Ventricular Assist Devices: A Review of Psychosocial Risk Factors and Their Impact on Outcomes

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ABSTRACT

Background: Psychosocial contraindications for ventricular assist devices (VADs) remain particularly nebulous and are driven by institution-specific practices. Our multi-institutional, multidisciplinary workgroup conducted a review with the goal of addressing the following research question: How are preoperative psychosocial domains predictive of or associated with postoperative VAD-related outcomes? Answers to this question could contribute to the development of treatment-specific (contra) indications for patients under consideration for mechanical devices.

Methods and Results: We identified 5 studies that examined psychosocial factors and their relationship to postoperative VAD-related outcomes. Our results suggest that 3 psychosocial variables are possibly associated with VAD-related outcomes: depression, functional status, and self-care. Of the few studies that exist, the generalizability of findings is constrained by a lack of methodologic rigor, inconsistent terminology, and a lack of conceptual clarity.

Conclusions: This review should serve as a call for research. Efforts to minimize psychosocial risk before device placement can only be successful insofar as VAD programs can clearly identify who is at risk for suboptimal outcomes. (*J Cardiac Fail 2014;20:996−1003*)

Key Words: LVAD, depression, ambulation, frailty, self-care, outcomes.

Psychosocial risk factors affect patient survival and graft success after cardiac transplantation. Poor perioperative physical functioning, psychiatric disorders, poor social support, use of avoidant coping strategies, poor self-efficacy, and low optimism have all been identified as factors that could potentially affect post-transplantation outcomes.[1−3] Whether and how psychosocial considerations should be weighed in the context of mechanical circulatory support devices is less clear, however, particularly when the intended device strategy is destination therapy (DT).[4,5]

Professional guidelines recommend that all candidates for mechanical circulatory support be screened for psychosocial risk before device placement. However, the use of psychosocial criteria as contraindications for placement is variable and unstandardized across settings, primarily because far less is known about the role of psychosocial risk factors for mechanical support devices rather than cardiac transplantation.[6,7] Understanding factors affecting mechanical support device outcomes in particular can help to tailor (contra)indications that are specific to patients being considered for this intervention, whether as DT or as bridge to transplant (BTT).

This review aims to assimilate studies that identify preoperative psychosocial risk factors and their impact on postoperative ventricular assist device (VAD)−related outcomes. We approached this review with the goal of addressing the following research question: How are preoperative psychosocial domains predictive of or associated with

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postoperative VAD-related outcomes? Answers to this question will help to develop inclusion and exclusion criteria for treatment candidacy that take into consideration the distinct trajectories of mechanical support device outcomes in relation to transplantation or other end-stage heart failure interventions.

Methods

Our workgroup consisted of members from the fields of heart failure cardiology, nursing, bioethics, decision science, social work, psychiatry, medical anthropology, and epidemiology. We adhered to the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines to conduct our review.[8]

Conceptual Bases

Our workgroup worked iteratively to develop a coherent and comprehensive definition of ''psychosocial considerations.'' To inform its development, we reviewed existing conceptual models of ''quality of life'' and ''psychosocial,'' revealing that specific dimensions are often labeled differently by different authors.[9] For example, the term ''quality of life'' often refers to health status, physical functioning, psychosocial adjustment, well-being, life satisfaction, and happiness. Within these models, physical functioning is often conceptualized as falling under the rubric of psychosocial considerations, and there is considerable variation in dimensions and proxies for ''physical functioning.'' ''Physical'' domains may refer to pathophysiologic changes, functional deficits, or perceived health status.[10,11]

Therefore, definitional variability and inconsistency regarding analogous concepts across studies, as well as the limitations of existing conceptual models, made it difficult to develop an operational definition for ''psychosocial considerations.'' To be consistent with other workgroups' practices and professional guidance statements in heart failure,[1] we ultimately opted to define ''psychosocial considerations'' to encompass 5 domains to guide us during data abstraction:

1. Physical functioning (which we refer to more precisely as ''functional status'').
2. Psychologic functioning (eg, psychiatric illness, behavioral disorders, neurocognitive functioning).
3. Overall quality of life considerations (defined to include subjective well-being, which means how happy or satisfied someone is with life as a whole).
4. Behavioral functioning (eg, compliance, substance use/abuse).
5. Social functioning (eg, social adjustment, stability, social support).[1]

These domains have the added benefit of being largely consistent with existing tools for psychosocial assessments used before transplant and VAD placement. The Stanford Integrated Psychosocial Assessment for Transplant (SIPAT) tool is considered to be a psychometrically rigorous instrument that provides a comprehensive list of psychosocial factors frequently assessed for transplant and mechanical circulatory support candidates, which are similar to the psychosocial factors as those numbered above.[1,12] We used postoperative ''outcomes'' that are collected by Interagency Registry for Mechanically Assisted Circulatory Support (INTERMACS) as a conceptual basis to inform our review of post−device placement outcomes.[13] ''Outcomes'' was defined to include mortality or morbidity, including infection, rehospitalization, or post−VAD placement perceptions of quality of life.

Search Strategy

We searched Pubmed, Psychinfo, and Scopus databases with the use of the following search terms: [left] ventricular assist device [OR] mechanical circulatory support [OR] VAD [AND] patient selection [OR] contraindications [OR] social support [OR] neurocognitive/neurocognition [OR] substance abuse or dependence or use [OR] alcohol [OR] psychopathology/psychology [OR] personality traits or disorder [OR] compliance/adherence [OR] anxiety [OR] depression [OR] quality of life [OR] functional status. Searches were conducted by at least 2 independent reviewers (CB and JBB). We also manually searched reference lists and reviewed the bibliographies of all articles that fulfilled the inclusion criteria to capture all potentially relevant articles. After our pilot search, we contacted experts to validate the scope of our review.

Inclusion Criteria and Data Abstraction

Our search criteria included adult (nonpediatric) studies, conducted in the United States and published in English, which examined preoperative psychosocial factors and their relationship to VAD-related outcomes. We excluded studies that did not: (a) present information on preoperative psychosocial factors, (b) include VAD candidates or patients in the study, (c) assess the relationship between psychosocial factors and outcomes, or (d) expressly use concrete definitive psychosocial criteria to exclude patients from being considered for VAD placement. Abstract-only publications, editorials, reviews, and commentaries containing no data were excluded. We also excluded studies that were published before 2001. Our rationale for extending as far back as 2001 (when pulsatile pumps were used) is that a review examining the relationship between psychosocial considerations and outcomes would likely be underinclusive if it focused exclusively on continuous pumps.[14−18] We did not restrict our search on the basis of study design other than as specified above. The search was conducted during February−May 2014, with most database searches occurring during March. Figure 1 illustrates our search results.

At least 2 of us (CB and JBB) independently appraised all of the studies that met our inclusion criteria. These 2 authors examined abstracts that met criteria. We (CB, JE, GA, and BT) used standards developed by the Evidence-Based Medicine Working Group to score the methodologic rigor of the studies.[19] We resolved discrepancies by using a 3rd investigator to reconcile the discrepancy. Table 1 provides a description of the studies included in this review. Table 2 presents the methodologic rigor of the studies, provides overall quality scores, and defines the criteria used to evaluate methodologic rigor.

Results

Functional Status

Two studies examined the relationship between functional status and post−device placement outcomes, yet only 1 found a significant relationship between pre−device placement status and increased risk of postoperative death, perhaps owing to the different instruments and methodologies used to measure functional status. Dunlay et al defined functional status (ie, ''frailty'') as a ''state of increased vulnerability to adverse outcomes.''[20,21] Frailty was