Clinical Guidelines for Adult Heart Transplantation
British Columbia

Revised: Date: September 2017

The contents of this Clinical Guideline has been prepared by members of the transplant team and reviewed and endorsed by Dr Anson Cheung, Surgical Director Adult Heart Transplant Program and Dr Mustafa Toma, Medical Director Adult Heart Transplant Program.

Signed: Anson Cheung

Signed: Mustafa Toma

Reviewed by Dr. Anson Cheung and Approved November 2017.
Reviewed by Dr. Mustafa Toma and Approved November 2017.
1 Introduction

1.1 Background

British Columbia’s first heart transplant was performed at Vancouver General Hospital in 1988. One hundred and eleven transplants were performed at that site until 1996. At that time, the program was moved to St Paul’s Hospital when the site was named the Provincial Heart Centre. Since 1996, over 350 heart transplants have been performed at St Paul’s.

This Clinical Guideline contains the current practices in the BC Adult Heart Transplant Program. Program members are a part of the Canadian Cardiac Transplant Network (CCTN). This network is affiliated with or works closely with Canadian Society for Transplantation (CST), Canadian Cardiovascular Society (CCS) and Canadian Blood Services (CBS). The CCTN sets policy for Heart Transplant Programs across the country.

The Adult Heart Transplant Program annually reviews its outcomes and has a mechanism to review practices weekly. An annual report is created by BC Transplant and presented to the team for discussion and planning. A copy of this report is available upon request to the Clinical Nurse Specialist (akaan@providencehealth.bc.ca).

The Program follows the Canadian Cardiovascular Society Consensus (CCS) Statements and Guidelines as well as resources released by the Canadian Cardiac Transplant Network (CCTN) as a basis for its protocols pre-and post-heart transplant (see hyperlink below). As well, the team refers to the International Society for Heart and Lung Transplant Consensus documents and Guidelines.
1.2 Philosophy and Decision-making

The team recognizes that decision making around transplant candidacy can be fraught with difficulty as every person referred to us is different. Hence very few absolute rules exist.

1.2.1 Guiding Principles

Our primary focus is the well-being and autonomy of the patient in our care.

Resource utilization, impacts on staff, and program or system issues are not considerations in decision-making for individual patients.

Communication with the patient is clear, respectful, and avoids false hope. In conjunction with the patient, assessment will focus on whether transplantation is the best option given the patient’s full medical, lifestyle and psychosocial situation.

It should be remembered that possible alternatives include no intervention and palliative care

The team’s responsibility for stewardship of donated organs is enacted by basing practice on the best available evidence including current peer reviewed guidelines for transplantation.

Exclusion criteria are based on those of the Canadian Cardiovascular Transplant Network, the Canadian Cardiovascular Society, and the International Society for Heart and Lung Transplantation, all of which are publically available. When not clear in the guidelines, where possible, decisions regarding aspects of assessment should be evidence-based.

The decision-making process for heart transplantation is clear and there is transparency regarding the reasons for decisions that are made.

Decisions are informed by assessments from the psychosocial team and external specialists (when consulted). Decisions and the decision-making process are documented in the patient’s chart.

The decision to implant a VAD and/or list a patient for heart transplant shall be made by the on-service transplant surgeon, the on-service cardiologist and one other cardiologist in the program with input and discussion from colleagues, consulting specialists and the allied health team. If the decision is made outside of normal working hours, the VAD Coordinator on call shall provide input regarding psychosocial information available. In cases where a stalemate exists, the final decision will be made by the heads of cardiac surgery and cardiology or designate/s. This process shall be reviewed at the annually.
All patients suitable for assessment are viewed as potential transplant candidates and, if identified, every effort is made to mitigate any exclusion criteria.

Medical and psychosocial issues may change over time. Reassessment will be considered when these changes are sustained for a predetermined length of time; or if there are marked changes in the patient’s home environment, coping or health behaviors. VAD, as a bridge to candidacy, is considered in cases where modifiable exclusion criteria exist and more time is needed to determine if successful change is possible.

There is a culture of respect among colleagues.

Different perspectives and opinions are expected and valued among colleagues. All are given serious consideration. The expertise and scopes of practice of all team members are respected.

Care providers are mindful of their own set of personal values and beliefs and their potential impact on decisions.

Care must be taken to be cognizant of personal biases that arise both negatively (e.g., patient criminal history, developmental disability, racist patient attitudes) and positively (e.g., patient likeability, expressions of remorse, age, verbal skills, parenting status). “Care must be taken to ensure that psychosocial factors predictive of outcome are not confused with judgments of an individual’s social worth.” (Journal of Heart and Lung Transplantation listing criteria 2006, Page 1034 http://www.jhltonline.org/article/S1053-2498(06)00460-8/pdf)
### 1.3 The Heart Transplant Team

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
<th>Contact Email</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aujla, Harveen</td>
<td>Post-Transplant Clerk</td>
<td><a href="mailto:haujla@providencehealth.bc.ca">haujla@providencehealth.bc.ca</a></td>
<td>604-826-8602</td>
</tr>
<tr>
<td>Bashir, Jamil</td>
<td>Heart Transplant Surgeon</td>
<td><a href="mailto:jbashir@providencehealth.bc.ca">jbashir@providencehealth.bc.ca</a></td>
<td>604-682-2344</td>
</tr>
<tr>
<td>Brownjohn, Kim</td>
<td>Post-Transplant Clinic Nurse</td>
<td><a href="mailto:kbrownjohn@providencehealth.bc.ca">kbrownjohn@providencehealth.bc.ca</a></td>
<td>604-682-2344</td>
</tr>
<tr>
<td>Clark, Jenny</td>
<td>Psychologist</td>
<td></td>
<td>604-806-9026</td>
</tr>
<tr>
<td>Cheung, Anson</td>
<td>Surgical Director, Heart</td>
<td><a href="mailto:acheung@providencehealth.bc.ca">acheung@providencehealth.bc.ca</a></td>
<td>604-682-2344</td>
</tr>
<tr>
<td></td>
<td>Transplant Program.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chiu, Wynne</td>
<td>Pre-Transplant/VAD Coordinator</td>
<td><a href="mailto:wchiu@providencehealth.bc.ca">wchiu@providencehealth.bc.ca</a></td>
<td>604-806-8887</td>
</tr>
<tr>
<td>Davis, Margot</td>
<td>Heart Transplant Cardiologist</td>
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<td>604-682-2344</td>
</tr>
<tr>
<td>Feeney, Sinead</td>
<td>Dietitian</td>
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<td>604-682-2344</td>
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<tr>
<td>Ignaszewski, Andy</td>
<td>Heart Transplant Cardiologist</td>
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<td>604-682-2344</td>
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<tr>
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<td>604-806-8574</td>
</tr>
<tr>
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<td>Clinical Nurse Specialist</td>
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<td>604-806-8976</td>
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<td>604-682-2344</td>
</tr>
<tr>
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<td>604-682-2344 x 66183</td>
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<tr>
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<td>604-682-2344</td>
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<tr>
<td></td>
<td>Failure Program</td>
<td></td>
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</tr>
<tr>
<td>Turtle, Chelsea</td>
<td>Pre-Transplant Clerk</td>
<td><a href="mailto:cturtle@providencehealth.bc.ca">cturtle@providencehealth.bc.ca</a></td>
<td>604-806-8374</td>
</tr>
<tr>
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<td>604-682-2344</td>
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<tr>
<td>Virani, Sean</td>
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<td>604-806-9026</td>
</tr>
</tbody>
</table>
2 Referral and Workup for Heart Transplant

2.1 Referral

The Adult Heart Transplant Program accepts referrals from around the province of British Columbia and Yukon Territory. From time to time the program also receives out-of-province referrals.

The program provides advanced heart failure therapies for patients who are being assessed for transplant candidacy. Early referral to the program is crucial as late referral significantly affects outcomes. In general, criteria for referral for transplantation candidacy are as follows:

- **Age** – although no absolute age cutoff, referrals over the age of 70 should have no major co morbidities.
- **End-stage heart failure not responding to medical therapy and/or cardiogenic shock with inotrope dependence.**
- **No other medical or surgical therapies available.**
- **Absence of**
  - Life limiting co morbidities.
  - Life-threatening non-adherence to medical therapy.

Adult patients should be referred to the Pre-Transplant Clinic. Non-emergent referrals should be made using this [form](#). For emergent referrals or questions please call the Transplant Cardiologist on call.

**Business Hours:** 604-806-8602  
**After Hours (Transplant Cardiologist on call):** 604-877-2240  
**Toll Free:** 1-800-663-6189

**Address:** St. Paul’s Hospital  
Pre-Heart Transplant Clinic 5C,  
1081 Burrard Street  
Vancouver, BC, V6Z 1Y6

Sometimes admission is required to complete the assessment process, depending on the patient and their condition. If the patient is a potential candidate, the Pre-Transplant clinic will monitor their progress. If the patient is not a candidate – either because they are too well or not suitable, the patient will be transferred to Heart Function clinic or discharged back to the referring physician or clinic, clearly outlining reasons for transfer and criteria for re-referral.
2.2 **Urgent Inpatient Referrals from other Hospitals**

Urgent referrals from other centres can be made by contacting the Heart Transplant (HTx) Cardiologist or HTx Surgeon on-call through BC Transplant 604-877-2240 or St Paul’s Hospital (604) 682-2344.

2.3 **Pediatric Referrals**

Pediatric patients should be referred to the Pediatric Heart Transplant Program at BC Children’s Hospital.

2.4 **Patient Assessment**

There are 3 levels of assessment for heart transplant candidacy.

2.4.1 **Routine Heart Transplant Assessment**

Routine assessment is reserved for stable patients where there is a lower level of urgency. Normally this assessment takes 4 weeks depending on availability of the patient for specialized testing and waiting times for other specialty opinions.

Prescriber Orders are on the following 2 pages:
HEART TRANSPLANT ASSESSMENT (ROUTINE) ORDERS
(items with check boxes must be selected to be ordered)

<table>
<thead>
<tr>
<th>LABORATORY: CBCD, type and screen, PTT, INR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biochemistry: electrolytes, urea, creatinine, bilirubin-total and direct, TSH, AST, ALP, GGT, LDH, total protein, albumin, pre-albumin</td>
</tr>
<tr>
<td>□ NT-pro BNP</td>
</tr>
<tr>
<td>□ PSA (males)</td>
</tr>
<tr>
<td>□ AC1 (HbA1c) and fasting glucose (diabetic)</td>
</tr>
<tr>
<td>Stool for OB x 3 (or FIT if available for outpatients)</td>
</tr>
<tr>
<td>Urinalysis, urine C&amp;S</td>
</tr>
<tr>
<td>Virology: CMV (IgG)</td>
</tr>
<tr>
<td>EBV VCA- IgG</td>
</tr>
<tr>
<td>Herpes Simplex Virus -IgG</td>
</tr>
<tr>
<td>HIV</td>
</tr>
<tr>
<td>Hepatitis B surface Antibody, Hepatitis B surface Antigen, Hepatitis B core total Antibody</td>
</tr>
<tr>
<td>Hepatitis C Antibody</td>
</tr>
<tr>
<td>Varicella Zoster Virus IgG</td>
</tr>
<tr>
<td>Microbiology: Toxo IgG</td>
</tr>
<tr>
<td>VDRL (Blood) (T. pallidum screening EIA)</td>
</tr>
<tr>
<td>Mumps Measles and Rubella (MMR)</td>
</tr>
<tr>
<td>TBQ5 (In SCM: “Add collect”, enter “Heart transplant candidate – pre-approved by Dr. Romney”)</td>
</tr>
<tr>
<td>Immunology: Cytotoxic Antibody Screen</td>
</tr>
<tr>
<td>HLA typing pre transplant</td>
</tr>
<tr>
<td>DIAGNOSTICS: □ Chest X-Ray - PA/lateral</td>
</tr>
<tr>
<td>□ Abdominal ultrasound</td>
</tr>
<tr>
<td>□ Right heart catheterization with □ pharmacological challenge</td>
</tr>
<tr>
<td>□ ECG</td>
</tr>
<tr>
<td>□ Echocardiogram</td>
</tr>
<tr>
<td>□ Cardiopulmonary Exercise Test (spirometry included)</td>
</tr>
<tr>
<td>□ Non-contrast CT chest if any of the following are present</td>
</tr>
<tr>
<td>□ previous sternotomy</td>
</tr>
<tr>
<td>□ smoking history more than 20 pack years</td>
</tr>
<tr>
<td>□ over 50 with known vascular disease</td>
</tr>
<tr>
<td>□ Carotid Doppler (CAD or over 40 years)</td>
</tr>
<tr>
<td>□ Vascular Dopplers (CAD or over 40 years)</td>
</tr>
<tr>
<td>□ Bone density scan (over age 40 years or if indicated)</td>
</tr>
<tr>
<td>□ Mammogram (over age 40 years and no result in the last year or if indicated)</td>
</tr>
<tr>
<td>□ Pap smear (over age 25 and no result in last year or if indicated)</td>
</tr>
</tbody>
</table>

