

Children's National Hospital
Division of Nursing & Patient Services

Nursing Practice Guideline

Chapter: Cardiovascular 12

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Intracardiac Line Removal

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I. Introduction

A. Transthoracic Intracardiac Monitoring lines are frequently used to monitor patients post cardiac surgery. These lines are utilized to monitor pressures within the heart, provide reliable central access, and can assist with arrhythmia recognition (Gold et al., 1986). There is an overall low rate of serious complications and associated morbidities associated with intracardiac line use (Flori, Johnson, Hanley, & Fineman, 2000). Complications of removal can include retention or migration of catheter and bleeding (Beham et al., 2017). LA and PA lines have higher risk of complications historically (Gold et al., 1986).

B. Transthoracic Intracardiac Monitoring lines are used only in the Cardiac Intensive Care Unit (CICU), therefore this guideline is to be used for nurses in the CICU only.

C. This guideline outlines the nursing procedure for removing intracardiac lines. For the general maintenance and care of intracardiac lines, please refer to the Nursing Practice Guideline on [Central Venous Therapy](#) (Section V).

II. Definitions

A. Transthoracic Intracardiac Monitoring Lines- Intracardiac catheter placed during open-heart surgery to monitor pressure within the heart or structure. Tip of catheter is confirmed via chest x-ray. Intracardiac lines are named for the location of the termination of the catheter. Catheters may terminate in right atrium, left atrium, pulmonary artery or Fontan Conduit. Most patients will have intracardiac dressings separate from but adjacent to the mid sternal dressing. Stress loops should be included under dressing.

III. Procedure

A. Removal of an Intracardiac Line

1. Pre-Procedure Requirements for Nurses

- a. Nurses must have attended an education session conducted by Cardiovascular Surgery (held on PRN basis as need arises).
- b. Nurses must have competency completed (Appendix A).
 - i. Competency will require three precepted intracardiac line removal pulls. The initial is to be in done in the presence of a CV Surgeon, fellow, or PA. The other 2 may be precepted by a CICU Nurse Educator or CV surgeon, fellow or PA.

Guidelines for Intracardiac Line Removal					
Line to be removed	Contraindications/ Caution	Goal PT/INR	Intervention if elevated	Heparin Infusion stop time prior to removal	Special Considerations
Right Atrial (RA) line (Including common atrial lines and LA lines in single ventricle patients)	<ul style="list-style-type: none"> Patients on ECMO 				<ul style="list-style-type: none"> RA line to be removed prior to CT removal No RA line removal after 1400
Left Atrial (LA) line (True LA lines are placed in patients after a biventricular repair)	<ul style="list-style-type: none"> Patients on ECMO/VAD Patients on Heparin with PTT>60 INR>1.5 	<ul style="list-style-type: none"> PT<15 INR<1.5 Platelet count>100000 	<ul style="list-style-type: none"> Re-evaluate indication for line removal with ICU team/surgeons Platelet transfusion if counts low FFP 10ml/kg (no need to recheck coagulation study, unless patient is actively bleeding) 	4 hours	<ul style="list-style-type: none"> Ensure one unit of PRBCs is available in blood bank Always remove LA line prior to CT removal No LA line removal after 1400
Pulmonary Artery (PA) line ONLY REMOVED BY CV SURGERY TEAM	<ul style="list-style-type: none"> Patients on ECMO/VAD Patients on Heparin with PTT>60 INR>1.5 	<ul style="list-style-type: none"> PT<15 INR<1.5 Platelet count>100000 	<ul style="list-style-type: none"> Re-evaluate indication for line removal with ICU team/surgeons Platelet transfusion if counts low FFP 10ml/kg (no need to recheck coagulation study, unless patient is actively bleeding) 	4 hours	<ul style="list-style-type: none"> Ensure one unit of PRBCs is available in blood bank Always remove PA line prior to CT removal PA lines are generally removed by third post-op day No PA line removal after 1400

