Cardiac Surgery Clinical Pathway

Site Applicability

St. Paul's Hospital

Pathway Patient Goals

1. Prevent post-op complications by:
    a. Extubation within 4 hours post-op
    b. Transfer out of CSICU POD 1
    c. Discharge home or out of ward by POD 5
2. Patient will report pain below 3/10
3. Prevent readmission by providing effective discharge planning and teaching to patient and care-givers

Inclusion Criteria

1. Provider order for pathway (required)
2. All patients having aortic valve, mitral valve, tricuspid valve and coronary artery bypass surgery.

Exclusion Criteria

1. All patients having heart transplant, laser lead extractions, transcatheter valve implantation (TAVI), repair of congenital heart defects and ventricular assist devices implantations.

Instructions

1. Review pathway once per shift for patient care goals and expected outcomes
2. Do not document on this pathway, complete documentation in the Electronic Health Record or paper chart as per policy
3. Criteria for REMOVING a patient from the pathway includes:
    a. Patient remains in hospital at or beyond POD 10 unless otherwise ordered by physician
    b. Patient is transferred to the Intensive Care Unit (ICU) or Coronary Intensive Care Unit (CICU) at any time during the post-op period

Pathway

PRE-SURGERY (PRE-ADMISSION CLINIC VISIT or PRE-OP ON WARD (IF APPLICABLE))	
Care Category	**Expected Outcomes**
Fall Risk	• Universal Fall Prevention strategies are in place (SAFE Step) • Falls risk assessment complete and care plan initiated if appropriate
Cognition	• Delirium Risk factors assessed and baseline CAM result recorded • Alert and Oriented x 3
Assessment	• Admission head to toe assessment and vital signs completed as per *Physical Assessment: Patients and Cardiac or Cardiac Surgery Inpatient Units* nursing standard • Baseline Admission Screening /Risk Assessments completed: o Violence risk o Delirium risk o Alcohol/Drug Screen o Smoking o Dysphagia o Falls o Advanced care planning • Vital signs within patient normal limits • Respiratory assessment within normal limits for patient • Cardiac monitoring initiated as per pre-op orders • Pre-op checklist initiated • Consents signed as per PAC/ ward protocol
Pain Management	• Acceptable comfort pain level (as stated by the patient) documented (_/10)
Elimination	• Patient voiding without difficulty • Patient's regular bowel pattern documented
Nutrition / Hydration	• Tolerating prescribed diet • Patient on fluid or salt restriction if ordered
Skin/Dressings/Drains	• Skin integrity intact or documented • Baseline Braden Scale documented • Understands pre-op skin prep (chlorhexidine sponge or wipes) • Pre-op skin preparation completed as per pre-op orders
Diagnostics	• Ordered pre-operative investigations are completed and results available (e.g. Lab work, CXR, ECG) • Physician made aware of abnormal blood work results

Mobility	• Activity as tolerated
Medications	• Best possible medication history obtained and recorded • Pre-operative medication instructions available for patient
Consults	• Patient seen by consultants as ordered (e.g. psychiatry, addictions, social work etc.)
Teaching & Discharge Planning	• Ensure patient has a copy of "Cardiac Surgery Patient Guide" • Review all education materials and instructions with patient/family ensuring opportunity to ask questions and assess understanding of the following: o Planned surgery and expected length of stay o Transportation needs for discharge o Pre-op medications, skin preparation and fasting instructions o Pain scales and anticipated pain management strategies o Post-op mobility limitations and sternal precautions o Deep breathing exercises and activity levels o Maintaining optimal nutritional status and bowel hygiene • Patient and family have watched pre-op video and reviewed post-op expectations and potential complications with nurse • Patient and family understand post-op course and possible complications (e.g. changes in mood/depression, post-op delirium etc.) • Verify name of family doctor