Printed Name  Signature  College ID  Contact Number

(R. Nov 16-17)  ALL NEW ORDERS MUST BE FLAGGED

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HEART TRANSPLANT ASSESSMENT (ROUTINE) ORDERS
(items with check boxes must be selected to be ordered)

STAGE 2 OF ASSESSMENT (complete only if listing deemed likely by the transplant team):

CONSULTS:
- Psychiatry
- Renal
- Endocrine
- BCT Infectious Diseases (for high-risk infection post-transplant)
- Gastroenterology
- Respiratory
- Hematology
- Gynecology for PAP Smear
- Dentistry
- Transplant Surgeon
- Social Work
- Psychologist
- Dietitian
- Other: ____________________________

VACCINES:
- meningococcal quadrivalent conjugate Grp A, C, Y, W-135 vaccine 0.5 mL IM x 1 dose
- pneumococcal polysaccharide vaccine (PNEUMOVAX 23) 0.5 mL IM x 1 dose (unless 2 lifetime doses have been given)
- influenza vaccine (seasonal) 0.5 mL IM x 1 dose (unless already given for this year)
- tetanus-diphtheria vaccine (TD-ADSORBED) 0.5 mL IM x 1 dose (unless given in last 10 years)
- hepatitis B vaccine 20 mcg (1 mL) IM x 3 doses (0, 1, 6 months)
- human papillomavirus vaccine 0.5 mL IM x 3 doses (0, 2, 6 months) for women 45 years of age or younger

RNs please send Immunization Record (HH059) back to Pre transplant clinic

Live Vaccines: do NOT administer if transplant anticipated within 4 weeks
- measles, mumps and rubella vaccine (PRIORIX) 0.5 mL SUBCUT x 1 dose for all adults born after 1956 and not previously immunized
- varicella vaccine (VARIVAX III) 0.5 mL SUBCUT x 2 doses (give 4 to 8 weeks apart) for VZV negative or VZV IgG non-reactive patients

Printed Name __________________________ Signature __________________________
College ID __________________________ Contact Number __________________________

R. Nov 16-17)

ALL NEW ORDERS MUST BE FLAGGED

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2.4.2 Urgent Heart Transplant Assessment

Urgent assessment is a “fast-track” version of the routine assessment and designed to be completed within 7 days. This is reserved for patients who are in hospital and NYHA class IV. All other testing is reserved for after the patient is stabilized and the clinical picture is clearer.

