

	Document Scope: Departmental	
	Document Type: Clinical Practice Guideline Approved on 2019-08-10 Next Review Date: 2021-08-09	
	<b>Heart Transplant -Antibody Mediated Rejection Therapeutic Plasma Exchange</b>	Version: 2

*This policy is departmental specific and applies only to activities within the Nephrology and Cardiology programs.*

## 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.

## 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 (1month-16 years) 80 ml/kg
  - Adolescents (16 years and older) 70 ml/kg
- **Plasma Volume** is the total volume of plasma in the body.
  - $\text{Plasma Volume} = \text{TBV (ml)} \times (1 - \text{hematocrit})$
- **Exchange** - patient plasma is replaced by donor plasma. The exchange product can be either FFP, 5% Albumin or a combination of both.

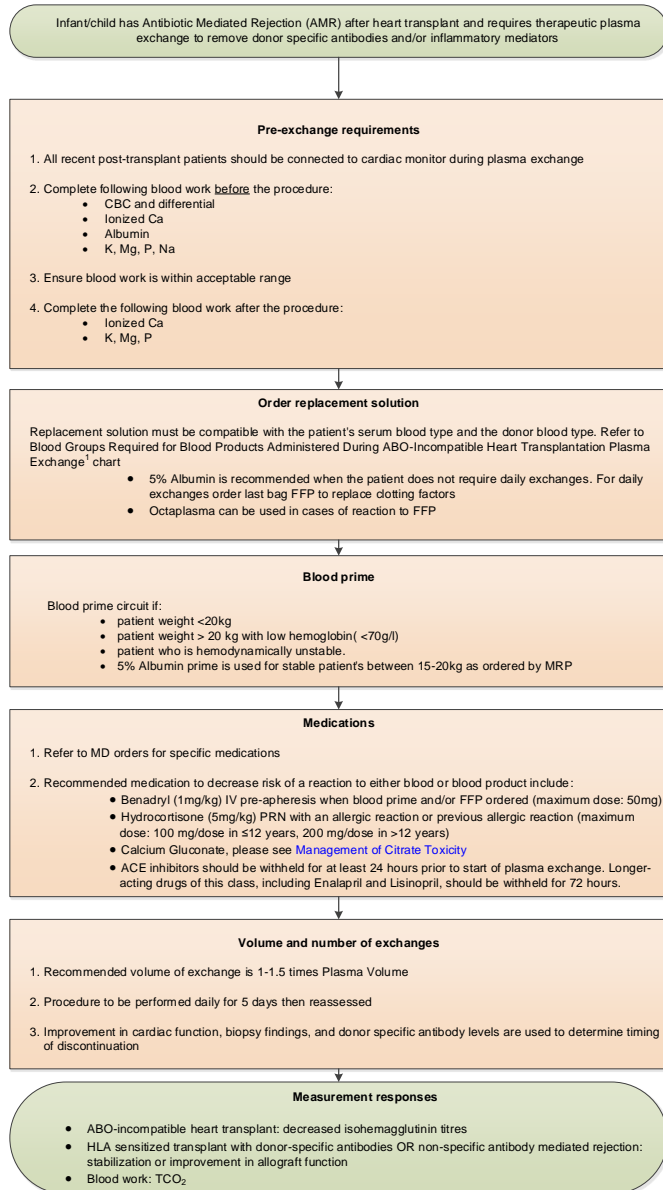
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## Heart Transplant -Antibody Mediated Rejection Therapeutic Plasma Exchange

### Clinical Recommendations

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Heart Transplant-Antibody Mediated Rejection  
Therapeutic Plasma Exchange



**Please note the following:**

- number of plasma exchanges is patient specific and ordered by MRP
- plasma exchanges should NOT be performed within 24 hours of an operative procedure. MD **must document** if need to bypass this recommendation

**Acceptable blood work values prior to exchange:**

- Mg: > 0.5 mmol/L
- K: > 3.0 mmol/L
- P: ≥ 1.0 mmol/L for children < 2 years; ≥ 0.7 mmol/L for children > 2 years
- TCO<sub>2</sub>: <30 mmol/L
- Ionized Ca: > 0.9 mmol/L

**Blood Groups Required for Blood Products Administered During ABO-Incompatible Heart Transplantation.**

Donor's Blood Group <sup>1</sup>	Recipient's Blood Group <sup>1</sup>	Indicated Plasma <sup>1</sup>	Red Cell Blood Group <sup>1</sup>
A	O	AB or A	O
B	A	AB	O or A
A	B	AB	O or B
B	O	AB or B	O
AB	A	AB	O or A
AB	B	AB	O or B
AB	O	AB	O

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## Related Documents:

[Therapeutic Plasma Exchange Procedure](#)  
[Management of Citrate Toxicity](#)  
[Blood component Infusions](#)

## References

1. McLeod, B C Apheresis: Principles and Practice. 1997 (409-415)
2. Pollock-BarZiv SM, den Hollander N, Ngan B, Kantor P, McCrindle B, Dipchand AI. Pediatric Heart Transplantation in Human Leukocyte Antigen Sensitized Patients: Evolving Management and Assessment of Intermediate-Term Outcomes in a High-Risk Population. *Circulation* (2007),116:l:172-178.
3. Rao, J. N., Hasan, A., Hamilton, J.R., Bolton, D., Haynes, S., Smith, J. H., Wallis, J., Kesteven, P., Khattak, O'Sullivan, J. and Dark, J. H. (2004). ABO-Incompatible heart transplantation in infants; The Freeman Hospital experience. *Transplantation*. 77 (9), 13.
4. Schwartz et.al (2016). Guidelines on the use of therapeutic apheresis in clinical practice- evidence based approach from the writing committee of the American society for apheresis: the seventh special issue. *Journal of Clinical Apheresis*. 31, 149-338
5. Weinstein, Robert. Hypocalcemic Toxicity and Atypical Reactions in Therapeutic Plasma Exchange (2001). *Journal of Clinical Apheresis* 16:210-211
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7. West, L. J. (2003). ABO-Heart transplant study (DRAFT).

## Attachments:

[heart transplant care pathway july 2019.pdf](#)