DAY OF SURGERY (PRE-OP)	
Care Category	**Expected Outcomes**
Risk Assessments	• Universal Falls Prevention strategies are in place (SAFE Step) • Falls risk care plans in place, if appropriate
Cognition	• Alert and Oriented x 3 • Anxiety level within acceptable level for patient • Delirium screening completed • No evidence of new confusion, agitation or CAM screen negative
Assessment	• Vital signs within normal limits for patient • Cardiac monitoring as per pre-op orders • Respiratory assessment within normal limits for patient • Pre-op checklist complete • Ensure patent IV, saline locked • Patient blood glucose 4.1 to 8.0 mmol/L
Pain Management	• Acceptable comfort pain level (as stated by the patient) documented (_/10)
Elimination	• Patient voiding without difficulty • Bowel movement within last 24 hours
Nutrition / Hydration	• Patient maintains NPO as per order
Skin/Dressings/Drains	• Braden Scale completed and documented (if not already done) • Pre-op skin preparation completed as per pre-op orders
Diagnostics	• Ordered pre-operative investigations are completed and results available (e.g. Lab work, CXR, ECG) • Physician made aware of abnormal blood work results
Mobility	• Activity as tolerated
Medications	• Appropriate medications held as ordered (as per pre-op orders)
Consults	• Patient seen by consultants as ordered (e.g. psychiatry, addictions, social work etc.)
Teaching & Discharge Planning	• Ensure patient and family have received and understand all pre-op teaching information. • Review and reinforce pre-op teaching if needed • Ensure teaching materials have been provided e.g. Cardiac Surgery Patient Guide

DAY OF SURGERY (POST-OPERATIVE CSICU)	
Care Category	**Expected Outcomes**
Safety	• Assessment of all equipment completed and documented
Risk Assessments	• Universal Falls Prevention strategies are in place (SAFE Step) • Falls risk assessment completed prior to first mobilization • Falls risk care plans in place, if appropriate
Cognition	• Sedation administered as per orders • Delirium screening completed • RASS assessment completed, if appropriate • No evidence of new confusion, agitation or anxiety or CAM screen negative
Assessment	• Head to toe assessment and vital signs frequency completed as per *Cardiac Surgery: Post-Operative Care (CSICU)* nursing standard • Patient in stable cardiac rhythm • Patient's temperature is 36˚ to 37.5 ˚C within 2 hours post-op • CI above 2.2 L/min/m^2 • Patient hemodynamically stable (see orders for HR and SBP parameters) • Lung sounds within normal limits for patient • Patient extubated within 4 hours post-op • Maintain SpO_2 above 92% as per orders • Maintain PaO_2 above 60 mmHg as per orders
Pain Management	• Pain assessment as per CSICU nursing care standard • Pain medication administered as per orders • Patient reports pain below 3/10
Elimination	• Urine output 1mL/kg/h pre-extubation • Urine output more than 1.5mL/kg/h post-extubation
Nutrition / Hydration	• No nausea and vomiting • If nausea and vomiting- controlled with antiemetic (as ordered) • Clear fluids (as per orders) tolerated
Skin/Dressings/Drains	• Patient turned/tilted within 2 hours of admission (if stable) • No evidence of pressure areas (See Braden Scale) • Dressings assessed as per nursing standard • Dressings dry and intact • Chest tubes secured and assessment completed • Chest tube drainage less than 150 mL/h for the first 4 hours; then less than 50 mL/h

Diagnostics	• Ordered post- operative investigations are completed and results available (e.g. Lab work, CXR, ECG, ABG's) • CBC, electrolytes, urea, creatinine, glucose and coagulation status within acceptable ranges • CXR and ECG results reviewed by MRP
Mobility	• Dangle and stand if extubated and hemodynamically stable
Medications	• Inotropes weaned off (as per order and unit protocol) • Blood glucose 4.1 to 10.0 mmol/L
Consults	• Patient seen by consultants as ordered (e.g. psychiatry, addictions, social work etc.)
Teaching & Discharge Planning	• Patient and family understands plan of care for next 24 hours • Patient and family understands sternal precautions, pain control management and importance of deep breathing exercises • Refer to Cardiac Surgery Patient Guide

