Transfemoral, Transcatheter Aortic Valve Implantation, Post-procedure Care

Site Applicability

PHC: Cardiac Critical Care (CICU, CSICU) & Cardiac wards
VCH: VGH Cardiac Cath Lab & CCU

Practice Level

RN: Advanced skill

- Cardiac monitoring skills; critical care nursing skills required for immediate post-operative period

Need to Know

Aortic stenosis (AS) is a narrowing of the aortic valve orifice. Valve replacement is the treatment of choice of severe AS. Surgical aortic valve replacement (SAVR) is the established surgical approach. Transcatheter aortic valve implantation (TAVI) is a minimally invasive option. TAVI can be performed using a transfemoral (TF) approach (i.e. through the femoral artery) or a non-TF approach (e.g. transapical, direct aortic). The prosthetic aortic valve is delivered via an arterial sheath and is placed within either a native aortic valve or within a previously replaced aortic valve as a valve-in-valve (ViV) (see Table 1).

Table 1: Common TF-TAVI sheath access sites

	Site(s)	Purpose	Size	Closure
ARTERIAL	2 femoral arterial puncture sites are common	1 sheath for delivery of valve prosthesis	14 – 20 Fr	Vascular closure devices are commonly used (e.g. Perclose ProGlide)
		1 sheath for angiogram	5 – 7 Fr	Closure device (e.g. Angioseal) or arterial clamp
VENOUS	1 femoral venous puncture site is common	Venous sheath used for intra-procedure temporary pacing wire	7 Fr	Manual pressure

Depending on the patient's risk profile and procedural requirements, TF-TAVI may be performed under general anesthesia (GA) or awake with local anesthetic with or without sedation. When GA is used, patients require intra-procedure intubation and valve placement is usually guided with transesophageal echo (TEE). When patients are awake, a post-procedure transthoracic echo (TTE) is required (i.e. in the procedure lab, cardiac recovery area, or CICU) to confirm valve placement/function unless otherwise indicated by the implanting physician.

Early removal of invasive lines (e.g. procedural sheaths, hemodynamic monitoring lines, indwelling urinary catheters), early mobilization, and early discharge planning are essential to promote optimal recovery after TF-TAVI.

Practice Guideline

Post-procedure assessment TF-TAVI

INITIAL NURSING ASSESSMENT	INTERVENTIONS

Immediately following patient's arrival into the CICU/cardiac care recovery area, the RN will assess and document:
 	
• Neurological status: GCS, stroke assessment.
  o Ask patient to smile; inspect for facial symmetry or changes from baseline
  o Note speech characteristics; look for slurring
  o Ask patient to raise arms and grip; screen for asymmetrical weakness/numbness.
 	
If GA intra-procedure: In addition to above, assess RASS
 	
• VS (BP, HR, RR, SpO2 or SaO2, T): Measure NBPs bilaterally x 1
 	
• Cardiac rhythm; ST segment analysis as applicable
 	
• Heart sounds: clarity
 	
• Breathing and breath sounds: Respiratory qualities including chest expansion and use of accessory muscles and effort.
 	
If GA intra-procedure: In addition to above, auscultate over trachea and examine for signs of stridor or respiratory impairment
 	
• Characteristics of any percutaneous sheath introducers in situ and/or procedural puncture sites:
  o Determine whether sheath(s) and/or puncture sites are arterial or venous
  o Observe for signs of bleeding (blood at sites, swelling or palpable hematoma, bruising)
 	
• Limb perfusion: colour, warmth, movement, sensation, palpate peripheral pulses (or use doppler)
 	
• Pain
  • Access sites; back/postural pain
	Use active re-warming to manage hypothermia (e.g. temperature less than 36°C)
	PHC: see NCS5063 – Warming Blanket
	VGH: see C-155 – Care of the Post Anesthetic Patient in Phase I
	
	AV blocks are the most severe arrhythmia associated with TAVI. Monitor for conduction abnormalities; notify most responsible physician (MRP) if new onset AV block occurs
	
	If temporary pacing wire in situ:
	Assess and secure pacing wire and pulse generator: see VCH/PHC Temporary Transvenous Pacemakers, Management of (Adult)
	
	Avoid opioids and sedative-hypnotics to minimize risk of delirium; optimize repositioning