Prescriber Orders are shown below:

```
HEART TRANSPLANT ASSESSMENT (URGENT) ORDERS
(When listing needs to occur within 1 week)
(items with check boxes must be selected to be ordered)

ADMISSION INSTRUCTIONS: Notify Transplant Clinical Coordinator on 604-250-2658
CONSULT:
Heart Transplant Surgeon on call
Transplant Social Worker 66503
Psychology
Other

LABORATORY: (check only if not done in last 48 hours or if indicated)
Hematology:
PTT/INR
Transfusion Medicine: Group & screen
Biochemistry:
Electrolytes, urea, Cr, Ca,
Bilirubin and direct
TSH, AST, ALP, GGT, LDH, CK
Total protein, albumin, pre albumin
NT-pro BNP
PSA (male)
HgbA1C (diabetic)

Microbiology/Virology:
Toxoplasma titre, VDRL, MMR titre
CMV (IgG, EBV (IgG), HSV (IgG), HCV, VZV
Hepatitis B surface Antibody, Hepatitis B surface Antigen, Hepatitis B core total Antibody
HIV (if not performed this admission)
HLA (if transplant listing anticipated)

Immunology:
Cytotoxic Antibody Screen (CAS)

Non-blood Analysis:
Urinalysis, Urine C&S
Stool CB x 3

DIAGNOSTICS:
Chest X-ray (if not done this admission)
Abdominal Ultrasound
Geriatric Doppler (CAD or older than 40 years)
ABI (ischemic or decreased pulses on examination)
Mammogram or if not possible, breast exam by OB/GYN
PAP smear (if indicated)
Dental assessment
Right heart catheterization - **please write “pharmacological intervention if PVR above 3 or TPG more than 12” on requisition**
Echocardiogram
Non-contrast CT chest for patients at risk of lung malignancy, previous sternotomy, vasculopathy

Printed Name
Signature
College ID
Contact Number

0 (R, Nov 16-17)

ALL NEW ORDERS MUST BE FLAGGED
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2.4.3 Emergent Heart Transplant Assessment

Emergent assessment is reserved for patients who present in cardiogenic shock and candidacy needs to be determined within 24 hours. Often, these patients will undergo assessment for Ventricular Assist Device implantation as a bridge to transplantation also.

Prescriber Orders are shown below:

![HEART TRANSPLANT ASSESSMENT (EMERGENT) ORDERS](image-url)

Printed Name: 
Signature: 
College ID: 
Contact Number: 

(R. Nov 15-17) ALL NEW ORDERS MUST BE FLAGGED
2.4.4 High Risk Cardiac Surgery – Mechanical Support Backup
Since 2016, the program no longer offers long-term mechanical support backup to high risk patients except in rare circumstances. In these cases, short or intermediate-term support will be offered as a “bridge to decision”. These devices buy time to make a more complete assessment and offer the possibility of weaning if appropriate.

2.5 Patient and Family Preparation
All patient information is reviewed by patients and families for readability and appropriate content.

When first referred, the patient and caregivers are given a copy of an introductory booklet. This booklet provides a short, easy to understand overview of heart transplantation and what to expect. Further information is offered once candidacy has been established.

If they would like more information, they are referred BC Transplant website and if they wish and demonstrate understanding, are given the longer, more comprehensive manual. The teaching plan for each patient and family member is prepared based on a number of key points:

- Clinical condition
- Where they are in the assessment process
- Ability to take in information related to low cardiac output
- Literacy
- Ability to speak and read English (The manual is available in Chinese)
- Environment
- Psychological state
- Care plan established with the patient, family and team

It must be recognized that many patients are suffering from low cardiac output and as well, are likely to be overwhelmed by the medical information provided to them.

2.6 Psychosocial Assessment

2.6.1 Psychology Assessment
The psychologist routinely assesses all stable patients being considered for heart transplantation using a semi-structured interview. This assessment focuses on the following: 1) the ability of the social support network to cope with the stressors of heart transplant care; 2) patient understanding of the requirements, risk and benefits of transplant; 3) adherence to medical care plan; 4) psychopathology; 5) cognitive assessment.
Psychological/psychiatric contraindications are first reviewed by the psychologist and where necessary a psychiatrist is consulted for further assessment and/or a second opinion. A score of psychosocial risk factors called Stanford Integrated Psychosocial Assessment for Transplant (SIPAT) is determined and reported. The Psychologist will also recommend referral for further neurocognitive testing if indicated.

2.6.2 Social Work Assessment
The Social Worker collects a detailed social history, which includes assessment of

- Social support
- Financial situation
- Relocation concerns
- Lifestyle issues
- Advance care planning
- Other relevant information

The Social Worker works with the team, the patient and family to establish a workable travel, accommodation and family support plan for presentation to the team.

The Social Worker also provides ongoing counseling and assistance as required.

2.6.3 Dietary Assessment
A full dietary assessment is performed by a registered dietitian. Ongoing support and teaching is performed when required. This information is then used to aid in decision making when considering a patient for transplant/VAD candidacy.

2.7 Selection of Candidates
The team’s decision-making process has been outlined earlier. A “Candidate Selection Form” (below) is completed and from that, a care plan determined.
# HEART TRANSPLANT PROGRAM
## CANDIDATE SELECTION FORM

**Date:** ___________________________

**Diagnosis:** ___________________________

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<tr>
<th>Medical/Surgical Contraindications</th>
<th>Lifestyle Management Contraindications</th>
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<tbody>
<tr>
<td>□ NONE</td>
<td>□ NONE</td>
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<td>□ Neurological</td>
<td>□ Smoking</td>
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<td>□ Cardiovascular</td>
<td>□ Substance use/abuse</td>
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<td>□ Hematologic</td>
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<table>
<thead>
<tr>
<th>Psychosocial Contraindications</th>
<th>Additional Information</th>
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<td>□ NONE</td>
<td>□ An invitation for dissenting opinions</td>
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<tr>
<td>□ Psychiatric disorder</td>
<td>□ Input from all appropriate team members</td>
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<tr>
<td>□ Personality disorder</td>
<td>Date re-listed: ___________________________</td>
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<tr>
<td>□ Poor coping</td>
<td>Signature: 1__________________________</td>
</tr>
<tr>
<td>□ Cognitive deficits</td>
<td>Signature: 2__________________________</td>
</tr>
<tr>
<td>□ Social support system limitations</td>
<td>Signature: 3__________________________</td>
</tr>
<tr>
<td>□ Relocation concerns</td>
<td></td>
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<tr>
<td>□ Financial concerns</td>
<td></td>
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<tr>
<td>□ OTHER</td>
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</table>

**TRANSPLANT TEAM DECISION:** Transplant Candidate: □ Yes □ No □ Deferred □ VAD Candidate: □ Yes □ No □ Deferred □ BTC □ BTT

**Decision approved by:** Cardiologist on-service: ___________________________

Cardiologist: ___________________________

Surgeon on-service: ___________________________

**Plan:** ___________________________
2.7.1 Smoking, Marijuana use and Vaping

2.7.1.1 Definitions

- Medically prescribed marijuana – legally prescribed and obtained
- Ingested marijuana – eaten in the form of cookies etc.
- Smoked marijuana – smoked
- E Cigarettes - any portal where the user inhales vapour of any kind through an electronic cigarette currently marketed
- Vaping - inhaling any vapour created by E Cigarettes
- Non-therapeutic – not prescribed by a physician and/or where the patient’s psychosocial workup shows that use is displaying abusive or addictive tendencies or points to other high risk behaviours.

2.7.1.2 Policy

Marijuana use that is deemed by the medical and/or psychosocial team to be non-therapeutic, regardless of whether it is prescribed or not, should initiate an opinion from the addictions team prior to consideration for transplant listing.

Active (within the last 6 months) smoking or vaping prior to hospitalization of any substance constitutes an absolute exclusion for transplant listing.

Smoking, vaping or smoking/inhaling marijuana should be discontinued for a minimum of 6 months prior to consideration for transplant listing.

Ventricular Assist Device (VAD) implantation can be considered for smokers and vapers as a Bridge to Candidacy if:

- They are deemed to have high likelihood of dying before the 6 months is complete and
- There is agreement by the team that there is a good likelihood of quitting given the evidence presented

2.7.2 Illicit Substance Use

Canadian and International Guidelines suggest recent (last 6 months) illicit substance use is a contraindication for heart transplant.

VAD implantation as bridge to candidacy could be considered where it is determined by experts in Addiction Medicine and psychosocial team that the patient has favourable likelihood of abstaining. The patient and family must understand the implications of continued use (no chance of transplantation).
2.7.3 **Team Meetings**

The team meets every Tuesday morning in Providence Room 1500 from 07:30-08:30.

Changes in patient status on the waitlist are discussed here and updated on PROMIS by the transplant coordinator.

Regular education sessions are held each week to review relevant literature and each year, the team reviews the patient outcomes and in turn, reviews and revises protocols.
3 Transplant Listing

3.1 Patient Listing

Patients and families are seen by the team in the clinic or in hospital and informed of the listing decision. Coaching and education is commenced around expectations and life on the waiting list. In addition, detailed instructions around the call-in for transplant are reviewed.

The transplant coordinators complete a checklist to ensure all requirements for listing have been completed (see below):

<table>
<thead>
<tr>
<th>Nurse Responsibility</th>
<th>Date Completed</th>
<th>Initials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide patient with the “Living With a Heart Transplant” manual</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Review “While on the Transplant List” handout with the patient</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obtain signed copies of the Canadian Blood Services Consent for Patients to Participate in the Canadian Transplant Registry (CTR)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Review patient’s medication list. Notify physician if patient is on a Novel Oral Anticoagulant (NOAC) or Sirolimus as these will need to be changed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confirm Immunology has recent sample for monthly tray</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clarify with Cardiologist if donor criteria is required in comment section (e.g. donor age older than 60 years, will accept beyond east of Manitoba)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ask Social Worker to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Create a travel plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Confirm accommodation location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Give the patient and/or family member a Rest Easy certificate (record date)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ask Program Assistant to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Add patient to the Transplant List on PROMIS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Distribute updated Transplant List to on-call Cardiologist, Cardiac Surgeon and on-call RN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Add donor criteria if applicable to comment section</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Obtain and distribute updated immunology list to cardiologist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Set up monthly standing orders for PRAs (copies for lab, patient and chart)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Fax booking form to VGH Immunology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete the Pre Heart Transplant Status Change Sheet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ensure the Heart Transplant Program Candidate Selection (GRID) form (NF207) is signed (signed twice if VAD patient is being re-listed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ensure surgical consents are signed. Consent for Treatment (PhC-MR002) and Consent for Transfusion of Blood and/or Blood Products (PhC-MR030)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*If you initial this form, you must complete the Interdisciplinary Signature Sheet at the front of the Patient chart.*
3.2 Prioritizing Patients on the Heart Transplant Wait List

Once listed, the patient is activated on the PROMIS database. This database is administered by BC Provincial Renal Agency and BC Transplant. It links directly with the National Organ Waitlist which is administered by Canadian Blood Services. Urgently listed patients (classified as Status 4 or 4S) automatically appear on the National Organ Waitlist to initiate interprovincial organ sharing. For more details on how this relationship works, contact BC Transplant directly.

