Cardiac Transplantation from Nursing Prospective

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Outlines

- Definition of Heart failure
- Indications and contraindications for cardiac transplant
- Perioperative nursing preparation
- Intraoperative nursing care
- Postoperative nursing care
- Complications post cardiac transplantation
- Rejection vs infection in cardiac transplanted patient
Heart failure is a condition in which the heart can't pump enough blood to meet the body's needs.

In some cases, the heart can't fill with enough blood.

In other cases, the heart can't pump blood to the rest of the body with enough force. Some people have both problems.

Heart failure is a chronic, progressive condition in which the heart muscle is unable to pump enough blood through to meet the body's needs for blood and oxygen. Basically, the heart can't keep up with its workload.
Absolute indications

Hemodynamically compromised heart failure due to:
- Refractory cardiogenic shock
- Documented dependency of inotropic support to maintain adequate organ perfusion
- Peak Vo2 max < 10 ml/kg with achievement of anaerobic metabolism

Severe symptoms of Ischemia:
- Limiting routine activity
- Not amenable for CABG or PCI

Recurrent symptomatic ventricular arrhythmia:
- Refractory to all therapeutic modalities
Indications for Cardiac Transplantation

Relative indications

Peak Vo2 max 11-14 ml/Kg:
- 55% predictable
- Mayor limitation of routine

Recurrent unstable ischemia:
- Not amenable to other intervention

Recurrent instability of the fluid balance/renal function:
- Despite patient compliance with medical regimen
Absolute contraindications

- **Fixed Pulmonary Hypertension**
  - PVR > 4 wood units
  - Transpulmonary gradient (TPG) > 15 mmgh

- **Systemic illness limiting survival despite cardiac transplant:**
  - Neoplasm other than skin
  - Low-grade prostate cancer that has not been “Cured”
  - HIV/AIDS
  - Systemic Lupus erythematosus or Sarcoid
The Saudi center for organ transplantation through its scientific committees has laid down priority criteria for heart transplant as follows:

Priority 1.
Patient on mechanical cardiac support or on ventilation who can’t be weaned off inotropic support or those who failed come off cardio-pulmonary bypass.

Priority 2.
Patient who requires inotropic support, with no requirement for ventilation or mechanical cardiac support.

Priority 3.
Patient who are on the waiting list and are awaiting at home.
Preoperative Nursing Preparation

- Correct patient identification
- Informed consent valid and completed as per the institution IPP
- Allergies updated in the system
- STAT laboratory studies:
  - CBCD, Renal and hepatic profile, Coagulation profile
  - Type & cross match is updated & 4 units of PRBC are to be ready.
  - 2 IV access 16-18 gauge to be inserted prior to OR
- Education
  - 1g of Cellcept will be given on call to OR.
Intraoperative Nursing care

2 staff nurse I: circulating and scrub nurse

**Scrub nurse:**
To ensure that a sterile instrument table with all required supplies are present before recipient arrives to the OR.

**Circulating nurse:**
- Responsible to ensure that the patient is comfortable and safe during preparation with anesthesiologist, especially during induction of anesthesia.
- Responsible to provide assistance during the procedure
- Responsible for transferring the patient to CSICU and to provide complete handover.

Both nurses to ensure availability of blood product before recipient arrival to OR room
Methylprednisolone 500mg IV (Solu-Medrol) at induction

Methylprednisolone 500mg IV (Solu-Medrol) before cross clamp removal
1. **Monitoring & Maintaining Cardiac Function**

Remember that CO=HR X SV

- Heart Rate and Rhythm
- Blood Pressure
- CVP readings and waveform (5-12 MMHG)
- PA pressure and Cardiac Output
- Patient will be paced post op to maintain his Cardiac output on rate between 100 to 120 BPM (>90 BPM)
- CVP reading above the normal range may reflect Right Ventricular failure (the most common complication post surgery)
Determinants of Blood Pressure

Blood Pressure

Cardiac Output

Heart Rate

Stroke Volume

Preload  Contractility  Afterload

Peripheral Vascular resistance

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Denervated heart

- Loss of sympathetic and parasympathetic
- The recipient heart depends on circulating catecholamine to increase its rate and contractility
- Certain drugs may have no effect on the denervated heart (Atropine)
- Carotid massage and valsalva maneuvers will not affect the denervated heart
- No (angina) chest pain will not be felt
2. Monitoring Respiratory Function

**Goal:**
- Early weaning & Extubation unless contraindicated
- Give the first dose of ATG *prior Extubation*.

**Post Extubation:**
1. Deep breathing
2. Coughing exercises
3. Incentive spirometer

Monitor sign and symptom for *respiratory Distress*, it might be sign of *Rejection*.
The primary determinant of effective renal function early after transplant is the patient's cardiac performance.