POST-OPERATIVE DAY 1 (CSICU/WARD)	
Care Category	**Expected Outcomes**
Risk Assessments	CSICU and Ward • Universal Falls Prevention strategies are in place (SAFE Step) • Falls risk care plans in place, if appropriate
Cognition	CSICU • Delirium screening completed • RASS screening completed, if appropriate • No evidence of new confusion, agitation or anxiety or CAM screen negative Ward • Delirium screening completed • No evidence of new confusion, agitation or anxiety or CAM screen negative
Assessment	CSICU • Head to toe assessment and vital signs frequency completed as per *Cardiac Surgery: Post-Operative Care (CSICU)* nursing standard • Patient in stable cardiac rhythm • PA and arterial lines removed (as per orders) • Begin to wean from oxygen and maintain SpO_2 above 92% (as per orders) • Epicardial pacing wires grounded and secured. • If patient requires temporary pacing (epicardial or transvenous)- care of wires, equipment and documentation as per nursing standard Ward • Head to toe assessment completed as per nursing standard • Vitals signs Q4H x 24 hours • Cardiac monitoring as per orders • Patient in stable intrinsic cardiac rhythm • Patient's temperature is between 36˚ to 37.5 ˚C • Patient hemodynamically stable • Begin to wean from oxygen and maintain SpO_2 above 92% (as per orders) • Epicardial pacing wires grounded and secured. If patient requires temporary pacing- care of wires, equipment and documentation as per nursing standard

Pain Management	CSICU/Ward • Pain assessment as per nursing standard • Pain medication administered as per orders • Patient reports pain below 3/10
Elimination	CSICU • Foley drains more than 1.5mL/kg/h Ward • Foley drains more than 400mL/shift CSICU and Ward • Pericare once per shift if Foley insitu • Daily weight to be assessed and documented
Nutrition / Hydration	CSICU and Ward • No nausea and vomiting • Antiemetic's given as per orders • Tolerating prescribed diet • Monitor fluid and salt restrictions (if ordered) • IV saline locked
Skin/Dressings/Drains	CSICU and Ward • No evidence of pressure areas (See Braden Scale) • Dressings assessed as per nursing standard • Dressings dry and intact • Chest tubes removed (as per orders)
Diagnostics	• Ordered post- operative investigations are completed and results available (e.g. Lab work, CXR) • Results of the following blood work are within acceptable range: o Coagulation status o Hgb above target threshold (see orders), o creatinine below 110 mmol/L (female) and below 120 mmol/L (male) o potassium between 4-5 mmol/L • If results not within acceptable range notify MRP • Post- CT removal CXR reviewed by MRP

Mobility	CSICU • Deep breathing exercises with supported coughing completed hourly • Stand at bedside with assistance Ward • Deep breathing exercises with supported coughing completed hourly • Up in chair for meals or TID • Ambulate few steps at bedside
Medications	CSICU • Inotropes weaned off (as per order and unit protocol) CSICU and Ward • VTE prophylaxis initiated as per order • Anticoagulation initiated as per order • Blood glucose 4.1 to 8.0 mmol/L • Pre-op medications resumed as per order
Consults	• Patient seen by consulting services as ordered
Teaching & Discharge Planning	CSICU and Ward • Progress on pathway reviewed • Review expected length of stay with patient and family • Verify name of family doctor • Patient and family understands plan of care for next 24 hours • Review sternal precautions, pain control management and importance of deep breathing exercises with patient and family • Discharge package started • Appropriate teaching materials provided e.g. sternal precautions booklet • Refer to Cardiac Surgery Patient Guide