Priority for listing can be found in the Canadian Cardiac Transplant Network (CCTN) document – Cardiac Transplantation: Eligibility and Listing Criteria in Canada 2012 outlines the definitions for determining “status” on the transplant list. An update is due to be posted in late 2017.

3.3 Combined Heart and Kidney Transplantation

In otherwise eligible candidates with renal failure that is considered by the nephrologist to warrant renal transplantation, a decision re candidacy will be made collaboratively with nephrology.

Two approaches to combined transplantation can be taken.

1. Combined heart/kidney transplant from the same donor
2. Staged heart transplant followed by a kidney transplant from another donor

The first approach is preferred; however, it is recognized that due to long renal waitlists, it is not always possible to achieve this as these candidates “jump the queue” for cadaveric renal transplant.

If a dialysis patient were a suitable candidate for combined transplant then a simultaneous cadaveric transplant could be performed. If the patient was not on dialysis and had renal dysfunction a plan would be created in conjunction with renal and cardiac teams together on an individual basis.

Standard Operating Procedure and Flow Sheet are found below:
3.3.1 Standard Operating Procedure – Combined Heart and Kidney Transplant

1. REVISION HISTORY

<table>
<thead>
<tr>
<th>Revision</th>
<th>Description of Changes</th>
<th>CO Ref.</th>
<th>Effective Date</th>
<th>Approved By</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>Initial Release</td>
<td>N/A</td>
<td>Mar 28, 2011</td>
<td>Dr.A.Ignaszewski, Dr. A. Cheung &amp; Dr. D. Lansberg, Dr Bashir</td>
</tr>
<tr>
<td>01</td>
<td>Update</td>
<td></td>
<td>August 12, 2013</td>
<td>Dr.A.Ignaszewski, Dr. A. Cheung &amp; Dr. D. Lansberg, Dr Bashir BCT ODHD team, W Chiu, J Kealy, A Kaan</td>
</tr>
</tbody>
</table>

2. PURPOSE

To describe the process for activating and calling in combined heart and kidney transplant recipients.

3. SCOPE

Organ Retrieval Hospital Donation (ODHD) team at BCT, the Pre-heart transplant team at St. Paul’s Hospital, the Pre-Renal Transplant team at St. Paul’s Hospital and the Pre-Renal Transplant team at Vancouver General Hospital.

4. RESPONSIBILITIES & PROCEDURE

4.1 BC Transplant ODH DH Retrieval Coordinator:

4.1.1 Organ Donor Coordinator (ODS/ODP) offers heart from BC donor to Tx cardiologist (usual process for clearing National HS listing patients, etc.) with relevant donor and organ function details. (as per SOP: Organ Offering and Allocation, ODHD-PRE.02.010)

4.1.2 If Cardiologist indicates interest in using heart for heart/kidney combo recipient, Donor Coordinator (ODS/ODP) to request Tx Cardiologist for back up heart recipient (if available, in case Tissue Typing crossmatch is positive). If no matching BC recipients as a back up recipient, offer heart extraprovincially as a back-up offer.

4.1.3 At time of kidney allocation, ODS to inform Transplant Nephrologist of prioritizing one of the kidneys for the heart/kidney combo recipient and allocate other kidney as per usual procedure.

4.1.4 If the decision is made to allocate to the heart/kidney recipient ODS should give the nephrologist the next patient on the list as a back up.

4.1.5 Transplant nephrologist confirms acceptance of kidney for heart/kidney combo recipient. ODS to encourage/facilitate discussion between transplant nephrologist and transplant cardiologist as required/appropriate.
4.1.6. ODS to confirm final acceptance of organs for heart/kidney combo transplant recipient with cardiologist and transplant nephrologist.

4.1.7. If for any reason, heart/kidney combo transplant can not proceed, allocate heart to back up recipient, and kidney to the back up recipient (as per SOP: Organ Offering and Allocation). If no matching BC recipients, offer organs extraprovincially.

4.1.8. In the unlikely scenario of an import heart offer, ODS/ODP will offer the heart to the transplant cardiologist as per usual practice. If the cardiologist indicates interest in the heart for the heart/kidney combo, ODS/ODP will enquire from the offering OPO if a kidney could also be received for transplant. Necessary arrangement for tissue typing cross match will be arranged as logistics allow.

4.1.9. ODS communicates acceptance of organs and intended recipients to Heart Coordinator, Recipient Coordinator, Clinical Trials and recovery personnel as appropriate.

4.2. The cardiologist will
   4.2.1. Informs retrieval coordinator of heart/kidney and backup recipient details
   4.2.2. Notify the Nephrologist (through BCT after hours number) and decide on whether or not to proceed
   4.2.3. Notify on call cardiac surgeon
   4.2.4. Arrange for backup recipient to be worked up in case heart/kidney crossmatch positive
   4.2.5. Informs units if backup recipient to be transplanted

4.3. The Nephrologist will
   4.3.1. Arrange possible backup patient in case of positive crossmatch
   4.3.2. Liaise with Cardiologist with results of the crossmatch
   4.3.3. Notify Renal Surgeon
   4.3.4. Arrange for dialysis if necessary

4.4. Cardiac Surgeon will
   4.4.1. Liaise with Renal Surgeon
   4.4.2. Perform usual transplant duties

4.5. Renal Surgeon will
   4.5.1. Liaise with Cardiac Surgeon and Nephrologist
   4.5.2. Perform usual transplant duties

4.6. Heart coordinator on call (via VAD hotline 604-250-2658) will perform usual transplant duties for both heart/kidney and backup recipients
4.7. Renal coordinator will
   4.7.1. Ensure monthly CAS are performed preoperatively
   4.7.2. Perform usual transplant duties

5. REFERENCE/ASSOCIATED DOCUMENTS
Form, Recipient Activation
Reference, VGH Transplant Checklist – Liver, Kidney, P/K
Reference, VGH Transplant Checklist – Lungs
Reference, Responsibilities for On-Call Nephrologist Regarding Cadaveric Kidney and/or Pancreas Transplantation
SOP-001- Heart Transplant Recipient Notification and Preparation
SOP –002- Call Triage for Heart Transplant patients after hours
SOP, Organ Offering and Allocation, ODHD-PRE.02.010

6. GENERAL REQUIREMENTS
   6.1 The heart recipient patient is selected by the Transplant Cardiologist and Surgeon.
   6.2 Cross-checking crossmatch and ABO matching information is the responsibility of the Transplant Surgeon, Cardiologist and clinical team in the OR according to hospital protocols.
   6.3 Patients that are considered for this combined procedure must first be found to be suitable candidates for cardiac transplantation alone
   6.4 Relative contraindications to the combined procedure:
      6.4.1 Criteria that would prevent listing as cardiac recipient alone (other than renal impairment/failure
      6.4.2 Renal failure due to diabetes
      6.4.3 Potentially reversible renal failure
      6.4.4 Creatinine of greater than 200 that is not felt to be reversible with cardiac transplant alone but less than that requiring dialysis within the usual acceptable limits of listing for renal transplant would need to be assessed for a potential living donor.
   6.5 All potential heart/kidney recipients should be seen by anesthesia in pre-admission clinic

7. ACTIVATION PROCEDURE
   7.1 Ensure this SOP is in the on-call book
   7.2 St. Paul’s Hospital Pre-Renal Transplant Clinical Coordinator will notify patient’s hemodialysis unit regarding the collection of a specimen monthly for immunology
7.3 Fax a note to immunology at VGH stating patient activated for combined heart/kidney transplant and that they are a priority on the renal list
7.4 Contact retrieval coordinator at BCT to notify of activation, send copy fo this SOP
7.5 Contact Clinical Coordinator at St. Paul’s Hospital renal program and VGH renal program of activation
7.6 Activate patient on PROMIS as Status 2
7.7 Notify Head of Anesthesia department when patient listed
### 3.3.2 Combined Heart-Kidney Process Flow Sheet

![Combined Heart-Kidney Process Flow Sheet](image-url)
3.4 Immunological Screening and Monitoring while Waiting for Transplant

All patients undergoing transplant assessment require Cytotoxic Antibody Screen (also called calculated Panel Reactive Antibody – cPRA). This test is only performed at the Vancouver General Hospital Immunology lab. See below for pre-transplant

<table>
<thead>
<tr>
<th>Blood sample for flow crossmatch in case of transplant to Immunology</th>
<th>cPRA 0% without VAD</th>
<th>All listed candidates with cPRA &gt;0% and/or VAD present</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly</td>
<td>Monthly</td>
<td></td>
</tr>
<tr>
<td>cPRA</td>
<td>Yearly</td>
<td>q 3 monthly</td>
</tr>
</tbody>
</table>

If sensitizing event occurs – i.e. blood transfusion or major infection requiring IV antibiotics, perform cPRA 3-4 weeks after event (e.g. blood transfusion date or date of DIAGNOSIS of infection) and then revert to above criteria.
4 The Transplant

4.1 Matching Donor to Recipient

The on-call transplant cardiologist when triaging a donor call from BC Transplant, will receive the donor’s blood group and Human Leukocyte Antigen (HLA) status. This information will then be cross-referenced with potential recipients on our local transplant list. Once a possible recipient is identified based on acuity, size, weight and time on list, the cardiologist will review each donor antibody against the list of recipient antigens provided by the BCT coordinator (virtual crossmatch). If this crossmatch is negative, then the donor would be considered an appropriate match for the specified recipient. If the crossmatch is positive, then two options are possible:

(1) The transplant cardiologist may identify a potential alternate on the transplant list that is appropriate in terms of size/weight/acuity who has a negative virtual crossmatch

(2) The transplant cardiologist may confer with the immunologist on-call (Dr. Paul Keown Ph. (604) 306-2104) to determine the significance of the potential antigen-antibody mismatch or the titer of the donor specific antibody. In the case that an organ is transplanted with a positive crossmatch, there is a conversation with the cardiac surgeon on-call to discuss the clinical situation, rationale for transplanting in this scenario and for identifying pre-intra- and post-operative strategies to minimize the risk of rejection.
4.2 Donor Criteria

An organ donor deemed suitable first by the criteria outlined by BC Transplant and then between the cardiologist and surgeon on call.

Additionally, the HTx surgeon and cardiologist use the following exclusion criteria to assess donor suitability:

- Poor Ejection Fraction
- diffuse atherosclerosis
- congenital or valvular heart diseases that are not easily correctable.

4.3 Exceptional Distribution of Organs

Exceptional Distribution of organs refers to organs obtained from a donor for whom the donor suitability assessment identified an increased risk for disease transmission.

BC Transplant has a physician handbook to support physicians in presenting information to patients. This handbook is available on request to BC Transplant. Appendix A contains a link to BC Transplant internal documentation that can only be accessed from inside the PHC system.

Appendix A contains the PHC consent form and Patient Information Brochure.

4.4 Call in for Heart Transplant

The recipient is agreed upon between the cardiologist and surgeon on call. The process for allocation is outlined previously.

The Heart Transplant Coordinator is notified (on call coordinator if after hours: 604-250-2658) by the Heart Transplant Cardiologist and informed as to who needs to be called in as well as approximate timing and any other pertinent information.

Once the patient has been called in and appropriate areas informed by the Coordinator on call, it is the responsibility of the Cardiologist and Cardiac Surgeon to manage the patient’s clinical care.

The form used to call in patients is below:
Heart Transplant Recipient Call-In Progress

Notes

Date/Time

Call received from

Call-in  □ Primary  □ Backup

Planned OR Time

Latest acceptable arrival time to hospital

Remind patient(s): □ NPO  □ Hold Coumadin & all meds  □ Bring meds (in case dry run)  □ Possibility of dry run

Travel Instructions

Where possible, patients to make their own way into the hospital
Discuss travel plan with pt and determine whether ETA fits with above latest acceptable time

If standard flight or ferry is NOT able to get the patient here at the above ETA:

FLIGHT
Call Uniglobe for flight booking, tell them you're with BC Transplant HTx program & ask for Kimberly Walsh (24/7 on call)
  • 1-416-564-6759, or 1-866-252-4942 (press 1)
  • Email: kwalsh@tehcentre.com

Provide Kimberly with patient's contact information required ETA
Ask Kimberly to phone you back with travel plans for patient
Inform Cardiologist if any delays

If the patient requires a ferry and it is a high volume time (eg stat holiday etc)
Obtain patients: vehicle colour______, year ________, make ________, license plate number_________ and departure terminal_________

Then call BC Ferries –1-888-223-3779 and inform them that the patient requires Medical Assured Loading

Call patient back with instructions to board ferry

ETA

If Delay – Notify Cardiologist on-call

Notify following departments / persons – inform of.  SPH # 604-682-2344

