer programmer.

The lead will be sutured to the skin adjacent to the portal of entry into the skin and underlying vein. The connected temporary permanent pacemaker system (lead and generator) will be securely taped to the patient using a Tegaderm dressing immediately post implant.



GUIDELINE

Initial Assessment & Interventions

Assessment and interventions as per B-00-13-10088 - Lead Extraction Post Op Care (CSICU), and B-00-13-10025 – Cardiac Surgery Post-Operative Care, but also include:

Initial Assessment	Intervention
Pulse generator and pacing leads secure and intact. Dressing is dry and intact.	If failure to pace, capture or inappropriate sensing is observed, notify electrophysiologist on call. Notify physician if TPPM dressing has increased drainage or dressing is disrupted.

Ongoing Assessment & Interventions

- Assessment and interventions as per NCS6356- Lead Extraction: Post Op Care, and NCS6154 Cardiac Surgery Post-Operative Care
- When iliac access is used; patient will remain on bedrest for 24 hours post implant. Then, mobilize with slow progression until full mobilization.

Transfer:

Patient may be transferred to the cardiac surgery ward as per B-00-13-10089 – Lead Extraction: Post-Operative Care (Ward)

Device interrogation is required prior to transfer to ensure appropriate pacing and sensing parameters.

Dressing care and management:

- Assessment and dressing care as per BD-00-12-40067- CVC Tunneled Central Venous Catheter (T-CVC-) Basic Care and Maintenance (Adult).
- The external permanent pacemaker site and dressing cannot be immersed in water and needs to be kept dry. Ensure dressing is adequately covered before showering.

Documentation:

Document assessments and interventions using the following:

1. 24 Hour Patient Care Flowsheet (Form no. NF427)
2. Nurses Notes (Form no. PHC-NF035)
3. (CSICU, CICU, PACU) Critical Care 24-Hour Flow Sheet (Form no. PHC-IC037)
4. (CICU only) Coronary Care Unit Nursing Physical Assessment Record (Form no. NF121)
5. (CSICU only) Assessment Record (Form No. NF072)
6. Heart Centre Care Map (Form no. NF279)
7. ECG Strip Flowsheet (Form no. PHC-IC004)

Patient /Family Education:

- Provide information resource: Lead Extraction as per FD.723.P114.PHC.
- Ensure patient teaching includes dressing care and management until permanent pacing system is implanted.
- After implant of permanent cardiac device; resources provided to the patient will be as per usual following a device implant.

Related Documents and Resources:

1. B-00-13-10088 - Lead Extraction Post Op Care (CSICU)
2. B-00-13-10089 – Lead Extraction: Post-Operative Care (Ward)
3. B-00-13-10011 - Cardiac Monitoring Protocol.
4. B-00-13-10017 - Physical Assessment (Critical Care Areas)
5. B-00-13-10096 - Physical Assessment (Cardiac Wards)
6. BD-00-12-40067- CVC Tunneled Central Venous Catheter (T-CVC-) Basic Care and Maintenance (Adult)

References:

1. Braun, M. U., Rauwolf, T., Bock, M., Kappert, U., Boscheri, A., Schnabel, A., & Strasser, R. H. (2006). Percutaneous lead implantation connected to an external device in stimulation-dependent patients with systemic infection—a prospective and controlled study. *Pacing and clinical electrophysiology*, *29*(8), 875-879.
2. Chihrin, S. M., Mohammed, U., Yee, R., Gula, L. J., Klein, G. J., Skanes, A. C., & Krahn, A. D. (2006). Utility and cost effectiveness of temporary pacing using active fixation leads and an externally placed reusable permanent pacemaker. *The American journal of cardiology*, *98*(12), 1613-1615.
3. Kawata, H., Pretorius, V., Phan, H., Mulpuru, S., Gadiyaram, V., Patel, J., ... & Birgersdotter-Green, U. (2013). Utility and safety of temporary pacing using active fixation leads and externalized re-usable permanent pacemakers after lead extraction. *Europace*, *15*(9), 1287-1291.
4. Kornberger, A., Schmid, E., Kalender, G., Stock, U. A., Doernberger, V., Khalil, M., & Lisy, M. (2013). Bridge to Recovery or Permanent System Implantation: An Eight-Year Single-Center Experience in Transvenous Semipermanent Pacing. *Pacing and Clinical Electrophysiology*, *36*(9), 1096-1103.
5. Kusumoto, F. M., Schoenfeld, M. H., Wilkoff, B. L., Berul, C. I., Birgersdotter-Green, U. M., Carrillo, R., & Exner, D. (2017). 2017 HRS expert consensus statement on cardiovascular implantable electronic device lead management and extraction. *Heart Rhythm*, *14*(12), e503-e551.
6. Pecha, S., Aydin, M.A., Yildirim, Y., Sill, B., Reiter, B., Wilke, I., Reichenspurner, H., Treede, H. (2013). Transcutaneous lead implantation connected to an externalized pacemaker in patients with implantable cardiac defibrillator/pacemaker infection and pacemaker dependency. Europace, 15(8), 1205–1209. https://doi.org/10.1093/europace/eut031.
7. Rastan, A. J., Doll, N., Walther, T., & Mohr, F. W. (2005). Pacemaker dependent patients with device infection—a modified approach. *European journal of cardio-thoracic surgery*, *27*(6), 1116-1118.

Persons/Groups Consulted:

Cardiac Surgeons

Cardiologists

Nurse Educators, CSICU, 5B

Developed By:

Clinical Nurse Specialist Heart Rhythm Program

Effective Date:	15-OCT-2018
Posted Date:	
Last Revised:	
Last Reviewed:	
Approved By: *(committee or position)*	PHC
	Professional Practice Standards Committee
Owners: *(optional)*	PHC
	Cardiology