Cardiac Surgery Clinical Pathway

Site Applicability

Vancouver General Hospital

Pathway Patient Goals

1. Post-operative complications will be prevented by:
    - Extubation within 4 hours post-op
    - Transfer out of CSICU POD 1
    - Discharge home or out of ward by POD 5
2. The patient will report pain below 3/10 or adequate for mobilizing and Deep Breathing & Coughing (DB&C) exercises.
3. Readmission will be prevented by providing effective discharge planning and teaching to patient and caregivers.

Inclusion Criteria

- All patients having aortic valve, mitral valve, tricuspid valve, coronary artery bypass surgery and ascending aortic surgery.

Exclusion Criteria

- Descending aorta repair, TEVAR, and minimal invasive surgeries.

Instructions

1. Review pathway once per shift for patient care goals and expected outcomes
    a. A variance must be documented when expected outcomes have not been met or interventions not given. The variance is documented each shift until resolved
2. Do not document on this pathway, complete documentation in the Electronic Health Record (Cerner) or paper chart as per policy.

Pre-Op Assessment – Inpatient Unit	
CARE CATEGORIES DAILY TASKS AND ACTIVITIES	**EXPECTED OUTCOMES**
Diagnostics & Other Assessments ▪ Diagnostic blood work as per pre-printed pre-op order sets (unless done and available within 48 hours of admission) ▪ Type & cross match 2 units PRBC ▪ Capillary blood glucose QID (for diabetic patients) ▪ PA and left lateral CXR (unless done within 48 hours and available for inter-hospital transfer or within 6 weeks for elective patients ▪ ECG (unless done within 48 hours of admission and available) ▪ +/- echocardiogram, carotid Doppler studies ▪ Consent for OR and blood transfusion completed ▪ Old chart ordered ▪ Pre-op checklist initiated ▪ Telemetry as per orders	• Physician aware of abnormal blood work results • Pre-op checklist in patient's room • Diagnostic tests completed or booked • Consents signed as per PAC protocol
Consults ▪ Anesthesia ▪ Psychiatry ▪ Other consults as ordered	
Patient/Family Teaching ▪ Review surgery planned (estimated length of OR time, CSICU and hospital stay) with patientand family ▪ Arrange to view pre-op video ▪ Review medication instructions, NPO, chlorhexidine wipes ▪ Orientation to CSICU and cardiac ward ▪ Review cardiac surgery patient guide with patient and family; ▪ Post-op mobility limitations and sternal precautions ▪ Possible changes in mood/depression ▪ Post-op delirium and management protocol ▪ Importance of deep breathing and coughing post-op ▪ Maintaining optimal nutritional status and bowel hygiene	• Instructions for admission and surgical preparationreviewed with patient and family • Patient and family have watched pre-op video andreviewed post-op expectations and potential complications with nurse • "Cardiac Surgery Patient Guide" reviewed with patientand family • Patient and family understand post-op course andpossible complications
Discharge Planning ▪ Discuss expected length of stay ▪ Discuss usual hospital post-op course ▪ Discuss post-op home needs	• These discussions have taken place with patient and when possible with family.