POST-OPERATIVE DAY 2	
Care Category	**Expected Outcomes**
Risk Assessments	• Universal Falls Prevention strategies are in place (SAFE Step) • Falls risk care plans in place, if appropriate • Dysphagia screening tool completed
Cognition	• Delirium screening completed • No evidence of new confusion, agitation or anxiety or CAM screen negative
Assessment	• Head to toe assessment completed as per nursing standard • Vitals signs Q4H • Vitals signs within normal limits for patient • Cardiac monitoring as per orders • Patient in stable intrinsic cardiac rhythm • Patient's temperature is between 36˚ to 37.5 ˚C • Weaned from oxygen and maintain SpO_2 above 92% as per orders • Epicardial pacing wires grounded and secured. • If patient requires temporary pacing- care of wires, equipment and documentation as per nursing standard
Pain Management	• Pain assessment as per nursing standard • Pain medication administered as per orders • Patient reports pain below 3/10
Elimination	• Foley catheter removed (as per order) • Voiding without difficulty • Daily weight to be assessed and documented • Bowel protocol initiated as per orders
Nutrition / Hydration	• No nausea and vomiting or nausea and vomiting controlled by antiemetic's (as ordered) • Tolerating prescribed diet • Monitor fluid and salt restrictions (if ordered)
Skin/Dressings/Drains	• No evidence of pressure areas (See Braden Scale) • Dressings assessed as per nursing standard • Dressings dry and intact
Diagnostics	• Ordered post- operative blood work collected and results available • MRP/NP aware of abnormal lab results

Mobility	• Deep breathing exercises with supported coughing completed hourly • Up in chair for meals or TID • Ambulate up to 1 lap • If patient has radial graft- review hand exercises (see nursing care standard)
Medications	• VTE prophylaxis as per order • Anticoagulation initiated as ordered • Blood glucose 4.1 to 8.0 mmol/L • Diuresis to target weight as per orders
Consults	• Patient assessed by PT • Reassess patient need for additional services • Consider referral to dietician if not progressing to prescribed diet • Consult services for specialized education (e.g. pharmacist, diabetes RN)
Teaching & Discharge Planning	• Progress on pathway reviewed • Review expected length of stay with family • Confirm arrangements for transportation home with patient • Refer to Cardiac Surgery Patient Guide and review the following post-op care and management with patient and family (if appropriate): o Incision care o Mood changes o Sternal precautions o Pain management o Delirium o Deep breathing exercises

POST-OPERATIVE DAY 3	
Care Category	**Expected Outcomes**
Risk Assessments	• Universal Falls Prevention strategies are in place (SAFE Step) • Falls risk care plans in place, if appropriate
Cognition	• Delirium screening completed • No evidence of new confusion, agitation or anxiety or CAM screen negative
Assessment	• Head to toe assessment completed as per nursing standard • Vitals signs Q6H • Vitals signs within normal limits for patient • Cardiac monitoring as per orders • Patient in stable intrinsic cardiac rhythm • Patient's temperature is between 36˚ to 37.5 ˚C • Patient on room air and SpO_2 maintained above 92% as per orders • Epicardial pacing wires removed by MD/NP/CNL/CNE
Pain Management	• Pain medication administered as per orders • Patient reports pain below 3/10
Elimination	• Voiding without difficulty • Daily weight to be assessed and documented • Bowel protocol administered as per orders
Nutrition / Hydration	• No nausea and vomiting • Tolerating prescribed diet • Monitor fluid and salt restrictions (if ordered)
Skin/Dressings/Drains	• No evidence of pressure areas (See Braden Scale) • Sternal and leg incisions dressing removed as per nursing standard • Incisions well approximated, dry and intact
Diagnostics	• Ordered post- operative blood work collected and results available • MRP/NP aware of abnormal lab results • INR at target (MRP/NP or pharmacist to determine target INR)
Mobility	• Deep breathing exercises with supported coughing completed hourly • Up in chair for meals or TID • Walk in hallway x 3; ambulate up to 1 lap or more if tolerated • If patient has radial graft- review hand exercises (see nursing care standard)

