Heart Transplant - Antibody Mediated Rejection
Therapeutic Plasma Exchange

1.0 Introduction

This Clinical Practice Guideline (CPG) refers to the therapeutic plasma exchange for an infant/child with evidence of Antibody Mediated Rejection (AMR) after heart transplant. The goal of TPE is to remove donor-specific antibodies and/or inflammatory mediators implicated in AMR. The number of therapeutic plasma exchanges is patient specific and is ordered by the physician responsible for the patient's care. Please see Therapeutic Plasma Exchange under related documents for CPG on procedure.

The target users of this guideline will be Nurses, Physicians within the Nephrology and Cardiology programs.

Indications: This CPG applies to infants/children who have evidence of AMR.

Contraindications: Plasma exchanges should not ordinarily be performed within 24 hours of an operative procedure. If necessary to bypass this recommendation, the Staff M.D. must document the need for the procedure in the patient chart.

2.0 Definitions

- Fresh Frozen Plasma (FFP) - is separated from whole blood and is frozen within eight hours of collection. FFP contains all the coagulation factors in normal concentrations. Plasma is free of red blood cells, leukocytes and platelets. Plasma also has volume expansion and oncotic properties.

- Total Blood Volume (TBV) - the amount of blood in the whole body, both cells and fluid. The volume of the patient's blood is based on the patient's weight. The TBV is related to lean body mass. There is a difference between children and adults with newborns having a higher TBV per kg because of their higher packed red cell volume. TBV is calculated using the following formula:

  - Neonates (0-1 month): 100 ml/kg
  - Infants/children (1 month-16 years): 80 ml/kg
  - Adolescents (16 years and older): 70 ml/kg

- Plasma Volume is the total volume of plasma in the body.

  - Plasma Volume = TBV (ml) X (1-hematocrit)

- Exchange - patient plasma is replaced by donor plasma. The exchange product can be either FFP, 5% Albumin or a combination of both.
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3.0 Clinical Recommendations

3.1  Pre-exchange requirements
1. All neonatal post-transplant patients should be connected to cardiac monitor during plasma exchange.
2. Complete following blood work prior to procedure:
   - CBC and differential
   - Ionized Ca
   - Albumin
   - K, Na, P, Ca
   - TCO2

3. Ensure blood work is within acceptable range.
4. Complete the following blood work after the procedure:
   - Ionized Ca
   - K, Na, P, Ca
   - TCO2

3.2  Order replacement solution
Replacement solution should be compatible with the patient’s serum blood type and the donor blood type. Refer to Blood Groups Required for Blood Products Administered During ABO-Incompatible Heart Transplantation Plasma Exchange chart:
- 5% Albumin is recommended when the patient does not have daily exchanges. For daily exchanges or when bag FFP is replaced during apheresis, albumin can be used in cases of reaction to FFP.

3.3  Blood prime
Blood prime should be:
- Patient weight <50 kg
- Patient height > 2.5 m
- Patient age > 2 years
- Patient is hemodynamically unstable
- 5% Albumin prime is used for stable patients between 10-20 kg as ordered by NRP

4.0 Related Documents:
- Therapeutic Plasma Exchange Procedure
- Management of Citrate Toxicity
- Blood Component Infusions

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5.0 References

1. McLeod, B C Apheresis: Principles and Practice. 1997 (409-415)

Attachments:

Heart Transplant_care pathway_Feb 2022 (1).pdf