2. Patient Requirements
 - a. Patients must meet certain criteria prior to line removal. Criterion can be referenced in the table below, organized by line type. No Transthoracic Intracardiac Monitoring line removal after 1400.
3. Supplies for Removal
 - a. Bedside emergency equipment: ambu bag and mask, suction, oxygen source
 - b. Adhesive remover
 - c. 2x2 Gauze
 - d. Chlorhexidine swab
 - e. Adhesive dressing, such as Suresite Window
 - f. Gloves
 - g. Suture removal kit
4. Removal Procedure:
 - a. When medical team and surgical team are in agreement that line should come out, LIP should place order to remove. Verify the order has been placed by LIP prior to proceeding. No Transthoracic line should be removed after 1400.
 - b. Verify the removal is for the correct patient by using patient's ID band.
 - c. Wash hands and don clean gloves.
 - d. Ensure cardio-respiratory monitor is in place and alarms are turned on.
 - e. Using adhesive remover, remove transparent dressing covering the site.
 - f. Cut and remove suture within/around the orange rubber bumper at the base of the line. DO NOT CUT SUTURE ON THE LINE.
 - g. Once the line is freed from sutures, slowly and steadily withdraw line, stopping if moderate resistance is encountered.
 - h. Remove entire line.
 - i. After removal check the tip of the line to ensure integrity of the catheter. If doubts, call CV Surgery Fellow immediately.
 - j. Wick away blood from the site using clean gauze.
 - k. In case of excessive bleeding (more than 10mL) from the line site - hold pressure on the site and call LIP/CV surgery fellow
 - l. Once bleeding has stopped, place an adhesive bandage over the site.
5. Post Procedure:
 - a. Evaluate patient for changes in hemodynamics, specifically for hypotension and tamponade.
 - b. Monitor removal site and dressing for recurrent bleeding.
 - c. Closely monitor for increased chest tube output.
 - d. Patient may transfer to the Heart and Kidney (HKU) Unit 2 hours after removal of the intracardiac line.
 - e. Document line removal in a procedure note.

IV. Patient/Family Education

- A.** Review the functions of the intracardiac line and reasons why it is no longer necessary.
- B.** Discuss the procedure for removal with the family and answer any questions that arise.
- C.** Inform family when line is going to be removed.

V. Documentation

- A.** Line removal is documented in a procedure note.

CERNER → Go to Documents → Click Add → Select Procedure note (drop down) → Add Title of Note: Intracardiac Line Removal

- B.** Procedure notes should follow this template:

1. Body of Note

- a.** Date/ Time of procedure
- b.** Medication and time given or non-pharmacological pain intervention used
- c.** Pain Scale utilized (FLACC, Numeric, Faces)
 - i.** Pre Pain Scale level 0-10
 - ii.** Post Pain Scale level 0-10
- d.** Type of distraction used: music, play, Ipad, etc.
 - i.** If distraction was not used, explain why.
- e.** Procedure: RA/LA/PA line removal
- f.** How the patient tolerated the procedure

2. Plan:

- a.** Monitor for bleeding
- b.** If any complications were noted, explain follow-up interventions and reassessment plan.

VI. References

Beham, K., Dave, H., Kelly, J., Frey, B., Hug, M. & Brotschi, B. (2017). Transthoracic intracardiac catheters in pediatric cardiac patients: A single-center experience. *Pediatric Anesthesia*, 27, 918-926. Flori, H., Johnson, L. (Level IV)

Gold, J., Jonas, R., Lang, P., Elixson, E., Mayer, J. & Castaneda, A. (1986). Transthoracic intracardiac monitoring lines in pediatric surgical patients: A ten-year experience. *The Annals of Thoracic Surgery*, 42(2), 185-191. (Level IV)

Hanley, F. & Fineman, J. (2000). Transthoracic intracardiac catheters in pediatric patients recovering from congenital heart defect surgery: Associated

complications and outcomes. Critical Care Medicine, 28(8), 2997-3001.
(Level III)