ONGOING NURSING ASSESSMENT	INTERVENTIONS
VITAL SIGNS: ***If TF-TAVI procedure done awake (i.e. local anesthesia only):*** • Monitor VS Q15min x 4, Q1H x 4, Q4H x 4, and then per unit routine. - OR - ***If GA or conscious sedation used intra-procedure:*** • Monitor VS Q15min x 4, Q30min x 2, Q1H x 4, Q4H x 4, and then per unit routine	Notify the cardiology physician immediately if post-procedure assessment findings reveal: • Diminishing LOC, asymmetrical physical responses that are changes from baseline • Hemodynamic instability • Arrhythmias including AV block • Decreasing QRS amplitude • Distant or muffled heart sounds • Labored respiratory efforts, increasing supplemental oxygen requirements, and/or asymmetrical chest expansion • Urine output less than 0.5 mL/kg/hr or urinary retention not responsive to nursing interventions Notify interventional/implanting physician and cardiology physician if: • Active bleeding or expanding hematoma at any percutaneous sheath insertion and/or puncture site(s) • Signs of diminished peripheral circulation or limb ischemia (e.g. diminished pulse strength, cool skin, pale/dusky skin pallor, new sensory changes such as numbness/tingling) • New AV block • Change in clinical status
VASCULAR ASSESSMENT: • Assess vascular access sites and extremities Q15min x 4, Q30min x 2; Q1H x 4, Q4H x 4, and then per unit routine if groin stable.	
NEURO ASSESSMENT: • Monitor NVS Q15min x 4, Q30min x 2, Q1H x 4, Q4H x 4, and then routine. ***If GA or conscious sedation used intra-procedure:*** • Assess sedation using sedation assessment tool (e.g. RASS or sedation score): o on admission, then o q5min if unconscious/reacting o q10min if responding o q15min if conscious Once patient is conscious for 3 consecutive assessments, assess sedation: o Q30min x 1, then o Q1H and PRN	
PHYSICAL ASSESSMENT: • As per unit routine.	

Post-Procedure Clinical Pathway

	0 to 6 Hours	6 to 12 Hours	12 to 18 Hours	18 to 24 Hours	24 to 36 Hours
GOALS	Facilitate removal of all invasive lines. Promote early mobilization.		Transfer out of critical care as soon as clinically indicated to facilitate mobilization, nutrition, and the return of baseline elimination patterns. In the absence of complications, the expected length of stay for TF-TAVI is 1 to 4 days.		
PAIN/DISCOMFORT	Assess and treat pain/discomfort as required: • Assess puncture sites • Back/postural pain		No pain/discomfort anticipated.		
ACTIVITY	HOB flat x 2 hours; increase HOB to 30 degrees after 2 hours; and then bedrest for additional 2 to 6 hours (as ordered by implanting physician)	Once 4 to 8 hours of continued hemostasis (as ordered) is achieved: • Dangle patient at bedside If patient tolerates dangle and hemostasis is sustained: • Transfer to commode • Mobilize short distance in room	• Transfer to commode • Up in chair for meals • Mobilize short distances in and out of room • Encourage self-care behavior • Facilitate uninterrupted rest/sleep and return to diurnal cycle		• Up in chair for meals • Mobilize for 5 to 10 minutes every 4 to 6 hours while awake • Encourage self-care behavior • Facilitate rest
CENTRAL LINES & IV THERAPY	**If hemodynamics are stable:** remove central line(s) within 4 to 6 hours	Once drinking, saline lock and maintain peripheral IV(s).			Remove peripheral IV saline lock prior to discharge home
INVASIVE HEMODYNAMIC MONITORING (e.g. arterial line)	Monitor arterial line as per unit standard **If hemodynamics are stable:** remove peripheral arterial line within 4 to 6 hours	N/A			
CARDIAC MONITORING	Continuous			May discontinue for intermittent self-care	

	0 to 6 Hours	6 to 12 Hours	12 to 18 Hours	18 to 24 Hours	24 to 36 Hours
VENOUS SHEATHS	If venous sheath in situ **and hemodynamics are stable:** remove venous sheaths as per: **SPH:** NCS6319 Cardiac Cath Lab: Post Procedure. **VGH:** F-045	N/A			
ARTERIAL SHEATHS	If arterial sheaths in situ **and hemodynamics are stable:** D/C arterial sheaths (less than 8F) as per: **SPH:** NCS6319 - Cardiac Cath Lab: Post Procedure. **VGH:** F-045	N/A			
ELIMINATION:	Avoid indwelling catheter: To promote elimination, assess hydration status and monitor for signs of dehydration (e.g. decreased urinary output, concentrated urine, dry mouth, thirst, headache)				
Voiding	Facilitate voiding within 4 hours of end of procedure. If unable to void and expressing discomfort: Consider bladder scan. **PHC:** if greater than 200 mL, consider in and out catheter as per NCS6405 - Urinary Catheters. **VGH:** if greater than 400 mL, consider intermittent catheter per D-00-12-30111	Mobilize to commode For men, consider facilitating voiding in standing position	Mobilize to commode and/or washroom with assistance	Mobilize to washroom with assistance	
Urinary Catheter	If procedural urinary catheter in situ: **when urine output greater than 30 mL/hour for 6 hours**, remove urinary catheter (do not interrupt sleep to D/C catheter; remove by 0900 POD 1, at the *latest*)		N/A		