Day of Surgery POD 0 (CSICU)	
CARE CATEGORIES DAILY TASKS AND ACTIVITIES	**EXPECTED OUTCOMES**
Safety	• Bedside safety check completed
Key Diagnostics & Other Assessments ▪ Blood work, ABG's as ordered ▪ Glucose monitoring as ordered ▪ Portable CXR, ECG (unless A-V, or V paced) on admission to unit	• The results of the following are within acceptable range: CBC, electrolytes, urea, creatinine, glucose, coagulation status • CXR completed and reviewed by MD • ECG completed and reviewed by MD
Central Nervous System ▪ Sedation and analgesic administered as per pre-printed orders • Delirium screening as per nursing protocol	• Patient reports pain control as adequate or 3/10 • No evidence of delirium (ICDSC < 4)
Cardiovascular System ▪ Nursing assessment and vital signs frequency as per nursing standard ▪ Maintain CI above 2.2 L/min/m^2 ▪ Maintain SBP 90 to 120 mmHg (unless otherwise specified) ▪ Maintain HR as per order ▪ Temporary pacing as per nursing standards • Monitor CT drainage with vital signs	• Patient in stable cardiac rhythm • Normothermic (Temp 36□ to 37.5□ C) within 2 hours post-op • Hemodynamically stable • CT drainage less than 150 mL/h for the first 4 hrs; then less than 50 mL/h
Respiratory System ▪ Maintain PaO2 above 80 mm Hg ▪ Maintain SpO2 above 92% as per respiratory standard ▪ Assess weaning criteria respiratory standard • Extubate within 4 hours post-op	• Lung sounds within normal parameters for patient • Chlorhexidine mouthwash pre/post extubation • Extubated within 4 hours post-op or as asssessed
Gastrointestinal System ▪ NPO ▪ Screen for dysphagia post extubation	• Nausea and vomiting absent or controlled with antiemetic • Tolerating clear fluids • Nursing Bedside Swallow Screen completed
Genitourinary System ▪ Maintain urine output between 0.5 to 1 mL/kg/h ▪ CAUTI precaution (no dependent loop, secured catheter, change collecting container daily and label)	• Urine output is between 0.5 to 1 mL/kg/h • Catheter secured and pericare/catheter care completed Qshift
Skin ▪ Assess using Braden Scale (PHC-EL029) with first repositioning post-op ▪ Dressings assessed as per nursing standard	• Braden scale risk assessment score completed • Dressing dry and intact • Remove Hemovac if drainage < or = to 20 ml/hr • ABI assessed and Coban™ applied, as applicable
Mobility ▪ Falls Risk Assessment prior to first mobilization ▪ Dangle and stand if extubated and hemodynamically stable	• Falls Risk Assessment Score is less than 45 less

Medications ▪ Inotropes titrated to maintain hemodynamic parameters as per orders • Insulin sliding scale as ordered	• Inotropes weaned off • Blood glucose as per protocol
Consults • As needed: Psychiatry, Endocrine, Social Work, Pastoral Care, Nephrology	• Consults performed as ordered
Patient/Family Teaching • Oriented to plan of care for the next 24 hours • Sternal precautions • Pain scale and use of analgesics • Deep breathing and coughing	• Patient and family understand plan of care • Patient & family understand sternal precautions, importance of deep breathing and coughing • Patient & family understand pain control management

Post-Operative Day 1 (CSICU / WARD)	
CARE CATEGORIES DAILY TASKS AND ACTIVITIES	**EXPECTED OUTCOMES**
Key Diagnostics & Other Assessments ▪ Blood work as per orders ▪ Nursing assessment and vital signs frequency as per nursing standard ▪ Vital signs Q4H x 24 when on ward	• Blood work results are within acceptable range • Temp 36°C to 37.5°C
Central Nervous System ▪ Analgesic administered as ordered ▪ Delirium screening as per nursing standard	• Patient reports pain control as adequate or 3/10 • No evidence of delirium as per ICDSC score < 4
Cardiovascular System ▪ Remove chest tubes, PA lines and arterial lines if hemodynamically stable, as per nursing standard ▪ Epicardial pacing and care of wires as per nursing standards and as MD orders ▪ **Ward:** ECG strips Q12H and with a change in rhythm ▪ CXR following chest tube removal	• Patient in stable intrinsic cardiac rhythm • Invasive monitoring lines removed • Chest tubes removed as ordered (if less than 100ml for 4 hours) • Chest X-Ray 2 hours post CT removal and reviewed by MD • Hemodynamically stable
Respiratory ▪ Wean from O_2 and maintain SpO_2 above 92% ▪ Deep breathing & coughing Q1H (spirometer) ▪ Mouth care: AM and HS + PRN (pneumonia prevention)	• No signs of respiratory complications • Patient reminded of mouth care after each meal
Gastrointestinal System ▪ Clear fluids to Regular Diet ▪ +/- Diabetic diet, fluid restricted diet ▪ Screen for dysphagia	• Tolerating prescribed diet • No nausea & vomiting • Bowel protocol initiated
Genitourinary System ▪ Daily weight ▪ In + Out ▪ CAUTI precaution (no dependent loop, secured catheter, change collecting container daily and label)	• Urinary catheter drains between 0.5 to 1 mL/kg/h • Catheter secured and pericare/catheter care completed Qshift
Skin ▪ Dressing assessment and care daily ▪ Tubes and drains removed according to unit policy or MD order	• Dressing(s) dry and intact. Reinforce PRN • COBAN intact (if applicable) • No evidence of skin breakdown • Drains removed
Mobility ▪ Up in chair for all meals or TID ▪ Falls Risk Assessment as required ▪ Mobilize as tolerated	• Up in chair for meals or TID • Falls Risk Assessment Score is less than 45
Medications ▪ IV insulin infusion or sliding scale insulin as ordered	• Blood glucose as ordered • Inotropes weaned off (document time)