5A  62304  * remind to pick up chart  CNL/CN:
CSICU  62117  CNL/CN:

Form completed by:  Signature:  Print name:  

Last revised June 25, 2016

Reviewed by Dr. Anson Uneung and Approved November 2017

Reviewed by Dr. Mustafa Toma and Approved November 2017.
4.5 *Pre-operative Protocol*

Heart Transplant Admission Preprinted Prescriber Order is initiated by the Cardiologist on-call.

**HEART TRANSPLANT PRE-OPERATIVE ORDERS**

(items with check boxes must be selected to be ordered)

<table>
<thead>
<tr>
<th>ADMISSION INSTRUCTIONS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most responsible physician: ____________________________</td>
</tr>
<tr>
<td>Admit to 5A</td>
</tr>
<tr>
<td>Notify family physician: ____________________________</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CODE STATUS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full code</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DIET:</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO medications with sips of water</td>
</tr>
<tr>
<td>NPO</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MONITORING:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetic, monitor capillary blood glucose Q4H while NPO, notify physician if below 4 mmol/L or above 10 mmol/L</td>
</tr>
<tr>
<td>Record Height and Weight on graphic record</td>
</tr>
<tr>
<td>[ ] Telemetry Class II [ ] Telemetry Class I (only if ICD off)</td>
</tr>
<tr>
<td>Call surgeon on call if INR above 1.8</td>
</tr>
<tr>
<td>Call Most Responsible Physician if:</td>
</tr>
<tr>
<td>LVAD alarms low flow or high watts</td>
</tr>
<tr>
<td>LVAD patient MAP less than 55 mmHg or more than 90 mm Hg</td>
</tr>
<tr>
<td>Temperature above 37.5 °C (if different from baseline)</td>
</tr>
<tr>
<td>[ ] Turn off AICD shock function</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LABORATORY:</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT:</td>
</tr>
<tr>
<td>PTT, INR, CBC with diff, reticulocyte count, electrolytes, urea, creatinine, calcium, magnesium, phosphate</td>
</tr>
<tr>
<td>Random glucose, total and direct bilirubin, AST, ALT, Alk Phos, GGT, LDH, total protein, albumin, amylase</td>
</tr>
<tr>
<td>Type and Screen</td>
</tr>
<tr>
<td>HLA and cytotoxic antibody screen (red top x 1, ACD Yellow top x 1 and 7 ml. EDTA purple top x 1; send to VH immunology – next day transport OR)</td>
</tr>
<tr>
<td>Urinalysis, urine culture</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DIAGNOSTICS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT chest x-ray (PA and lateral)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TREATMENTS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorhexidine shower</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INTRAVENOUS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] Insert saline lock if no IV</td>
</tr>
</tbody>
</table>

ALL NEW ORDERS MUST BE FLAGGED
HEART TRANSPLANT PRE-OPERATIVE ORDERS

(Medication items with check boxes must be selected to be ordered)

MEDICATIONS:

☐ Discontinue ASA and P2Y12 inhibitors (e.g. clopidogrel, ticagrelor)
  Specify: _____________________________

☐ Discontinue ACE inhibitors / ARB (e.g. ramipril, candesartan, valsartan/sacubitril)
  Specify: _____________________________

☐ Discontinue diabetes medications on day of surgery (e.g. glyburide, gliclazide, linagliptin,
  metformin, insulin)
  Specify: _____________________________

Discontinue IV heparin on call to OR
Discontinue warfarin
☐ vitamin K 10 mg IV STAT
lorazepam 0.5 to 2 mg sublingual Q2H PRN anxiety
ranitidine 150 mg PO 2 hours pre-op
zopiclone 3.75 mg PO HS PRN insomnia
☐ inotropes as per completed INOTROPE INFUSION ORDERS (PH019)

Immunosuppression:
Heart transplant team or cardiologist to indicate preferred post-operative induction agent:
☐ basiliximab *OR* ☐ antithymocyte globulin
  (CVT to order on Heart Transplant CSICU Admission Orders post-operatively)
methylPREDNISolone 500 mg IV x 2 doses in operating room (on induction of anesthesia and at reperfusion)
mycophenolate mofetil 1 gram PO STAT

Anti-infectives:
Antibiotic infusion must be completed within 60 minutes before incision. Patients known to be
colonized with MRSA should receive both ceFAZolin and vancomycin unless penicillin allergic.
Penicillin allergic patients should receive vancomycin only. CeFAZolin should be re-dosed Q4H after
initial dose until incision closed.

☐ weight below 80 kg: ceFAZolin 1 g IV on induction and Q4H throughout surgery until incision closed
☐ weight 80 to 120 kg: ceFAZolin 2 g IV on induction and Q4H throughout surgery until incision closed
☐ weight above 120 kg: ceFAZolin 3 g IV on induction Q4H throughout surgery until incision closed

Penicillin allergic and/or known MRSA colonization:

☐ weight below 80 kg: vancomycin 1 g IV over 60 minutes via infusion pump
☐ weight 80 kg and above: vancomycin 1.5 g IV over 90 minutes via infusion pump

IF SURGERY CANCELLED:

Physician to ensure patient aware to resume pre-admission medications.

Before discharging patient, ensure:

☐ implantable defibrillator has been reactivated
☐ anticoagulation recommended

Follow-up arranged with Family Physician

Printed Name
Signature
College ID
Contact Number

7 (R. Oct 18-17)

ALL NEW ORDERS MUST BE FLAGGED

Clinical Guidelines for Adult Heart Transplantation – Revised September 2017

Reviewed by Dr. Anson Cheung and Approved November 2017.
Reviewed by Dr. Mustafa Toma and Approved November 2017.
4.6 The Transplant Surgery

The surgery is performed by the Transplant Cardiac Surgeon on-call.

It is the responsibility of the Transplant Cardiac Surgeon to verify with the OR and BC Transplant teams involved in the organ retrieval, the correct blood group of the organ donor and the organ recipient before the transplant procedure commences.
5 Post-Heart Transplant

5.1 Most Responsible Physician
The most responsible physician until transfer to 5A is the Transplant Surgeon.

5.2 Post-Operative Orders

HEART TRANSPLANT CSICU ADMISSION ORDERS
[see corresponding Medication Administration Record PH261-MA (R. Oct 18-17)]
(items with check boxes must be selected to be ordered) (Page 1 of 4)

ADMISSION INSTRUCTIONS:
Most responsible physician: 
CMV status: Donor: Recipient: 

CODE STATUS: Full code

DIET: When extubated: screen as per dysphagia protocol (Refer to Interdisciplinary Guidelines: Dysphagia Management
$ Healthy Heart $ Diabetic
Fluid restriction 1500 mL/day

ACTIVITY: Bedrest
Once extubated initiate progressive mobilization

CONSULTS: Dietitian
Physiotherapist

LABORATORY: Daily CBC and diff, PTT, INR, electrolytes, magnesium, glucose, urea, creatinine, AST, ALT, LDH
CMV PCR every Monday

DIAGNOSTICS: Chest x-ray x 1

TREATMENTS: Red cell transfusion threshold hemoglobin: g/dL.
Warming blanket for temperature below 35.5°C
Vt 6 to 10 mL/kg, RR below 25/min; PEEP 5 to 10 cm H₂O, FiO₂ to keep SaO₂ over 92%
When hemodynamically stable, wean from mechanical ventilation as per protocol
Check intrinsc rhythm as per Pacemaker (Epocardial) Procedures: Temporary, Checking Intrinsc Rhythm
Manage arrhythmies or pacemaker malfunction as per Pacemaker (Temporary Epicardial) Protocol: Patient
Care in Emergency Situations

INTRAVENOUS: potassium chloride 40 mmol in dextrose 5% and sodium chloride 0.9% 1000 mL at 30 mL/hour
minimize IV diluent volumes

Printed Name: Signature: College ID: Contact Number:

61 (R. Oct 18-17) ALL NEW ORDERS MUST BE FLAGGED
HEART TRANSPLANT CSICU ADMISSION ORDERS
[see corresponding Medication Administration Record PH261-MA (R. Oct 18-17)]
(items with check boxes must be selected to be ordered) (Page 2 of 4)

MEDICATIONS:
Discontinue all previous medications and treatments

Induction Agent:
Refer to Heart Transplant Pre-Cp orders for preferred induction agent as selected by cardiologist.
If highly sensitized or positive crossmatch, select antithymocyte globulin (rabbit) as induction agent.

Select one of the following:

- basiliximab 20 mg IV x 2 doses (on day of surgery (date): ___________ and on POD 4)
- antithymocyte globulin (rabbit) ____mg IV (1.5 mg/kg rounded to nearest 25 mg) daily
  (maximum 150 mg/day) via 0.2 micron filter x 4 days
  Infuse over 6 hours on first day and 4 hours on subsequent days

Premedicate with:
acetaminophen 650 mg PO/NG/rectal 30 minutes prior to antithymocyte globulin (rabbit)
diphenhydrAMINE 50 mg IV 30 minutes prior to antithymocyte globulin (rabbit)

Dose adjustment:

<table>
<thead>
<tr>
<th>antithymocyte globulin (rabbit) dose</th>
<th>WBC (giga/L)</th>
<th>Platelet Count (giga/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>full dose</td>
<td>above 3</td>
<td>above 75</td>
</tr>
<tr>
<td>half dose</td>
<td>2 to 3</td>
<td>50 to 75</td>
</tr>
<tr>
<td>hold dose</td>
<td>below 2</td>
<td>below 50</td>
</tr>
</tbody>
</table>

Immunosuppression:
mycophenolate mofetil 1 g PO/NG Q12H 09:00 and 21:00
methylPREDNISolone 125 mg IV Q8H x 3 doses on POD 0
predniSONE ________mg (0.5 mg/kg/day rounded to the nearest 5 mg) PO/NG on POD 1; then taper by 5 mg/day until dose reaches 20 mg, then continue on predniSONE 20 mg PO daily

Antiviral Therapy:
If CMV mismatch (Donor CMV positive and Recipient CMV negative):
[ ] valGANCiclovir 900 mg PO daily for duration of hospital stay

If not CMV mismatch:
[ ] acyclovir 400 mg PO Q12H 09:00 and 21:00 for duration of hospital stay

Anti-infectives:
[ ] ceFAZolin 2 g IV Q8H x 3 doses *OR* [ ] ceFAZolin 2 g IV Q8H until chest tubes removed
cotrimoxazole 400/80 mg PO daily for duration of hospital stay
nystatin 500,000 units (5 mL) PO swish and swallow QID for duration of hospital stay

Printed Name __________________________ Signature __________________________
College ID __________________________ Contact Number __________________________

1 (R. Oct 18-17) ________________________ ALL NEW ORDERS MUST BE FLAGGED ________________

Clinical Guidelines for Adult Heart Transplantation – Revised September 2017

Reviewed by Dr. Anson Cheung and Approved November 2017.

Reviewed by Dr. Mustafa Toma and Approved November 2017.
HEART TRANSPLANT CSICU ADMISSION ORDERS
[see corresponding Medication Administration Record PH261-MA (R. Oct 18-17)]
(items with check boxes must be selected to be ordered) (Page 3 of 4)

MEDICATIONS: (continued)

Vasoactive agents:
Infuse the following to maintain CI above 2.2 and MAP greater than 60 mmHg:
- nitroglycerin 5 to 200 mcg/min IV PRN
- NORepinephrine 0.5 to 10 mcg/min IV PRN
- epinephrine 0.5 to 10 mcg/min IV PRN
If infusing from the operating room, use the following to maintain CI above 2.2 and MAP greater than 60 mmHg:
- milrinone 0.25 to 0.75 mcg/kg/min IV PRN (check with physician before titrating)
- PHENyllepine 10 to 200 mcg/min IV PRN
- vasopressin 0.005 to 0.04 units/min IV PRN
- nitric oxide 0 to 40 ppm inhaled PRN
- furosemide 10 to 80 mg IV PRN urine output less than 1.5 mL/kg/hour

Anxiety:
- proPOFol 5 to 100 mcg/kg/min IV infusion PRN
- proPOFol 20 mg IV bolus (to maximum 40 mg) in mechanically ventilated patients only
  administer over 10 seconds via infusion pump or over 2 to 4 seconds via gravity line
  Do not administer if SBP less than 90, call MD if proPOFol 40 mg total given
- midazolam 0.5 to 2 mg IV PRN
  When extubated: lorazepam 0.5 mg SL Q1H PRN anxiety (maximum 1 mg/24h)

Analgesia:
- HYDROmorphone 0.1 to 1 mg/hour IV infusion
- HYDROMorphone 0.2 to 0.6 mg IV Q5MIN PRN pain
- fentanyl 1 to 100 mcg/hour IV infusion
- fentanyl 20 to 50 mcg IV Q5MIN PRN pain
- acetaminophen 650 mg rectal within 2 hours of admission to CSICU
- acetaminophen 650 PO/NG/gastroc hole 06H until POD 5. Do not exceed 4 grams in 24 hours from all sources
- HYDROMorphone 1 to 2 mg PO Q2H PRN pain

Delirium:
- loxapine 2.5 to 5 mg PO/NG/subcutaneously Q2H PRN delirium (max 30 mg/24 hour)
- QUEtiazone 12.5 to 25 mg PO/NG TID PRN delirium or insomnia

Insomnia:
- zopiclone 3.75 mg PO HS PRN insomnia, may repeat once

GI prophylaxis:
- When intubated: ranitidine 50 mg IV Q8H
- When extubated: ranitidine 150 mg PO BID at 09:00 and 21:00

Printed Name
Signature
College ID
Contact Number

(R. Oct 18-17)

ALL NEW ORDERS MUST BE FLAGGED

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HEART TRANSPLANT CSICU ADMISSION ORDERS

[see corresponding Medication Administration Record PH261-MA (R. Oct 18-17)]

(items with check boxes must be selected to be ordered)  (Page 4 of 4)

MEDICATIONS: (continued)

Antiemetics: ondansetron 4 mg IV/PO Q8H PRN nausea/vomiting
dimenhyDRINATE 25 to 50 mg IV/IM/PO Q6H PRN nausea/vomiting

Dysglycemia: If arterial/capillary blood glucose over 10mmol/L, start insulin regular human as per completed INSULIN INFUSION PROTOCOL (Critical Care) orders (PH211)
If not on IV insulin, use the following insulin regular human subcutaneous sliding scale with capillary blood glucose check Q6H

<table>
<thead>
<tr>
<th>Capillary Blood Glucose (mmol/L)</th>
<th>Insulin regular human (subcutaneous)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 or less</td>
<td>Start Hypoglycemia Protocol</td>
</tr>
<tr>
<td>4.1 to 8</td>
<td>0 units</td>
</tr>
<tr>
<td>8.1 to 12</td>
<td>2 units</td>
</tr>
<tr>
<td>12.1 to 14</td>
<td>4 units</td>
</tr>
<tr>
<td>14.1 to 16</td>
<td>7 units</td>
</tr>
<tr>
<td>16.1 to 20</td>
<td>10 units</td>
</tr>
<tr>
<td>Over 20</td>
<td>12 units and call prescriber</td>
</tr>
</tbody>
</table>

Bowel Protocol: POD 2: start docosate 200 mg PO BID until opioids discontinued and mobile
If no BM by POD 3, or 3 days since last BM, give senna glycosides 17.2 mg (2 x 8.6 mg tabs) PO HS