	0 to 6 Hours	6 to 12 Hours	12 to 18 Hours	18 to 24 Hours	24 to 36 Hours
DIET/NUTRITION & HYDRATION	Keep NPO until clinically stable and hemostasis achieved and then encourage PO intake	Light dinner. Up in chair		Continue to assess hydration status. Encourage nutritional intake and preferred foods. Goal: 3 meals and 1 to 2 snacks in 24 hours. Encourage fluids if LVEF greater than 35% as per physicians orders.	
PATIENT TEACHING	Provide patient teaching about maintaining vascular hemostasis (e.g. avoid lifting head, support groin when sneezing and/or coughing)	Provide coaching to support reconditioning interventions (e.g. mobility)		Initiate "Discharge Guidelines Transcatheter Heart Valve Patients" checklist Review "Going Home After a Transcatheter Heart Valve Procedure" patient teaching	
DISCHARGE PLANNING	Confirm discharge plan with patient and family			Assess readiness for discharge Complete discharge guidelines and review with patient/family Communicate anticipated challenges with MRP	At time of discharge: Ensure patient has 1. Discharge brochure 2. Completed discharge guidelines 3. Prescription and/or lab requisitions

Patient Education and Resources

Discharge Guidelines:

- **PHC:** transcatheter heart valve patients (Form No. HH123)

Patient Education Materials: order from VCH or PHC

- Deciding to Have a Transcatheter Aortic Valve Implantation. FD.635.D356.PHC (R.Nov-13)
- Going Home After a Transcatheter Heart Valve Procedure. FD.635.G561.PHC (R.Nov-13)
- You Are Having a Transcatheter Aortic Valve Implantation: Getting Ready for the Procedure. FD.635.T687.PHC (R.Nov-13)

Documentation

PHC	VGH
1. **Nurses Notes** (PHC-NF035): 2. **Critical Care 24-Hour Flow Sheet** (PHC-IC037): Pre- and post- procedure VS, Hemodynamic parameters as available. **3. CICU only:** **Coronary Care Unit Nursing Physical Assessment Record** (PHC- NF121): Document physical assessment findings 4. **CSICU only:** **Department of Nursing CSICU Assessment Record** (PHC- NF072): Document physical assessment findings 5. **5A only:** **24 Hour Flowsheet (5AB)** (PHC-NF427) Document physical assessment findings 6. **Heart Centre Care Map** (PHC-NF279): Document patient care goals and progress 7. **ECG Strip Flowsheet** (Form no. PHC-IC004): Document	1. **Nursing Admission Assessment** (VCH.VA.VGH.0594): Document admission assessment 2. **Nurses Notes** (form M-29B) 3. **Critical Care Flowsheet** (VCH.VA.VGH.0468): Pre-and post- procedure VS, Hemodynamic parameter as available for first 24 hours in CCU 4. **Critical Care Assessment Record** (VCH.0339): Document physical assessment findings 5. **VS Record** (M-37): Document VS after first 24 hour Critical Care Flowsheet finishes 6. **24 Hour Fluid Record** (M-342A): Document fluid balance after first 24 hour Critical Care Flowsheet finishes

Related Documents:

VCH-PHC:

- Temporary Transvenous Pacemakers, Management (BD-00-07-400630)
- Non-Tunneled Central Venous Catheter (NT-CVC) - Basic Care and Maintenance (adult) (BD-00-12-40045)

PHC:

- NCS5096: Neurovascular Assessment (CWMS)
- NCS6045: Cardiac Monitoring, protocol
- NCS5074: ST Segment Monitoring
- NCS6319: Cardiac Cath Lab: Post Procedure
- NCS6074: Physical Assessment (Critical Care Areas), protocol
- NCS6367: Physical Assessment of Patient on a Cardiac Ward, protocol for
- NCS6044: Pain: Acute Postoperative, Patient Care
- NCS5063: Warming Patient Using Forced Air Warmer
- NCS6405: Urinary Catheters: Management for the Prevention of UTI
- NCS6075: General Anesthetic: PACU Care Following, protocol for (PHC)

VCH:

- VCH.VA.PPO.802: Transcatheter Heart Valve Implantation Post-Op Orders
- D-00-12-30065: Orthopedic Neurovascular Assessment
- P-250: Pre and Post Percutaneous Coronary Intervention (PCI) and Angiogram
- P-075: Pain Assessment and Documentation
- C-155: Care of the Post Anesthetic Patient in Phase I
- D-00-07-30110: Indwelling Urinary Catheters, Guideline to prevent CAUTI - Adult

References

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2. Hawkey, M., Lauck, S., Perpetua, E., Fowler, J., Schnell, S., Speight, M., Lisby, K.; Webb, J., Leon, M. (2014). Transcatheter aortic valve replacement program development: Recommendations for best practice. *Catheterization and Cardiovascular Interventions*, 85(6), 859-867.
3. Lauck, S., Wood, D., Achtem, L,, Baumbusch., Boone, R., Cheung, A., Dvir, D., Stub, D., Tan, J., Ye, J., Webb, J. (2014). Risk stratification and clinical pathways to optimize length of stay after transcatheter aortic valve replacement. *Canadian Journal of Cardiology*, 30(12), 1583-1587.
4. Lauck, S., Mackay, M., Galte, C., Wilson, M. (2008). A new option for the treatment of aortic stenosis: Percutaneous aortic valve replacement. *Critical Care Nurse*, 28(3), 1-15.

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VCH: *(Regional SharePoint 2nd Reading)*
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PHC: Professional Practice Standards Committee

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