▪ Wean inotropes off ▪ VTE prophylaxis initiated ▪ Assess and initiate anticoagulation as ordered ▪ Analgesics as ordered ▪ Resume pre-op medications as appropriate	
Consults ▪ Endocrine as per transfer orders ▪ As needed: Psychiatry, Social Work, Pastoral Care	• New Consults initiated as ordered
Patient/Family Teaching ▪ Oriented to plan of care for the next 24 hours **Review:** ▪ Sternal precautions ▪ Pain scale and use of analgesics ▪ Deep breathing and coughing	• Patient and family understand plan of care • Patient & family understand sternal precautions, importance of deep breathing and coughing • Patient & family understand pain control management
Discharge Planning ▪ Discuss length of stay ▪ Discuss goals for the day (i.e.: exercises, pain management, rest)	• Patient and family aware of discharge goals/plans

Post-Operative Day 2 (POD2)	
CARE CATEGORIES DAILY TASKS AND ACTIVITIES	**EXPECTED OUTCOMES**
Key Diagnostics & Other Assessments ▪ Blood work as ordered ▪ MD or Pharmacist to determine target INR and required anticoagulation ▪ Nursing assessment as per nursing standard	• Physician and/or NP aware of abnormal results • Anticoagulation, INR discussed; target set • Temp 36°C to 37.5°C
Central Nervous System ▪ Delirium screening as per nursing standard ▪ Analgesic administered as ordered	• No evidence of delirium (ICDSC < 4) • Patient reports pain control as adequate
Cardiovascular System ▪ Vital signs Q4H (0200h assessment at RN discretion) ▪ ECG strips Q12H and with a change in rhythm ▪ Epicardial pacing and care of wires as per nursing standard and as per MD orders	• Vital signs within normal limits for patient • Patient in stable intrinsic cardiac rhythm
Respiratory System ▪ Wean from O_2 and maintain SpO_2 above 92% ▪ Wean from O_2 and maintain SpO_2	• Mouth care of each meals • No signs of respiratory complications
Gastrointestinal System ▪ Screen for dysphasia as indicated ▪ Full fluid to Regular Diet +/- Diabetic diet, fluid restricted diet ▪ If no BM x 24 hrs, follow protocol	• Screen for dysphagia • Tolerating prescribed diet • No nausea & vomiting • Bowel movement daily
Genitourinary System ▪ Daily weight ▪ Remove urinary catheter at 0600	• Urinary catheter removed • Voiding without difficulty
Skin ▪ Incision assessment and care daily	• Dressing(s) dry and intact. Reinforce PRN ○ No evidence of skin breakdown • Braden scale risk assessment completed
Mobility ▪ Falls risk assessment ▪ Mobilize as tolerated	• Falls risk assessment score is less than 45 • Ambulating in hallway 2-3 times • Up in chair for meals or TID and to washroom PRN
Medications ▪ Anticoagulation initiated as ordered ▪ VTE prophylaxis as per orders ▪ Glycemic control as per orders ▪ Diuresis to target weight as per orders	• Anticoagulation initiated as per MRP orders • Blood glucose as ordered
Consults • Dietitian if not progressing to prescribed diet • Reassess need for: Social work, Pastoral Care, SLP, OT, PT • Heart Function Team if ordered	• No additional consults required • New consults initiated as ordered
Patient/Family Teaching Review:	

• Incision care • Mood changes • Sternal precautions • Pain management • Delirium • Deep breathing and coughing	• Patient and family have reviewed 'Cardiac Surgery Patient Guide' with nurse and understand post-op care and management
Discharge Planning ▪ Discuss length of stay ▪ Goals of the day ▪ Who's your support person when you're going to be home?	• Discussion on these topics took place