Verger J, Lebet R. AACN Procedure Manual for Pediatric Acute and Critical Care. St. Louis, 2008. Saunders Elsevier

VII. Reviewers

- A. CICU Education Team
- B. CICU Safe Practice Council
- C. CICU Nursing Director
- D. CICU Medical Unit Director
- E. CV Surgery Attending
- F. Shared Nursing Leadership Quality & Safe Practice Council – Systems Level

VIII. Legal Statement

The nursing practice guidelines are intended to serve as a reference for the nurses in their practice. The compilation of information provided is drawn from relevant literature research from juried, reliable and respected sources. The guidelines are not intended to replace individual judgment but instead to inform decision making. The material is updated approximately every 12-24 months.

IX. Approval

Senior Vice President & Chief Nursing Officer

Date

Original Date: 7/17
Revised Date(s): 3/19,
3/21, 4/23

Appendix A: Competency for Intracardiac Line Removal

NAME:	CARDIAC INTENSIVE CARE UNIT (CICU)
EMPLOYEE ID:	DATE COMPLETE:

COMPETENCY VALIDATION CHECKLIST: Intracardiac Line Removal Competency

COMPETENCY STATEMENT: 3 Successful Intracardiac line pulls must be demonstrated to validate competency.

Validation Key: VF = Verbal Feedback, OB = Observation, D = Discussion, RD = Return Demonstration

Performance Criteria	Method of Validation	Validator Initials			Comments
Prerequisite Knowledge: Explains indication(s) for placement & removal.	VF D				
CICU RN must attend education session conducted by CV Surgeon	VF D				Date Attended:
Explains possible complications with intracardiac line removal.	VF D				
Explains rational to the patient/family purpose of procedure, risks & process of procedure	VF D				
Demonstrates proper hand hygiene and standard precautions.	RD				
Identify the patient using two identifiers per hospital policy.	RD				
Refers to Guidelines for Removal of intracardiac line (Section 3 of NPG) to evaluate labs and any necessary interventions	RD				
Gathers necessary equipment: <ul style="list-style-type: none"> • Bedside emergency equipment: ambu bag and mask, suction, oxygen source • Suture removal kit • Adhesive remover • Chlorhexidine swab • 2x2 Gauze with Adhesive dressing • Gloves 	RD				
<i>Must successfully Return Demonstrate (RD) 3 intracardiac line removals to validate competency.</i>		#1	#2	#3	
Demonstrate the following <ul style="list-style-type: none"> • Ensure an order has been placed by the LIP to remove the line • Identify the patient using two identifiers per hospital policy. • Wash hands and don clean gloves • Ensure cardio-respiratory monitor is in place and alarms are on • Using adhesive remover, remove transparent dressing covering site • Cut and remove suture within/around the orange rubber bumper at the base of the line. DO NOT CUT SUTURE ON THE LINE. • Slowly and steadily withdraw line, stopping if moderate resistance is encountered. • Remove entire catheter. • Wick away blood from the site using clean gauze. • In case of excessive bleeding from the line site - hold pressure on the site and call LIP/CV surgery fellow • Once bleeding has stopped, place an adhesive bandage over the site 	RD				
<i>Post Line Removal</i>		#1	#2	#3	
<ul style="list-style-type: none"> • Evaluate patient for changes in hemodynamics, specifically hypotension and tamponade • Closely monitor for increased chest tube output • Patient may transfer to HKU 2 hours after removal of intracardiac line 	RD				

Completing the Procedure		#1	#2	#3	
Remove gloves and wash hands.	RD				
Document procedure in the medical record in a procedure note.	RD				
Obtains post pain assessment using appropriate pain scale	RD				

Reference: Verger J, Lebet R. AACN Procedure Manual for Pediatric Acute and Critical Care. St. Louis, 2008. Saunders Elsevier

	Preceptor Name (Please Print)	Initials	Date
#1			
#2			
#3			