If no BM by POD 4, or 4 days since last BM, give bisacodyl 10 mg rectal in AM, then senna glycosides 25.8 mg (3 x 8.6 mg tabs) PO HS
If no BM by POD 5, or 5 days since last BM, or poor results give lactulose 30 mL PO HS
If no BM by POD 6, or 6 days since last BM, notify prescriber

Electrolyte replacement:
- potassium chloride 20 mmol in sterile water 50 mL IV over 1 hour PRN if potassium 4 mmol/L or less
- magnesium sulfate 2 g in dextrose 5% 50 mL IV over 1 hour PRN if magnesium 1 mmol/L or less
- SODIUM phosphate 9 mmol in dextrose 5% 100 mL IV over 2 hours PRN phosphate below 0.8 mmol/L

Thromboprophylaxis: as per completed VTE Risk Assessment and Prophylaxis Orders (PHC-PH408)

Other:

Printed Name   Signature   College ID   Contact Number

(R. Oct 18-17) ALL NEW ORDERS MUST BE FLAGGED

Clinical Guidelines for Adult Heart Transplantation – Revised September 2017

Reviewed by Dr. Anson Cheung and Approved November 2017.
Reviewed by Dr. Mustafa Toma and Approved November 2017.
5.3 *Immunosuppression Intra- and Immediately Post-Operatively*

Immunosuppressive regimen immediately prior to transplant and intra-operatively can be found in the Heart Transplant Admission PPO.

Selection of induction agent depends on patients cPRA level pre-operatively or whether they have donor specific antigens (DSA) identified. The table below outlines the current process.

**VIRTUAL CROSSMATCH**

<table>
<thead>
<tr>
<th>VIRTUAL CROSSMATCH</th>
<th>NEGATIVE</th>
<th>POSITIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEGATIVE</td>
<td>Usual induction with Basiliximab on Day 0 and Day 4</td>
<td>Induction with rATG Monitor DSA as per protocol</td>
</tr>
<tr>
<td>POSITIVE</td>
<td>Discuss with Immunologist to determine whether the result is clinically relevant or not. May require further testing. If not a clinically relevant result, usual induction with Basiliximab on Day 0 and Day 4 If relevant, induction with rATG as per post-transplant order set.</td>
<td>Commence desensitization therapy as per protocol including rATG induction.</td>
</tr>
</tbody>
</table>

**5.3.1 Basiliximab Induction**

All patients who have cPRA <20% and negative virtual and/or flow crossmatch will receive Basiliximab induction as per Heart Transplant CSICU Admission Order.

**5.3.2 Antithymocyte Globulin (rATG) Induction**

All patients with cPRA ≥ 20% OR high-risk as outlined above will receive rATG induction as per Heart Transplant CSICU Admission Order.
Post-Heart Transplant Desensitization Therapy

- rATG induction
- Other immunosuppression as per standard protocol
- Discuss Plan with Renal Team – in general:
  - PLEX every day x 5 runs
  - PLEX every second day x 5 runs
  - IVIG 0.1g/kg after each PLEX
  - Discuss timing of Rituximab at team rounds. Only necessary if DSA continues to be positive
5.4 Post-Transplant Recovery

5.4.1 Early Post-Operative Phase
Close surveillance by the CSICU team and early intervention are the key. Post-operative order sets address prophylactic and preventative measures used to minimize complications.

Daily rounds by the Heart Transplant team occur in collaboration with the CSICU and other relevant teams.

5.4.2 Combined Heart-Kidney Transplant
In the case of combined heart and kidney transplantation, the Renal Transplant Team controls the immunosuppressive regimen.
5.5 **Transfer to 5A (post-operative ward)**

Most patients can be transferred to the ward within 2-5 days. Once hemodynamically stable and no longer requiring critical care surveillance, Heart Transplant Transfer Orders (below) are completed.

5.5.1 **Transfer orders**

**HEART TRANSPLANT TRANSFER ORDERS**

(Items with check boxes must be selected to be ordered) (Page 1 of 3)

**MOST RESPONSIBLE PHYSICIAN:** Dr. 

**ADMISSION INSTRUCTION:**

Transfer to: 5A or ____________
Day ____________ post-transplant. Target discharge date: ________________

**CODE STATUS:** Full code

**DIET:** Healthy Heart [ ] Diabetic [ ]
Fluid restriction: ______ mL/day

**ACTIVITY:** Encourage increasing mobilization

**CONSULTS:** Physiotherapy

**MONITORING:**
- Daily weight
- Dry weight: ________________
- Telemetry Class II – discontinue when in normal sinus rhythm for 24 hours

**LABORATORY:**
- Mondays, Wednesdays and Fridays:
  - CBC with diff, electrolytes, urea, creatinine, glucose (fasting)
  - tacrolimus pre level at 08:30 (30 mins prior to 09:00 dose) on: ________________ (date)
  - Other: ________________
- Mondays only: total and direct bilirubin, AST, ALT, GGT, LDH, CK, total protein, albumin, CMV PCR

**DIAGNOSTICS:**
- Book cardiac biopsy on date: ________________
  (complete requisitions, LA184, PHC-RA089)
- [ ] Chest X-ray on Mondays
- Echocardiogram at 1 week post operatively (complete requisition EK000)

**TREATMENTS:**
- Oxygen therapy - Insure to maintain Oxygen Saturation above 92%
- Remove pacing wires day 4 post operatively if NSR for over 24 hours
- Remove all chest incision and drain staples and/or sutures on POD: ________________

**INTRAVENOUS:**
- Saline lock, remove when off telemetry and IV therapy

---

**ALL NEW ORDERS MUST BE FLAGGED**

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HEART TRANSPLANT TRANSFER ORDERS

MEDICATIONS: Discontinue all previous medications and treatments

Induction Agent: □ basiliximab 20 mg IV x 1 dose on POD 4 (date: _____________________)
*OR*
□ antithymocyte globulin (rabbit) ______ mg IV (1.5 mg/kg rounded to nearest 25 mg) daily
(maximum 150 mg/day) via 0.2 micron filter x ________ days (infuse over 4 hours)
Premedicate with: acetaminophen 650 mg PO 30 minutes prior to antithymocyte globulin (rabbit)
diphenhydramine 50 mg IV 30 minutes prior to antithymocyte globulin (rabbit)

Immunosuppression: prednisone ______ mg PO today, taper by 5 mg/day to 20 mg PO daily
□ mycophenolate moefetil ______ gram PO Q12H at 9:00 and 21:00
□ tacrolimus ______ mg (0.075 mg/kg/dose) PO Q12H at 09:00 and 21:00

Antiviral Therapy: If CMV mismatch (Donor CMV positive and Recipient CMV negative):
□ valganciclovir 900 mg PO daily for duration of hospital stay
If not CMV mismatch:
□ acyclovir 400 mg PO Q12H 09:00 and 21:00 for duration of hospital stay

Anti-infectives: nystatin 500,000 units (5 mL) PO swish and swallow QID for duration of hospital stay
cotrimoxazole 400/80 mg PO daily for duration of hospital stay

Cardiac medications: □ milrinone ______ mcg/kg/min IV infusion (see PH019 - INOTROPE INFUSION ORDERS)
ASA enteric coated 81 mg PO daily
□ furosemide ______ mg PO BID
pravastatin 20 mg PO daily at 21:00

Analgesia: acetaminophen 650 mg PO QID until POD 5 then QID PRN; do not exceed 4 g per 24 hours from all sources
HYDROMORPHONE 1 to 2 mg PO Q2H PRN pain

Insomnia: zopiclone 3.75 to 7.5 mg PO HS PRN insomnia; may repeat once if needed

GI Prophylaxis: ranitidine 150 mg PO Q12H 09:00 and 21:00

Antiemetics: ondansetron 4 mg IV/PO Q8H PRN nausea/vomiting
dimenhydrinate 25 to 50 mg IV/IM PO Q6H PRN nausea/vomiting

Printed Name ___________________________ Signature ___________________________
College ID ___________________________ Contact Number ___________________________

2 (R. Oct 19-17)

ALL NEW ORDERS MUST BE FLAGGED
**HEART TRANSPLANT TRANSFER ORDERS**

_Items with check boxes must be selected to be ordered_

**MEDICATIONS:** (continued)

**Dysglycemia:**

- [ ] insulin regular human subcutaneous sliding scale with capillary blood glucose check QID

<table>
<thead>
<tr>
<th>Capillary Blood Glucose (mmol/L)</th>
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</thead>
<tbody>
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<td>10 units</td>
</tr>
<tr>
<td>Over 20</td>
<td>12 units and call prescriber</td>
</tr>
</tbody>
</table>

**Bowel Protocol:**

- POD 2: docusate 200 mg PO BID until opioids discontinued and mobile (hold if loose BM)
- POD 3: if no BM by POD 3 give senna glycosides 17.2 mg (2 x 8.6 mg tabs) PO HS
- POD 4: if no BM by POD 4 give microlax enema rectal in AM, then senna glycosides 25.8 mg (3 x 8.6 mg tabs) PO HS
- POD 5: if no BM by POD 5 or poor results give lactulose 30 mL PO HS
- POD 6: if no BM by POD 6, notify prescriber

**VTE Prophylaxis:** Refer to completed VTE Risk Assessment and Prophylaxis Orders (PHC-PH408)

**Others:**

- calcium carbonate 1250 mg PO Q12H 09:00 and 21:00
- vitamin D 1000 units PO daily

---

**Printed Name**

**Signature**

**College ID**

**Contact Number**

ALL NEW ORDERS MUST BE FLAGGED

---

Clinical Guidelines for Adult Heart Transplantation – Revised September 2017

Reviewed by Dr. Anson Cheung and Approved November 2017.

Reviewed by Dr. Mustafa Toma and Approved November 2017.
5.5.2 Most Responsible Physician on 5A
The most responsible physician is now the Heart Failure/Transplant Cardiologist. The patient is seen daily by a member of the Transplant Cardiology team.

5.5.3 Infection Control
Where possible, patients are nursed in a private room. This is primarily to enable more undisturbed time for rest and patient teaching. Standard infection control measures are used. Isolation procedures are only implemented with a specific order (e.g. severe neutropenia).

5.5.4 Immunosuppression
Triple therapy primarily with tacrolimus, mycophenolate mofetil and prednisone are initiated in the majority of patients. This is tailored according to clinical condition. The Heart Transplant Transfer Orders outline the immunosuppressive regimen used.

In the case of heart-kidney transplant recipients, the Renal Transplant Team controls the immunosuppressive regimen.

See BC Transplant Clinical Guidelines for Transplant Medications for the current accepted target blood levels for heart transplant recipients. This manual also contains detailed information about immunosuppressant medications.
5.5.5 **Patient Education**

Patient education is initiated as soon as feasible. The program uses a competency-based teaching program that is performed by all experienced nurses and allied health team members on 5A.

The post-transplant Patient Educator sees the patient and family to ensure they understand what they have learned and to provide outpatient information.

The Dietitian, Social Worker and Physiotherapist spend time with the patient and family to provide information around going home. The Psychologist is also available if required.

Patients learn to self-medicate while in the hospital and either the patient or a family member must show competence before discharge.
5.6 Discharge

Discharge from hospital occurs when the patient has completed education training and has demonstrated understanding and/or competence with self-medication, self-reporting of symptoms and other aspects of self-care. Patients are usually discharged within 10-14 days of surgery.

5.6.1 Discharge Prescriptions

HEART TRANSPLANT
DISCHARGE PRESCRIPTION

(To be dispensed by Community Pharmacy)

Date: __________________________

(Items must be selected to be ordered)

☐ ASA enteric coated 81 mg PO daily x 3 months
☐ cotrimoxazole 400/80 mg PO daily x 3 months
☐ calcium carbonate 1250 mg PO BID x 3 months
☐ vitamin D 1000 units PO daily x 3 months
☐ pravastatin 20 mg PO daily x 1 month, then pravastatin 40 mg daily x 2 months
☐ ranitidine 150 mg PO BID x 3 months
☐ amLODipine _________ mg PO _____ x _____ month(s)
☐ furosemide _________ mg PO _____ x _____ month(s)
☐ potassium chloride 20 mEq PO _____ x _____ month(s)
☐ acetaminophen 325 to 650 mg PO Q6H PRN x 30 tablets
☐ docusate sodium 100 to 200 mg PO BID PRN x 3 month(s)

Refills x ___

Refills x ___

Refills x ___

Refills x ___

Refills x ___

Refills x ___

Refills x ___

Pharmacist please contact Transplant Clinic at 604-806-8374 for any concerns

Physician’s Signature: __________________________ Printed Name: __________________________

College ID #: __________________________ Phone: __________________________

Distribution: Original: External Pharmacy
Photocopy for Chart before giving original to patient
HEART TRANSPLANT
DISCHARGE BCTS PRESCRIPTION
(To be dispensed by St. Paul’s Hospital Pharmacy)

Date: ______________________

(Items must be selected to be ordered)

☐ cycloSPORINE (NEORAL) __________ mg PO in AM and ______ mg PO in PM x 1 month

☐ tacrolimus (PROGRAF) __________ mg PO in AM and ______ mg PO in PM x 1 month

☐ predniSONE __________ mg PO daily x 1 month

☐ mycophenolate mofetil (CELLCEPT) ______ mg PO in AM, ______ mg PO in PM x 1 month

☐ ValGANcilovir __________ mg PO daily x 1 month – refill x 5

☐ Rejection Treatment Pack x 1 (predniSONE 100 mg PO daily x 3 days ONLY to be taken when directed by Heart Transplant Clinic for treatment of rejections)

Physician’s Signature: __________________________ Printed Name: __________________________

College ID #: __________________________ Pager: __________________________

Fax to St Paul’s Hospital Outpatient Pharmacy (68675) at least 3 hours prior to discharge.
All other medications to be obtained by patient from a Community Pharmacy.

Form No. PH061 (R. Apr. 11)
6 Long-Term

6.1 Follow-up

Regular and frequent early follow-up ensures close surveillance as well as ongoing education regarding medications, diet and exercise.

Follow-up plans are recorded on a detailed patient biography situated at the front of the patient’s outpatient chart.

<table>
<thead>
<tr>
<th></th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Week 6</th>
<th>Week 8</th>
<th>Week 10</th>
<th>Month 3</th>
<th>Month 4</th>
<th>Month 4.5</th>
<th>Month 6</th>
<th>Month 9</th>
<th>1 Year</th>
<th>Annual Visits after 1 year</th>
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</thead>
