PRE-IMPLANT Protocol for

Pediatric Patients Evaluated for VADs

**BACKGROUND**

VAD candidacy should be determined through a multi-disciplinary assessment of the patient’s cardiovascular status, medical comorbidities, and psychosocial risk factors.

**ACTION REVISED DATE:** 06/09/2021

**OBJECTIVES**

To provide a standardized, thorough approach to pre-VAD implantation work-up and patient selection that also takes into account the need for center specific variables and preferences.

**PROTOCOL**

The decision to place a VAD in a pediatric patient is generally made by a multi-disciplinary team including CT Surgery, Cardiology (HF/VAD specialist), Cardiac Intensive Care (physician and nursing input), & VAD coordinator.

Consults to consider (all patients): Palliative Care, Nutrition, OT/PT, Social Work/Psychology.

Consults to consider (based upon clinical indication): Hematology, Infectious Disease, Pulmonology, Nephrology, GI, and Neurology.

Financial clearance/insurance authorization should be obtained prior to VAD placement.

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| **Chemistry and Microbiology** | | | | |
|  |  | Comprehensive Metabolic Panel |  | Brain Natriuretic Peptide or NT pro-BNP |
|  | Cystatin C |  | Urinalysis |
|  | MRSA screen |  |  |
| * Screen for infection if clinically indicated (procalcitonin, CRP, ESR, cultures) * Additional testing as needed for patient specific concerns | | | |
| **Hematology** | | | | |
|  |  | Type and Screen |  | Plasma-free Hemoglobin |
|  | CBC w/ Differential |  | LDH |
|  | PT/INR, PTT |  | Anti-Xa if on heparin |
|  | Fibrinogen |  |  |
| * Consider additional thrombophilia or bleeding work up if concerning family history or clinical course: antiphospholipid antibodies, protein C and S, Factor V Leiden, prothrombin 20210, activated protein C resistance, cardiolipin IgG/IgM, warfarin pharmacogenomics, lupus anticoagulant if > 6 mo, MTHFR mutation, plasma homocysteine, TEG, von Willebrand panel, HIT assay (Anti-heparin PF4 Ab), Serotonin release assay if HIT+ | | | |
| **Ancillary Studies** | | | | |
|  |  | EKG |  | Echocardiogram |
| * Consider Head CT if patient at high risk (i.e. ECMO) or unable to get reliable neurologic exam * Chest CT if needed for fit assessment * If needed/optional: 6 min walk test, cardiac catheterization, PFTs, EEG, abdominal US, vessel map, video swallow study, dental clearance, PEDSQOL/VADQOL | | | |

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| **Durable VAD Indications** |
| Inability to separate from temporary MCS/ECMO |
| Symptomatic heart failure with intolerance of inotropes |
| Development of end organ compromise despite inotropic support. Examples of end organ compromise might include:   1. Need for invasive or non-invasive positive pressure ventilation 2. Renal dysfunction 3. Feeding intolerance 4. Hepatic dysfunction 5. Mental status changes or need for sedation to prevent destabilization 6. Inability to ambulate or participate in physical therapy |

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| **Potential Durable VAD Contraindications** |
| Irreversible intrinsic lung, liver, or kidney disease. Relevant subspecialty service should be consulted for guidance on potential for end-organ recovery with improved cardiac output. |
| Risk for intracranial bleed and/or neurologic compromise due to acute stroke, congenital AVM, or Moya-Moya. Neurology and/or neurosurgery should be consulted. |
| Clotting disorders, such as underlying coagulopathy (factor VIII deficiency, DIC) or thrombotic disorders (Factor V Leiden). Hematology service should be consulted to aid with risk assessment. |
| Active systemic infection. Infectious disease service should be consulted. |
| Active malignancy or recent malignancy with high risk of recurrence. Oncology service should be consulted. |
| Anatomic variant or severe valvar disease incompatible with VAD implantation/support. |
| Pregnancy. |
| Social factors limiting ability to care for VAD or ongoing non-adherence. |
| While not a contraindication to MCS, severe obesity (BMI > 35 kg/m2) is associated with increased morbidity in LVAD patients and should be considered in comprehensive risk assessment. |

Temporary VAD should be considered as a bridge to candidacy or to durable VAD support if:

1. Anticipated duration of support < 2 weeks
2. Patient is InterMACS profile 1 with evidence of end organ dysfunction

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*June 2021 Revisions: Robert Niebler, MD & Kevin Engelhardt, MD, on behalf of ICU Stakeholders Group*

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***Disclaimer:*** *The ACTION network is focused on quality improvement efforts such as harmonizing best practice protocols, disseminating them among institutions, and helping centers to improve care practices at the local level. This protocol was developed as a consensus tool for pediatric VAD programs. The information in the protocols are based on center practices, individual opinions, experiences, and, where available, published literature. Centers may choose to adapt this protocol to include in their center-specific protocols with reference to ACTION with the understanding that these are meant as guidelines and not standard of care. (Revised 06/09/2021)*