Medications	• VTE prophylaxis as per order • Anticoagulation administered as ordered • Blood glucose 4.1 to 8.0 mmol/L • Diuresis to target weight as per orders
Consults	• Reassess patient need for additional services
Teaching & Discharge Planning	• Progress on pathway reviewed • Review expected length of stay with family • Patient to attend physio class, if appropriate • Patient to watch Discharge Video • Refer to Cardiac Surgery Patient Guide and review the following post-op care and management with patient and family (if appropriate): o Sleep hygiene o Activity after discharge • Initiate teaching, if applicable for endocarditis prophylaxis, anticoagulation, smoking cessation and heart failure

POST- OPERATIVE DAY 4	
Care Category	**Expected Outcomes**
Risk Assessments	• Universal Falls Prevention strategies are in place (SAFE Step) • Falls risk care plans in place, if appropriate
Cognition	• Delirium screening completed • No evidence of new confusion, agitation or anxiety or CAM screen negative
Assessment	• Head to toe assessment completed as per nursing standard • Vitals signs Q12H, unless otherwise indicated • Vitals signs within normal limits for patient • Cardiac monitoring as per orders • Discontinue telemetry if NSR x 24 hours • Patient in stable intrinsic cardiac rhythm • Patient's temperature is between 36˚ to 37.5 ˚C • Patient on room air and SpO_2 maintained above 92% as per orders
Pain Management	• Pain medication administered as per orders • Patient reports pain below 3/10
Elimination	• Voiding without difficulty • Daily weight to be assessed and documented • Bowel protocol administered as per orders
Nutrition / Hydration	• No nausea and vomiting • Tolerating prescribed diet • Monitor fluid and salt restrictions (if ordered)
Skin/Dressings/Drains	• No evidence of pressure areas (See Braden Scale) • Incisions well approximated, dry and intact • CT sutures removed (as per order).
Diagnostics	• INR at target (MRP/NP or pharmacist to determine target INR)
Mobility	• Deep breathing exercises with supported coughing completed hourly • Up in chair for meals or TID • Walk in hallway x 3; ambulate up to 2 laps if tolerated • If patient has radial graft- review hand exercises (see nursing care standard)
Medications	• VTE prophylaxis as per order • Anticoagulation administered as ordered • Blood glucose 4.1 to 8.0 mmol/L • Diuresis to target weight as per orders
Consults	• Reassess patient need for additional services

Teaching & Discharge Planning	• Progress on pathway reviewed • Review expected length of stay with family • Confirm transportation home • Potential barriers to discharge identified and team made aware • Refer to Cardiac Surgery Patient Guide and review the following post-op care and management with patient and family (as appropriate): o Heart Disease risk factor counselling o Driving restrictions o Resuming sex o Returning to work o Healthy heart eating o Cardiac Rehab program • Confirm patient home prepared/ equipment in place, as needed • TST aware of pending discharge, if needed • Cardiac rehab referral form complete

POST- OPERATIVE DAY 5	
Care Category	**Expected Outcomes**
Risk Assessments	• Universal Falls Prevention strategies are in place (SAFE Step) • Falls risk care plans in place, if appropriate
Cognition	• Delirium screening completed • No evidence of new confusion, agitation or anxiety or CAM screen negative
Assessment	• Head to toe assessment completed as per nursing standard • Vitals signs Q shift, unless otherwise indicated • Pulse regular or same as pre-op • Vital signs within normal limits for patient • Discontinue telemetry if NSR x 24 hours • No signs of respiratory complications
Pain Management	• Pain medication administered as per orders • Pain managed with oral analgesics • Patient reports pain below 3/10
Elimination	• Daily weight to be assessed and documented • Patient at target weight • Patient reports BM • Bowel protocol administered as per orders
Nutrition / Hydration	• Tolerating prescribed diet
Skin/Dressings/Drains	• No evidence of pressure areas (See Braden Scale) • Incisions well approximated, dry and intact • CT sutures removed (as per order)
Diagnostics	• INR at target (MRP/NP or pharmacist to determine target INR)
Mobility	• Walk in hallway x 3; ambulate up to 3 laps or more if tolerated • If patient has radial graft- review hand exercises (see nursing care standard) • Independent with ADLs
Medications	• VTE prophylaxis as per order • Anticoagulation administered as ordered • Blood glucose 4.1 to 8.0 mmol/L • Diuresis to target weight as per orders
Consults	• Reassess patient need for additional services