<tbody>
<tr>
<td>Biopsy</td>
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<tr>
<td>Typical Steroid dose</td>
<td>17.5mg</td>
<td>15mg</td>
<td>12.5mg</td>
<td>10mg</td>
<td>7.5mg</td>
<td>5mg</td>
<td>2.5mg</td>
<td>off</td>
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<td>Mini Bloodwork</td>
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<td>3-6 monthly</td>
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<td>Chest Xray</td>
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<tr>
<td>Angiogram WITH IVUS (DSE if eGFR &lt;30)</td>
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<td></td>
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<td></td>
<td></td>
<td>1.25 years</td>
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<tr>
<td>Angiogram WITHOUT IVUS (DSE if eGFR &lt;30)</td>
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<td>at 10 years, every 5 years after that</td>
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<td>Echo</td>
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</tr>
</tbody>
</table>

Full bloodwork: CBC, diff, plates, lites, BUN, Creat, LFTs, alb, tot prot, tot/dirt bili, Ca, phos, Mg, HgbA1C (for diabetics), TSH, lipids, CylA or Tac level

Mini bloodwork: lites, BUN, Creat, CylA or Tac level

Caveat: While patient on Prednisone for immune suppression, the time points are a guide only and time points are determined by pred dose. If patient has had multiple rejection episodes, the time periods may change. Check patient biography.
6.2 Immunological Surveillance Post-Transplant

A new finding of Donor Specific Antibodies with a mean fluorescence intensity (MFI) over 5,000 is considered to require treatment.

<table>
<thead>
<tr>
<th>DSA present and/or Virtual/Flow XM POSITIVE</th>
<th>DSA</th>
<th>Echo</th>
<th>Endomyocardial Biopsy (Bx)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSA present and/or Virtual/Flow XM POSITIVE</td>
<td>Collect with Bx schedule&lt;br&gt;Year 1 2, 3, 4, 5&lt;br&gt;Thereafter if indicated</td>
<td>Week 1&lt;br&gt;Month 3, 6, 9, 12&lt;br&gt;Annually and if indicated</td>
<td>As per routine (specify C4D staining required)</td>
</tr>
<tr>
<td>Post AMR Treatment</td>
<td>Week 1, 4&lt;br&gt;Month 3, 6, 9&lt;br&gt;Year 1, 2, 3, 4, 5&lt;br&gt;Thereafter if indicated</td>
<td>Month 3, 6, 9, 12&lt;br&gt;Annually and if indicated</td>
<td>If &lt; 1 year post transplant, Bx as per routine&lt;br&gt;Otherwise, month 1, 3, 6, 12 post-treatment (specify C4D staining required)</td>
</tr>
<tr>
<td>cPRA &gt; 20%</td>
<td>Month 3&lt;br&gt;Year 1&lt;br&gt;If DSA found, discuss plan with cardiologist</td>
<td>As per routine</td>
<td>As per routine</td>
</tr>
<tr>
<td>DSA found for any reason other than above</td>
<td>If DSA found, repeat in three months&lt;br&gt;Discuss plan with cardiologist</td>
<td>Echo x 1 and if dysfunction follow AMR pathway</td>
<td>As per routine</td>
</tr>
</tbody>
</table>
6.3 **Long-term care - Approach**

The heart transplant clinic aims to improve long-term survival of heart transplant recipients under their care by providing support through:

- Self-management education and counseling
- Heart Transplant related follow-up
- Providing support to primary care providers
- Providing an efficient and safe service

6.3.1 **Primary Care Involvement**

Establish a partnership with Primary Care Providers (PCP), recognizing that active involvement in patient management with clear communication is a key factor in influencing outcomes.

Below is an example letter that is sent to the patient’s PCP when they first go home.

---

Dear Dr,

Please find attached a copy of the discharge summary for X.

Now that X has been discharged, we would like to outline what you can expect from our clinic in relation to care of your patient. We would like to enter into a partnership with you.

### Summary of Heart Transplant Clinic visit schedule

<table>
<thead>
<tr>
<th>Testing</th>
<th>1 month</th>
<th>Up to 6 months</th>
<th>6 months to 1 Year</th>
<th>Annually</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart Biopsy</td>
<td>Weekly 1 month</td>
<td>Second weekly until 5 months</td>
<td>Than month 6, 8 and 1 year</td>
<td>After 1 year, only if indicated</td>
</tr>
<tr>
<td>Renal function and immunosuppressive levels</td>
<td>As above</td>
<td>As above</td>
<td>As above</td>
<td>As above</td>
</tr>
<tr>
<td>Coronary artery disease screening tests</td>
<td></td>
<td></td>
<td></td>
<td>Yearly</td>
</tr>
</tbody>
</table>

**Our commitment – We will:**

- Manage the patient’s immunosuppression for life.
- Continue to manage specific medications that we prescribe.
- Manage lipids and hypertension.
- Order cardiac diagnostic procedures.
- Refer to cardiac rehab.
- Send you a summary sheet of each clinic visit with our plans.
- Send a yearly summary letter.
- Phone you if we have any concerns.
- Send you a discharge summary if the patient has been hospitalized here.

**We ask that you:**

- Manage other non-cardiac chronic conditions such as diabetes.
- Keep the program here informed of major changes to the patient’s condition
  - Malignancies
  - Infections
  - Surgery
  - Major morbidities
  - Death
- Administer yearly flu shots
- Organize routine malignancy screening particularly
  - Bowel
  - Breast
  - Gynaec
  - Skin (at least 6 monthly)

We look forward to managing this patient with you. We would appreciate feedback if you have any so that we can continue to provide consistent care with you.

**Who to call**

- **Business hours** 604-806-8374
- **After hours local** 604-377-2240
- **After hours toll-free** 1-800-863-6189

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Clinical Guidelines for Adult Heart Transplantation – Revised September 2017

Reviewed by Dr. Anson Cheung and Approved November 2017.

Reviewed by Dr. Mustafa Toma and Approved November 2017.
### 6.3.2 Readmissions to Hospital

#### 6.3.2.1 Heart Transplant and Immunosuppression related issues
Patients readmitted to hospital where possible, will be cared for directly by the Heart Transplant Cardiologist in 5A. Recognizing that there may be logistical or medical issues that prevent this, the Heart Transplant Cardiologist should be actively involved in their management plan.

#### 6.3.2.2 Non-heart transplant related issues
It is the role of the Heart Transplant Cardiologist to provide advice in a consultative manner around immunosuppression and cardiac medications. Regular updates will be sought by the team members in order to provide input when necessary.

### 6.4 Immunosuppression
See [BCT Pharmacy Manual](#) for more detailed information about suggested dosing and blood levels. Below is a summary of suggested drug levels used in our program.

#### 6.4.1 Tacrolimus

<table>
<thead>
<tr>
<th>Time Post-Transplant (Months)</th>
<th>Tacrolimus* Trough Blood Concentration (ng/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12 hours Post-Dose</td>
</tr>
<tr>
<td>Less than 3</td>
<td>9 to 12</td>
</tr>
<tr>
<td>3 to 6</td>
<td>8 to 9</td>
</tr>
<tr>
<td>6 to 12</td>
<td>6 to 8</td>
</tr>
<tr>
<td>Greater than 12</td>
<td>4 to 8</td>
</tr>
</tbody>
</table>
### 6.4.2 Cyclosporine

<table>
<thead>
<tr>
<th>Time Post Transplant (Months)</th>
<th>Cyclosporine* C0 (Trough) Concentration (ng/mL)</th>
<th>Cyclosporine* C2 Concentration (ng/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>When eGFR is greater than 45 mL/min/1.73 m²</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 1 month</td>
<td>Not used</td>
<td>1200 to 1400</td>
</tr>
<tr>
<td>2 to 3 months</td>
<td>Not used</td>
<td>1000 to 1200</td>
</tr>
<tr>
<td>4 to 5 months</td>
<td>Not used</td>
<td>800 to 1100</td>
</tr>
<tr>
<td>6 to 12 months</td>
<td>Not used</td>
<td>700 to 1000</td>
</tr>
<tr>
<td>12 to 24 months</td>
<td>Not used</td>
<td>600 to 800</td>
</tr>
<tr>
<td>Greater than 24 months</td>
<td>Not used</td>
<td>400 to 600</td>
</tr>
<tr>
<td><strong>When eGFR is less than 45 mL/min/1.73 m²</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 1 month</td>
<td>Not used</td>
<td>1000 to 1200</td>
</tr>
<tr>
<td>2 to 3 months</td>
<td>Not used</td>
<td>800 to 1100</td>
</tr>
<tr>
<td>4 to 5 months</td>
<td>Not used</td>
<td>700 to 900</td>
</tr>
<tr>
<td>6 to 12 months</td>
<td>Not used</td>
<td>600 to 800</td>
</tr>
<tr>
<td>12 to 24 months</td>
<td>Not used</td>
<td>400 to 600</td>
</tr>
<tr>
<td>Greater than 24 months</td>
<td>Not used</td>
<td>300 to 400</td>
</tr>
</tbody>
</table>

**Patients Transplanted before January 2000 who are receiving C0 level monitoring**

| Greater than 12 months        | 100 to 150                                   | Not used |

### 6.4.3 Sirolimus

<table>
<thead>
<tr>
<th>Time Post Transplant (Months)</th>
<th>Sirolimus Trough Concentration (ng/mL)*</th>
<th>Sirolimus Trough Concentration (ng/mL)*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(When sirolimus is used with tacrolimus or cyclosporine +/- mycophenolic acid and steroids)</td>
<td>(When sirolimus is used as a single agent +/- steroids)</td>
</tr>
<tr>
<td>All</td>
<td>4 to 8</td>
<td>8 to 12</td>
</tr>
</tbody>
</table>
6.4.4 Mycophenolate

<table>
<thead>
<tr>
<th>Patient Status</th>
<th>Mycophenolic Acid* Trough Blood Concentrations (mg/L) 12 hours Post Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stable and no transplant rejection</td>
<td>1.7 to 4</td>
</tr>
<tr>
<td>Has transplant rejection</td>
<td>2.5 to 4</td>
</tr>
<tr>
<td>Has MPA side effects and is stable</td>
<td>1.7</td>
</tr>
</tbody>
</table>

*Assay done at Vancouver General Hospital Special Chemistry Lab - Tandem Mass Spectrometry Assay

In general, mycophenolate levels are only performed if indicated.

6.5 Cellular Rejection Treatment

Acute cellular rejection monitoring is performed using the endomyocardial biopsy (EMBx). The first one is usually performed prior to discharge at around 10 – 14 days post-operatively. EMBx are performed on Wednesday mornings and prn for emergencies. The standard EMBx surveillance protocol is outlined earlier.

Treatment protocol is as follows:
An endomyocardial biopsy result of ISHLT 2R or above is considered significant enough to treat actively. In general, the following schedule is followed at the discretion of the attending Heart Transplant Cardiologist.

Protocol for Treatment of Acute Rejection – St Paul’s Hospital

As much as is possible, patients with cardiac rejection will be treated on an outpatient basis. The severity of the rejection and accompanying signs and symptoms such as low BP, shortness of breath, arrhythmia, fever, decreased exercise capacity may require inpatient treatment.

<table>
<thead>
<tr>
<th>ISHLT Grade of Rejection</th>
<th>&lt; 3 months post-Tx</th>
<th>&gt; 3 months post-transplant</th>
<th>Hemodynamic Compromise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 0R</td>
<td>Nil</td>
<td>Nil</td>
<td>Assessed individually</td>
</tr>
</tbody>
</table>
| Grade 1R                  | Nil                 | Nil                      | 1g IV Solumedrol x 3 days Admit to CCU  
|                           |                     |                          | • Echo  
|                           |                     |                          | • Monitor  
|                           |                     |                          | • +/- inotropes  
|                           |                     |                          | • Consider ATG |
| Grade 2R                  | 100mg Prednisone po x 3 days | 100mg Prednisone po x 3 days | 1g IV Solumedrol x 3 days Admit to CCU  
|                           | 1g IV Solumedrol x 3 days Admit 5a  
|                           | • Consider ATG  
|                           | • Optimize immunosuppression |                          | • Echo  
|                           |                     |                          | • Monitor  
|                           |                     |                          | • +/- inotropes  
|                           |                     |                          | • Consider ATG |
| Grade 3R                  | 1g IV Solumedrol x 3 days Admit 5a  
|                           | • Consider ATG  
|                           | • Optimize immunosuppression | 1g IV Solumedrol x 3 days Admit to CCU  
|                           |                     |                          | • Echo  
|                           |                     |                          | • Monitor  
|                           |                     |                          | • +/- inotropes  
|                           |                     |                          | • Consider ATG  
|                           |                     |                          | • Optimize immunosuppression |

Nursing Considerations:

- Close monitoring of hemodynamic parameters such as BP, heart rate, rhythm and symptoms of pump failure such as fluid retention and shortness of breath should be carefully monitored and reported immediately.
- Prednisone is discontinued while the patient is receiving Solumedrol.
- If the patient was a CMV mismatch, or if they required Acyclovir post transplant due to HSV prophylaxis, they will need prophylactic antiviral treatment reinitiated as per infection protocol.
- Septra will need to be reinitiated as per infection protocol.
- If the patient had steroid induced Diabetes in the immediate post-transplant period, this will likely re-occur. Check with the physician to see if he wants to order any therapy.
6.6 *Antibody Mediated Rejection*