Post-Operative Day 3 (POD3)	
CARE CATEGORIES **DAILY TASKS AND ACTIVITIES**	**EXPECTED OUTCOMES**
Key Diagnostics & Other Assessments ▪ Blood work as per orders ▪ MD or pharmacist to determine target INR and required anticoagulation ▪ Nursing assessment as per nursing standard	• Physician and/or Nurse Practitioner aware of abnormal results • Temp 36°C to 37.5°C • INR at target
Central Nervous System ▪ Delirium screening as per nursing protocol ▪ Analgesic administered as per orders	• No evidence of delirium (ICDSC < 4) • Patient reports pain control as adequate
Cardiovascular System ▪ Vital signs Q6H ▪ ECG strips Q12H and with a change in rhythm	• Vital signs within normal limits for patient • Patient in stable intrinsic cardiac rhythm
Respiratory System ▪ Maintain SpO_2 above 93% on room air	• Mouth care after each meals • No signs of respiratory complications
Gastrointestinal System ▪ Regular diet +/- Diabetic diet, fluid restriction ▪ If no BM x 48 hrs, follow protocol	• Bowel movement daily • Tolerating diet
Genitourinary System ▪ Daily weight	• Voiding without difficulty
Skin ▪ Incision assessment and care daily	• No evidence of skin breakdown • Sternal mepilex dressing removed, incision cleansed, well approximated, dry +intact. Incision left exposed • COBAN removed, incision assessed, cleanedand COBAN reapplied
Mobility ▪ May shower (insulate epicardial wires)	• Falls risk assessment score is less than 45 • Ambulating in hallway 3-6 times • Up in chair for meals and to washroom PRN
Medications ▪ Anticoagulation as per orders ▪ VTE prophylaxis as per orders ▪ Glycemic control as per orders ▪ Diuresis to target weight as per orders	• Blood glucose as ordered
Consults ▪ As needed: Psychiatry, SW, Pastoral Care, Nephrology	• New consults initiated as ordered
Patient/Family Teaching ▪ Review previous topics and educate as needed **Review**: ▪ Sleep hygiene ▪ Activity after discharge	• Patient and family have reviewed 'CardiacSurgery Patient Guide' with nurse and understand post-op care and management
Discharge Planning ▪ Goals of the day ▪ Education class (if able) ▪ Patient and family watches "Going home" video	• Discussion on these topics took place

▪ Initiate teaching as applicable: anticoagulation,smoking cessation, endocarditis, HF	

Post-Operative Day 4 (POD4)	
CARE CATEGORIES **DAILY TASKS AND ACTIVITIES**	**EXPECTED OUTCOMES**
Key Diagnostics & Other Assessments ▪ MD or pharmacist to determine target INR and required anticoagulation ▪ Nursing assessment as per nursing standard ▪ Vital signs Q12H **unless** otherwise indicated	• INR at target • Temp 36°C to 37.5°C
Central Nervous System ▪ Delirium screening as per nursing protocol ▪ Analgesic administered as per orders	• No evidence of delirium (ICDSC < 4) • Patient reports pain control as adequate
Cardiovascular System ▪ ECG strips Q12H and with a change in rhythm ▪ Epicardial pacing wires removed by MD or NP with nursing care as per standard (IV saline lock remains until discharge) ▪ Discontinue telemetry if NSR x 24 hours	• Vital signs within normal limits for patient • Patient in stable intrinsic cardiac rhythm • Epicardial pacing wires removed
Respiratory ▪ Maintain SpO_2 above 93% on room air	• Mouth care after each meals • No signs of respiratory complications
Gastrointestinal System ▪ Diet as ordered ▪ If no BM x 72 hrs, follow protocol and notify MD/NP	• No nausea & vomiting • Tolerating diet
Genitourinary System ▪ Daily weight	• Voiding without difficulty
Skin ▪ Incision assessment and care daily ▪ Discuss removal of surgical clips with MD/NP	• Incisions well approximated, dry and intact ○ No evidence of skin breakdown • Surgical clips removed as per MD/NP order • Braden scale risk assessment score completed
Mobility ▪ Encourage mobilization	• Falls risk assessment score is less than 45 • Ambulating in hallway 3-6 times per day • Up in chair for meals or TID and to washroom PRN
Medications ▪ Anticoagulation as per orders ▪ VTE prophylaxis as per pre-printed orders ▪ Glycemic control as per pre-printed orders ▪ Diuresis to target weight as per orders	
Consults ▪ As needed: Psychiatry, SW, Pastoral Care, OT, PT	• New consults initiated as ordered
Patient/Family Teaching ▪ Review previous topics and reinforce as needed **New topics**: ▪ Heart Health diet ▪ Risk factors counseling ▪ Resuming sex ▪ Return to work ▪ Driving	• Patient and family have reviewed 'Cardiac Surgery Patient Guide' with nurse and understand post-op care and management
Discharge Planning ▪ Discuss transportation plans ▪ Arrange PT/OT equipment PRN ▪ Coordinate TST needs with CML	• Discharge booklet started and information gathered • Discussion on these topics took place