Renal function may be impaired prior to transplantation secondary to:
- Low cardiac output
- Chronic high dose of diuretic therapy
4. Prevention of Early Infection

- **Strict hand washing**
- Wearing **mask** is required before entering the patient room, gloves if in contact with the patient.
- Room ventilation usually accomplished by high volume air exchange (10 exchanges per hour) in a **positive pressure setting**.
- Rooms should be **closed** to maintain positive pressure.
- Adherence to Bundles of care for CLABSI, CAUTI and VAP.
Use Protective Isolation precautions

Contact and Droplet Precaution

**Droplet Precautions**
- Clean hands with alcohol-based hand rub or soap and water
- Wear surgical mask within 2 metres of patient
- Wear eye protection within 2 metres of patient
- Clean hands with alcohol-based hand rub or soap and water

**Contact Precautions**
- Wear gown when providing direct care
- Wear gloves when providing direct care
Potential Post-operative complications

- Bleeding
- Right sided heart failure
- Cardiac tamponed
- Hemodynamic instability
- Rejection
Patients post-heart transplants are at risk of bleeding due to:

- Pericardial sac is larger than normal after transplant
- Small new heart leaves empty space to conceal post-operative bleeding
- Cardiopulmonary bypass and heparin use during surgery
- Coagulopathy
PRBC’s should be irradiated and leukocyte reduced
If patient is profusely bleeding, all platelets should be administered through a leukocyte filter
FFP for correction, coagulation defect (INR)
Cryoprecipitate can be given if fibrinogen level is < 0.5
Drugs, (Protamine sulphate, Tranaxemic Acid)
RIGHT SIDED HEART FAILURE
(Cor Pulmonale)

- Fatigue
- ↑ Peripheral Venous Pressure
- Ascites
- Enlarged Liver & Spleen
- May be secondary to chronic pulmonary problems
- Distended Jugular Veins
- Anorexia & Complaints of GI Distress
- Weight Gain
- Dependent Edema
Right Sided Heart Failure

Treatment:

- Medications can be used to augment RV function like: Isoproterenol, Milrinone, Enoximone, Dobutamine, Epinephrine.

- **Systemic Vasodilators with Pulmonary Vasodilating Property:** NTG sodium, Nitroprusside, can be used in absence of systemic Hypotension.

- **Selective Pulmonary Vasodilators can be used:** PGE1, PGEI2, Inhaled NO, Sildenafil.
19.1 KFHI Immunosuppression Protocol (Immediate Post-operative Care)

**Preop**
Mycophenolate mofetil (CellCept®) 1gm PO as a single dose

**In OR**
Methylprednisolone 500 mg IV _____ at induction
Solu-Medrol®
Methylprednisolone 500 mg IV _____ before unclamping aorta
Solu-Medrol®

**CSICU Admission**

**Day 1**
Methylprednisolone 125 mg q8H IV (on admission first dose)
Solumedrol® total of three doses
ATG (Rabbit) 3 mg/kg IV (Via central line) to start 4 hours after admission if patient is stable

**Day 2**
Methylprednisolone 125 mg q12H IV 2 doses
Solu-Medrol®
Tacrolimus® (FK 506) 0.1-0.2 mg/kg/day PO in two divided doses
OR
CsA 4 mg/kg PO BID, (if renal dysfunction, start at 2 mg/kg PO BID
CellCept® 500 mg - 1gm PO BID
ATG (Rabbit) 3 mg/kg IV adjust according to absolute/% lymphocytes

**Day 3**
Prednisone 1 mg/kg/day PO
(if not extubated, equivalent dose of Solumedrol i.e. 0.8 mg/kg IV)
CellCept® 500 mg - 1gm PO adjust to WBCD
FK506/CsA adjust to levels
ATG 3 mg/kg IV, adjust according to absolute/% lymphocytes
<table>
<thead>
<tr>
<th>Hyper acute rejection</th>
<th>Acute cellular rejection</th>
<th>Vascular (humeral) rejection</th>
<th>Chronic rejection</th>
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<tbody>
<tr>
<td>As soon as the vascular anastomosis is completed and clamps removed</td>
<td>Early weeks or months following transplantation</td>
<td>A slower immune mediated injury that affects the endothelial lining of the coronary vasculature</td>
<td>A major cause of death after the first year</td>
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<td>Result of an antigen-antibody reaction</td>
<td>Patient may have evidence of dyspnea, fatigue, hypotension and dysrhythmias</td>
<td>During the first few months after transplantation</td>
<td>Accelerated type of CAD (cardiac allograft vasculopathy)</td>
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<td>Fatal rejection and need re-transplantation</td>
<td>ECHO will show decreased left ventricular ejection fraction</td>
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</table>
Fever more than 38 degree
Sweats or chills
Skin rash
Pain, tenderness
Redness or swelling
Unhealed Wound
Red, warm or draining sore or wound (Swab)
Sore throat
White patches in mouth or on tongue (Fungal infection)
Bloody, cloudy or foul-smelling urine
Fever over 38°C

"Flu-like" symptoms such as chills, aches, headaches, dizziness, nausea and/or Vomiting

Shortness of breath

New chest discomfort or tenderness

Fatigue (Decrease Physical activity)

Decrease in blood pressure (Hypotension)

Fluid retention

Pulmonary edema
Confirmation of Rejection

Endomyocardial biopsy

- Interstitial infiltrates
- Perivascular infiltrates
- Lymphocytes infiltrates
Medical Treatment of Antibody Mediated Rejection:

- **Immunosuppressive bolus:**
  - High Dose of IV CS
  - Cytolytic Immunosuppressive therapy
- Plasmapherises (if not responding to IV CS)
- IVlg (Immune Globulin)
- Rituximab
- Chemotherapy
THANK YOU