```
Approach to Suspected AMR

EF decreased or 
HF symptoms (unexplained)  EF unchanged

pAMR 1-3

Comence 
treatment

pAMR 2-3  pAMR 0-1  pAMR 1-2  pAMR 3

Treat  No treatment  Treat

DSA pos  DSA neg

Reviewed by Dr. Anson Cheung and Approved November 2017.
Reviewed by Dr. Mustafa Toma and Approved November 2017.
```
6.6.1 Antibody Mediated Rejection (AMR) Treatment

6.6.1.1 In Hospital AMR Treatment

**HEART TRANSPLANT ANTIBODY MEDIATED REJECTION (AMR) ORDERS**

*Items with check boxes must be selected to be ordered*

---

**ADMISSION:**

48 HOURS PRIOR TO COMMENCING PLEX TREATMENT:

- MD to use AMR Planning and Summary Flowsheet (HH154) to communicate plan.

  - Consult Nephrology Consult Team to set up PLEX
  - □ Cytotoxic antibody screen (CAS) – Donor Specific Antibodies (if not done in last month)
  - Rituximab to be administered as per completed RITUXIMAB INFUSION FOR BIOPSY PROVEN ANTIBODY MEDIATED TRANSPLANT REJECTION ORDERS (PH249). If not possible to give 48 hours before, administer immediately after first PLEX

**MEDICATIONS:**

- methylPREDNISOLONE sodium succinate 500 mg daily IV x 3 days
- cotrimoxazole 400-800 mg PO daily for 6 months after last treatment

**TREATMENT:**

Nephrology Consult Team to arrange for PLEX every second day x 5 runs on the following dates:

- PLEX 1 date: ____________________________
- PLEX 2 date: ____________________________
- PLEX 3 date: ____________________________
- PLEX 4 date: ____________________________
- PLEX 5 date: ____________________________

After PLEX 1, 2, 3 and 4:

- IVIG ________ (0.1 g/kg) IV after each PLEX run

After PLEX 5:

- Draw bloodwork for: CAS (Donor Specific Antibodies)
- CBC
- CD19/20 (use ‘add test’ option in SCM)
- IVIG ________ (0.1 g/kg) IV; administer only after CAS has been drawn

---

**Printed Name**

**Signature**

**College ID**

**Contact Number**

5 (R. Aug 15-17)  **ALL NEW ORDERS MUST BE FLAGGED**

---

Clinical Guidelines for Adult Heart Transplantation – Revised September 2017

Reviewed by Dr. Anson Cheung and Approved November 2017.

Reviewed by Dr. Mustafa Toma and Approved November 2017.
6.6.1.2 Ongoing Outpatient AMR Treatment

INTRAVENOUS IMMUNE GLOBULIN (IVIG) – HEART TRANSPLANT OUTPATIENT

CLINICAL INDICATION FOR IVIG: Antibody mediated rejection
Weight: __________ kg
IV access (peripheral or central)

MEDICATIONS:
- acetaminophen 650 mg PO/PR for fever/headache 30 minutes prior to IVIG x 1 dose
- diphenhydrAMINE 25 mg PO/IV for itchiness/rash 30 minutes prior to IVIG x 1 dose
- hydrocortisone 100 mg IV for itchiness/rash 30 minutes prior to IVIG x 1 dose

INTRANEOUS:
- [ ] Pre transfusion: sodium chloride 0.9% IV 500 mL bolus
- [ ] Post transfusion: sodium chloride 0.9% IV 500 mL bolus

Intravenous Immune Globulin (IVIG):
Enter IVIG order in SCM prior to each appointment
Administer IVIG 1g/kg __________ g as per MSSU protocol monthly x 3 months
Infuse the adjusted amount supplied by Transfusion Medicine to complete the order. Adjusted dose will be noted on the transfusion record.

Administer as per NCS Intravenous Immunoglobulin (IVIG): Patient Care and Administration
(Use Adult IVIG Infusion Rate Table)

In case of reaction:
- STOP Transfusion; disconnect IVIG and connect to new IV line primed with D5W
- Infuse with D5W TKVO
- Notify physician
- Monitor vital signs Q5 minutes until stable
- Refer to Blood/Blood Products: Transfusion Reaction Identification and Management (NCS6327)
- and Quick Reference Guide - Response to Transfusion Reaction (PHC-LA081a)
- Resume infusion as per physician’s orders
- Complete Transfusion Reaction Report (PHC-LA081)

FOLLOW-UP:
- Rebook patient every month until a total of 3 doses of above have been completed.

DISCHARGE:
- Discharge patient after completion of total dose if no signs or symptoms of transfusion reaction

Printed Name ________________________________ Signature ________________________________ College ID ________________________________ Contact Number ________________________________

(jan 18)

ALL NEW ORDERS MUST BE FLAGGED

Clinical Guidelines for Adult Heart Transplantation – Revised September 2017

Reviewed by Dr. Anson Cheung and Approved November 2017.

Reviewed by Dr. Mustafa Toma and Approved November 2017.
6.6.1.3 After Initial AMR Treatment

If 50% drop in DSA MFI not seen following treatment, a second round of Section 6.6.1.1 and 6.6.1.2 could be considered.

Additional Rituximab dosing should be considered if no drop in CD 19/20 result.

If second round does not demonstrate a 50% drop in DSA MFI, discussion with the team should occur, with creation of an individualized treatment plan that should be documented on the patient biography outlining frequency of surveillance and what action is required.

In the long term, for all AMR patients, once initial round is completed, continue IVIG at 1g/kg which may be divided into 2 doses over 2 days if necessary monthly x 3. Clinic RN to use PH694 order set for Medical Short Stay instructions.

6.7 Infection Prophylaxis

After transplantation, all patients are placed on

- Nystatin 500,000 units swish and swallow until discharge from hospital.
- Cotrimoxazole 800/40 until oral prednisone is discontinued.
- If cytomegalovirus (CMV) mismatch (donor positive, recipient negative), follow CMV Prophylaxis and Treatment Regimen for Heart Transplant Recipients.
- In the case of prophylaxis for Hepatitis B should it be required – it can be found on pp 30-40 of the Clinical Guidelines for Transplant Medications Document.

6.7.1 Hepatitis B

<table>
<thead>
<tr>
<th>Organ</th>
<th>Donor HBV Status</th>
<th>Recipient HBV Status</th>
<th>Anti-Viral Therapy Post Tx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart</td>
<td>HBV core positive AND Hep B DNA detectable</td>
<td>Any hepatitis B status</td>
<td>Start lamivudine and refer to hepatologist</td>
</tr>
<tr>
<td></td>
<td>HBV core positive AND Hep B DNA undetectable</td>
<td>HBV core negative regardless of HBV surface antibody status</td>
<td>Monitor for HBV reactivation*</td>
</tr>
<tr>
<td></td>
<td>HBV core negative</td>
<td>HBV core positive</td>
<td>Monitor for HBV reactivation* May consider a referral to hepatologist to monitor for Hep B reactivation</td>
</tr>
</tbody>
</table>

*Monitor for HBV reactivation at every 3 months for one year then every 6 months. Tests to be done: hepatitis B surface antigen, hepatitis B core antibody, hepatitis B surface antibody and hepatitis B DNA.
6.8 Other Post-Transplant Medications
In general, the following medication changes apply, depending on the individual's situation.

- Ranitidine is generally discontinued when prednisone is discontinued.
- Calcium decreases or is discontinued (depending on dietary intake) when prednisone is discontinued. This will be determined with the dietitian if needed.
- Vitamin D supplements are continued for life.
- Statin medications are continued for life unless contraindicated.
- Antihypertensive and other cardiac medications are provided as indicated.
6.8.1 Graft Vasculopathy Surveillance and Treatment

1. Purpose
   To outline surveillance for CAV

2. Scope
   Adult heart transplant recipients

3. Responsibilities
   Cardiologist
   - Ensure clear plan exists for each patient
   - Individualize plan according to clinical situation
   - Initiate appropriate treatment if necessary
   Post Transplant Clinic Nurse
   - Ensure up to date plan and summary record are kept in the Biography at the front of the patient chart
   Post Transplant Clinic Clerk
   - Ensure tests are booked in accordance with plan
   - Ensure PROMIS is kept up to date

4. Procedure
   **DONOR SURVEILLANCE**
   Donor angiograms should be sought in the following situations
   Males ≥65 years
   High risk donors
   - e.g. Females with risk factors, cocaine use, etc

   **RECIPIENT SURVEILLANCE**
   Discussion at team rounds should occur if there are unusual circumstances.
   DSE’s no longer indicated unless specific indications exist

   In the presence of normal renal function:
   - Selective coronary angiograms (SCA) with IVUS (unless established epicardial disease) should be performed at years 1, 2 and 5
   - Thereafter, SCA (without IVUS) at year 10, then q3 yearly if normal (patients transferred to our program in between these years should have an individual plan prepared to fit in with our eventual schedule).
   - If abnormal, SCA frequency should be individualized and the plan charted on the patients Biography. The following should be considered
     - Severity of disease
     - Speed of progression
     - Renal function
     - Type of disease
     - Symptom burden
   - If PCT performed, follow-up SCA should be performed 6 months after procedure and follow-up plan individualized.
     - Consider tailored immunosuppression if intimal-medial thickness (IMT) increases by 0.3mm (incremental) or 1mm (absolute).

   In the presence of abnormal renal function:
   - Surveillance should be individualized and documented on the Biography. In general, dobutamine stress echo should be performed instead.

   **TREATMENT**
   - If CAV diagnosed through SCA or on IVUS if intimal-medial thickness (IMT) increases by 0.6mm (incremental) or 1mm (absolute):
     - ATIA
     - Statin targeting LDL < 2.0
     - Consider conversion to sirolimus, substitute in place of MMF
     - Reduce CNI 50% at initiation
     - PCI if lesions amenable
     - Individualize frequency of surveillance angiography (document on Biography)
     - Consider re-transplant
       - Consider ICD
       - At relaying stop sirolimus

5. Revision history

<table>
<thead>
<tr>
<th>Revision</th>
<th>Description of Changes</th>
<th>Effective Date</th>
<th>Approved By</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>Initial Release</td>
<td>August 2016</td>
<td>Cheung, Toma</td>
</tr>
<tr>
<td>01</td>
<td>Revision</td>
<td>September 2017</td>
<td>Toma, Cheung</td>
</tr>
</tbody>
</table>
6.8.2 Cancer Surveillance
Patients are encouraged to visit their Primary Care Provider regularly to screen for potential malignancies. Skin cancers are the most frequent cancer found in transplant recipients and therefore the following skin cancer precautions are in place:

- Patients are encouraged to visit their GP regularly for skin screening
- Where possible, referral to dermatology for yearly screening

Mammography, colon cancer screening, cervical cancer screening and prostate cancer screening should be done in accordance with recommendations by BC Cancer Agency and organized by Primary Care Provider.

6.8.3 Dental care
Patients should be encouraged to have regular dental checkups every 6 months or as indicated. Antibiotic prophylaxis regime is based on the Canadian Dental Association postion on Prevention of Infective Endocarditis.

6.8.4 Immunization
Yearly influenza vaccinations are advised by the program for heart transplant recipients. Pneumovax if needed is also recommended. Prior to travel, patients are encouraged to discuss vaccinations with the team in collaboration with vaccination clinics.

Live vaccines are not recommended for transplant recipients.

6.8.5 Pregnancy
Male and female patients are encouraged to discuss conceiving children and pregnancy with the Heart Transplant Cardiologist prior to planning a family. Patients are informed that some drugs may harm the unborn child and so careful planning with Primary Care Provider, the transplant team and referral to the Cardiac Obstetrics clinic at St Paul’s prior to conceiving.

Pregnancy is not recommended in the first year after heart transplant at this program.
7 References


8 APPENDIX A – Exceptional Distribution Physician Handbook


The above link will only work within Providence or PHSA Intranet.
8.1 **PHC Exceptional Distribution Consent form**

**INFORMED CONSENT FOR EXCEPTIONAL DISTRIBUTION**

**WILLING TO ACCEPT A DONOR OFFER WITH INCREASED RISK OF DISEASE TRANSMISSION**

1. I understand that receiving an organ carries a risk of disease including but not limited to bacterial or viral infection (e.g. hepatitis C) and cancer. Some organ donors have a higher risk of transmitting infectious diseases than other donors. These donors are called increased risk donors.

2. I understand that testing of donors for diseases has limitations. I understand that some of these diseases may not be identified until after my transplant has occurred (e.g. the donor had an unrecognized bloodstream infection). I may need to be monitored after my transplant as a result. If appropriate, I may be offered treatment or see specialists about this.

3. I understand that I may be offered an organ from an increased risk donor. This will be because my transplant doctor feels the benefit of accepting this organ outweighs the risk. The specific benefits and risks of taking this organ will be explained to me at the time of transplantation. I can refuse the organ and my status on the waiting list will not be affected.

4. I have been provided with a copy of the Patient Information Guide – “Risk of Disease Transmission from Organ Donors”. I understand that I can ask a transplant nurse or physician about any questions that I may have on infectious disease from donors at any time to assist me in making an informed decision.

I understand the information above and would be willing to be offered an organ from an increased risk donor.

**NAME:** (Mr. Mrs. Ms.)

**SURNAME**

**GIVEN NAMES**

**SIGNATURE:**

**PATIENT OR SUBSTITUTE DECISION MAKER**

*(Identify name of substitute decision maker if different from patient)*

**PRINT NAME IF NOT THE PATIENT**

**RELATIONSHIP TO PATIENT IF NOT THE PATIENT**

**DATE:**

**WITNESS:**

**SIGNATURE**

**PRINTED NAME**

**DATE:**

**STATEMENT BY PROFESSIONAL INTERPRETER**

Complete ONLY if a professional interpreter is used to obtain consent.

I have translated the above information to the ☐ Patient/Client ☐ Substitute Decision Maker ☐ Legal Guardian or representative and I have interpreted their responses to the health care provider.

**SIGNATURE OF INTERPRETER**

**PRINTED NAME**

**DATE SIGNED**

---

Form No. PHC-MR115 (Nov 21-17)
8.2 PHC Patient Information Handout for Exceptional Distribution

Risk of Disease Transmission from Organ Donors
Introduction

Receiving an organ transplant carries many risks, including the risk of getting a disease from the donor. This is true for every organ we transplant.

**BC Transplant makes every effort to minimize these risks.**

Getting a disease from an organ donor is rare - it is estimated to happen in about 0.2% (or 1 in 500) of all transplants.

*How much is 0.2%? A single dot is 0.2% of this group of dots*

*This booklet walks you through our screening process and answers some of the questions you may have about the risk of disease transmission from transplantation.*

How are organs screened and tested for disease?

All organ transplants in Canada are regulated by Health Canada. Health Canada has strict screening requirements to minimize the risk of transmitting any disease from a donor. This screening and testing is similar to what is done for blood donation.

We do the following tests on ALL DONORS:

1) A thorough review of the donor’s past medical and social history
2) A physical exam of the donor and donor organs. We check for signs of intravenous (IV) drug use, evidence of infections and any other potential sign of risk.
3) Screening of the blood for infection
Limitations in screening and testing

Organ donors are extensively screened and tested, but there are still limitations:
• There are not screening tests for every infection. For example, we do not currently have a good tuberculosis test in deceased donors.
• Testing is not 100% accurate. Although it is rare, sometimes a test will come back negative even though the person has an infection. This is most common when an infection first happens, because it takes time for the infection and the body’s immune response to develop. The time when we can’t detect these early infections is called the “window period”.
• Our risk assessment relies on a person who is not the donor telling us a history about the donor. They may not know everything about the donor.

It is impossible to know everything about an individual donor.

What is an Increased Risk Donor?

An increased risk donor is someone who has certain behaviours that are associated with a higher risk of transmitting infectious diseases to transplant recipients (See Table 1 below). These donors may test negative for infections, but they may still be a risk for spreading HIV, Hepatitis C virus, and Hepatitis B virus to transplant patients in the period where the infection(s) cannot be detected by the tests (i.e. during the window period). Organs are considered to come from an increased risk donor if the donor has any of the identified behaviours in the table below.

### Table 1. Health Canada Criteria for Increased Risk Donors

- Injection drug user in the past five years
- A man who has had sex with another man in the past five years
- Person who has engaged in sex in exchange for money or drugs in the past five years
- Person who has had sex in the past 12 months with a person who meets any of the above three criteria, or with anyone known or suspected to have HIV, hepatitis C virus, or hepatitis B virus.
- Exposure to these viruses in the past 12 months through percutaneous inoculation or open wound
- Prison, lock up, jail or juvenile detention for 72 hours in the past 12 months
- Non-sterile tattooing or piercings in the past 12 months
- Close contact with anyone with clinically active viral hepatitis (e.g. living in the same house where kitchen and bathroom are shared) in the past 12 months

Adapted from GSA standards 2012, Annex E.

You will be informed if your donor is an increased risk donor when the organ is offered to you.
You will only be offered an organ from an increased risk donor if your transplant doctor feels the benefit of getting a transplant outweighs the risk of getting an infection from the organ. The benefit will be that you are able to get a transplant right away instead of waiting longer.

The actual risk will vary by the type of organ you are receiving and the risk factor. If the current tests are negative, this risk will be very low (less than 1%). The specific risk and benefits will be discussed in detail with you when an offer is made. The choice is yours.

Are there other types of increased risk donors?

In addition to the risks in Table 1, donors may also have had cancer or risk of having an infection such as tuberculosis. In certain circumstances when your benefit is high and the risk to you is felt to be low you may be offered an organ from a donor with one of these risks. This will be discussed with you when the organ is offered to you and the choice is yours.

What about a donor who has been exposed to hepatitis C?

It is possible that a donor may have been infected with hepatitis C virus but could have naturally fought off the infection or could have been treated and cured. In this situation, if current testing for the virus in the potential donor is negative, your risk of getting infected is very low (less than 1%). Your doctor will discuss this with you when the organ is offered to you, and you may decide not to take this risk. The choice is yours.

What is the difference between an organ from an increased risk donor and one from a standard organ donor?

If someone is an increased risk donor, it only means that the donor engaged in activities before their death that increase the chance they got an infection right before they died. All donors are screened for infectious diseases including HIV, hepatitis B, and hepatitis C. However, even with negative test results, there is still a very small chance that an organ from an increased risk donor has an infection that could be transmitted during transplant. The doctor offering you the organ will be able to explain the risk.

The increased risk of infection from the donor does not affect how well the organ will work. In fact, on average, increased risk donors tend to be of younger age with better organ function.
Why would I think about accepting an organ from an Increased Risk Donor?

Accepting an organ from an increased risk donor may increase your chance of getting a transplant. It can also mean you may get your transplant more quickly than if you wait for an organ from a donor without these risks.

These are the facts:

- ORGANS ARE SCARCE. There is a constant shortage of organs and tissue that can be used for transplant.
- There are more than 600 British Columbians waiting to get life-saving organ transplants.
- Every three days, someone dies while waiting for an organ transplant.
- The waiting times for organ transplants can be up to several years depending on the organ.

Why would I be offered an increased risk organ?

You will only be offered an organ from an increased risk donor if a transplant doctor at your hospital feels that the benefits of transplanting you with the organ are greater than the risk of getting an infection. Otherwise the organ will not be offered to you. When the organ is offered to you, a transplant doctor will speak with you about the risks and benefits of accepting the increased risk organ versus waiting for another organ.

How will I know if I develop an infection?

If you accept the organ, you will be monitored after your transplant to make sure that you do not have an infection. In the unlikely case that you do get an infection, treatments are available. Specialists, such as infectious disease doctors, will treat you if needed.

Who decides if I should accept an Increased Risk Organ?

The decision to accept the increased risk organ is entirely YOURS. If you decide not to accept the organ, you will not lose your place on the waiting list. If you have questions about organs from increased risk donors, discuss this with a member of your health care team while you are waiting for your transplant.
If I do not agree to accept an increased risk organ, will it hurt my chances of getting a standard organ?

**NO.** Everyone has a different level of how much risk they are willing to accept for themselves. The decision to accept the organ is yours. If you decide not to accept the organ, you will not lose your place on the waiting list.

Questions to ask my healthcare team

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