Post-Operative Day 5 (POD5)	
CARE CATEGORIES DAILY TASKS AND ACTIVITIES	**EXPECTED OUTCOMES**
Key Diagnostics & Other Assessments ▪ MD or pharmacist to determine target INR and required anticoagulation	• INR at target
Central Nervous System ▪ Delirium screening as per nursing protocol ▪ Analgesic administered as per orders	▪ No evidence of delirium (ICDSC < 4) ▪ Patient reports pain control as adequate
Cardiovascular System ▪ Nursing assessment as per nursing standard ▪ Vital signs Q shift	• Pulse regular or same as pre-op • Vital signs within normal limits for patient
Respiratory	• Mouth care after each meals • No signs of respiratory complications
Gastrointestinal System	• Bowel movement daily
Genitourinary System ▪ Daily weight	• At target weight
Skin ▪ Expose surgical incisions to air ▪ Remove CT sutures 4 days post chest tube removal	• Incisions well approximated, dry and intact No evidence of skin breakdown • Chest tube sutures removed
Mobility ▪ Independent personal care	• Falls risk assessment score is less than 45 • Mobilizing independently on ward • Up in chair for meals or TID and to washroom PRN
Medications ▪ Anticoagulation as per orders ▪ VTE prophylaxis as per orders ▪ Glycemic control as per orders ▪ Diuresis to target weight as per orders	• Blood glucose as ordered
Consults As needed: Psychiatry, SW, Pastoral Care, Nephrology	• New consults initiated as ordered
Patient/Family Teaching ▪ Review previous topics and reinforce as needed **Review:** ▪ Medications ▪ When to call doctor or 911; symptoms to watch for ▪ Cardiac Rehab program	• Patient and family have reviewed 'Cardiac Surgery Patient Guide' with nurse and understand post-op care and management
Discharge Planning ▪ Discharge teaching ▪ Provide: "My Care Plan", medication sheet, booklet with recent test results (lab, ECG, Echo, microbiology, CT, carotid U/S)	• Discharge teaching done • Documentation given

Post-Operative Day Additional	
CARE CATEGORIES DAILY TASKS AND ACTIVITIES	**EXPECTED OUTCOMES**
Key Diagnostics & Other Assessments ▪ MD or pharmacist to determine target INR and required anticoagulation	• INR at target
Central Nervous System ▪ Delirium screening as per nursing protocol ▪ Analgesic administered as per orders	▪ No evidence of delirium (ICDSC < 4) ▪ Patient reports pain control as adequate
Cardiovascular System ▪ Nursing assessment as per nursing standard ▪ Vital signs Q shift	• Pulse regular or same as pre-op • Vital signs within normal limits for patient
Respiratory	• Mouth care after each meals • No signs of respiratory complications
Gastrointestinal System	• Bowel movement daily
Genitourinary System ▪ Daily weight	• At target weight
Skin ▪ Surgical Incision exposed to air	• Incisions dry and intact
Mobility ▪ Activity as tolerated ▪ Independent personal care	• Falls risk assessment score is less than 45 • Patient independent with personal care and ambulating as tolerated
Medications ▪ Anticoagulation as per orders ▪ VTE prophylaxis as per orders ▪ Glycemic control as per orders ▪ Diuresis to target weight as per orders	• Blood glucose as ordered
Consults ▪ Reassess need for endocrine, SW, pastoral care, respiratory therapy	• New consults initiated as ordered
Patient/Family Teaching ▪ Review previous topics and reinforce as needed	• Patient and family have reviewed 'Cardiac Surgery Patient Guide' with nurse and understand post-op care and management
Discharge Planning ▪ Refer to POD 5 content	• Refer to POD 5 content

Developed By

Effective Date:	
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