Teaching & Discharge Planning	• Progress on pathway reviewed • Refer to Cardiac Surgery Patient Guide and review the following post-op care and management with patient and family (if appropriate): o Medication teaching o Follow-up appointments o When to call doctor or 911 o Community resources • Review and reinforce previous discharge education and instructions • TelAsk form reviewed and completed

POST –OPERATIVE DAY 6 to 10	
Care Category	**Expected Outcomes**
Risk Assessments	• Universal Falls Prevention strategies are in place (SAFE Step) • Falls risk care plans in place, if appropriate
Cognition	• Delirium screening completed • No evidence of new confusion, agitation or anxiety or CAM screen negative
Assessment	• Head to toe assessment completed as per nursing standard • Vitals signs Q shift, unless otherwise indicated • Pulse regular or same as pre-op • Vital signs within normal limits for patient • Discontinue telemetry if NSR x 24 hours • No new signs of respiratory complications or return to patient baseline
Pain Management	• Pain medication administered as per orders • Pain managed with oral analgesics • Patient reports pain below 3/10
Elimination	• Daily weight to be assessed and documented • Patient at target weight • Patient reports BM • Bowel protocol administered as per orders
Nutrition / Hydration	• Tolerating prescribed diet
Skin/Dressings/Drains	• No evidence of pressure areas (See Braden Scale) • Incisions well approximated, dry and intact • Surgical incisions open to air • CT sutures removed (as per order) • Sternal staples removed (as per order) • Leg staples removed by POD 10 (as per order)
Diagnostics	• INR at target (MRP/NP or pharmacist to determine target INR)
Mobility	• Independent with personal care • Ambulating independently; walking up to 3 laps or more if tolerated
Medications	• VTE prophylaxis as per order • Anticoagulation administered as ordered • Blood glucose 4.1 to 8.0 mmol/L • Diuresis to target weight as per orders

Consults	• Reassess patient need for additional services
Teaching & Discharge Planning	• Progress on pathway reviewed • Refer to Cardiac Surgery Patient Guide and review previous discharge education and instructions and reinforce as needed

Day of Discharge	
Care Category	**Expected Outcomes**
Risk Assessments	• Universal Falls Prevention strategies are in place (SAFE Step)
Cognition	• Delirium screening completed • No evidence of new confusion, agitation or anxiety or CAM screen negative
Assessment	• Head to toe assessment completed as per nursing standard • Vitals signs Q shift, unless otherwise indicated • Vital signs within normal limits for patient • No signs of respiratory complications
Pain Management	• Pain medication administered as per orders • Pain level acceptable to patient
Elimination	• Patient at target weight • Patient has had a BM
Nutrition / Hydration	• Tolerating prescribed diet
Skin/Dressings/Drains	• Incisions well approximated, dry and intact • Surgical incisions open to air • Remove IV saline lock
Diagnostics	• INR at target (MRP/NP or pharmacist to determine target INR)
Mobility	• Independent with personal care • Ambulating independently
Discharge	• Refer to Cardiac Surgery Patient Guide and review previous discharge education and instructions and reinforce as needed • Home support available and prepared, if needed • Patient/family have discharge prescription • Patient/family aware of follow up appointments • Patient/family received discharge summary • Patient/family have watched Discharge Video • Patient /family have all their belongings • TST notified of discharge (if needed) • Prescription and discharge summary faxed to GP office

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