



Cardiac Transplantation and Psychopathology

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Abstract

Heart transplantation (HT) is a well-established procedure for terminal cardiac disease and is considered the treatment of choice in cases of severe cardiac insufficiency refractory to medical or surgical treatment. Although cardiac transplantation leads to a dramatic improvement in functional status and quality of life, it still represents one of the more invasive and psychologically threatening surgical interventions. HT raises unique

psychological issues which originate from the complexity of the entire clinical and therapeutic trajectory as well as from extraordinary symbolism of the heart and the human source of the graft. Psychiatric and psychological disturbances, mainly mood and anxiety disorders, are common both in the pre- and posttransplant phase, with prevalence rates of 50% in HT candidates and 20–30% in HT recipients, even in the long term. Correct detection and treatment of these conditions is mandatory given their recognized impact on HT main outcomes, including survival. Available interventions include pharmacological treatment, mainly selective serotonin reuptake inhibitors (SSRIs), and psychotherapeutic approaches, but the evidence to guide clinicians' management of psychopathology

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in this population is still limited. Further research is needed to optimize treatment and management of psychological outcomes.

Keywords

Heart transplantation · Psychopathology · Depression · Anxiety · Delirium · Antidepressants · Psychopharmacological treatment · Psychotherapy · Psychosocial outcomes

Introduction

Heart transplantation (HT) is a well-established procedure for terminal cardiac disease and is considered the treatment of choice in cases of severe cardiac insufficiency refractory to medical or surgical treatment. However, even nowadays, more than 50 years after Christiaan Barnard performed the world's first human-to-human heart transplant at Groote Schuur Hospital in Cape Town, South Africa, cardiac transplantation still evokes intense emotions. Indeed, it represents one of the more invasive and psychologically threatening surgical interventions [1, 2].

HT is only a part of a complex clinical process, which involves a series of stages, each one carrying dangerous implications. In the preoperative period, the patient may experience recurrent episodes of acute decompensated heart failure, leading to urgent hospital admissions, invasive procedures, and, in some cases, mechanical circulatory support. The postoperative phase is also physically and psychologically challenging due to a first period of isolation, the risk for acute rejection, infections, and immunosuppressants' side effects. For many transplant recipients, transplantation and related comorbidities impose a significant and lifelong physical and emotional symptom burden [3].

It is often assumed that HT psychological peculiarities are interwoven with the extraordinary symbolism of the heart. From the dawn of time, cardiac sound – we all may hear it – marks the beginning as the end of our lives. Through the history of mankind, the heart became soon the

vital center of the human being, long before blood circulation was discovered. From the very beginning of heart transplantation, psychiatry was deeply involved into transplantology, as it was for surgery, immunology, ethics, and sociology. *Major* organ transplantation soon became a kind of in vivo experiment along the development of body scheme organization, enriching the experience had with amputated patients or having congenital or acquired malformations. A paradigmatic example of life-extending operations, heart transplantation is characterized by important psychological implications, over all the convergence of the themes of identity, death, and rebirth [4].

Of note, many transplant recipients celebrate the anniversary of the surgical intervention in terms of a new birth, the beginning of a second life. Richard Blacher, an American psychiatrist and psychoanalyst, talks about *rebirth* discussing psychological implications of open-heart surgery [5].

The concept of rebirth indissolubly recalls the thought of death and dying, which is central in the inner experience of transplant recipients. The graft “weighs.” It carries feelings of guilt that many recipients may experience for having desired, mostly unconsciously, the death of another human being during the waiting period [6].

The graft is, effectively, the organ of a deceased which continues to beat. The mourning for a young person, whose heart still continues to pulse in another body, may be almost impossible to elaborate. The concept of rebirth evokes also the dimension of identity, the possibility of remaining ourselves, despite the change. In fact, the themes of extraneousness, non-self and “double”, often recur in these clinical settings. The integration of the new organ into the body scheme often requires time [7]. From a psychological perspective, the graft is not inert: it carries some of the donors' features. The transplanted organ almost immediately achieves a mental representation: it does not become only a part of the body, but represents the donor and the relationship to that person [4, 8]. It is an anatomical part which becomes anthropomorphized. Identification with the donor is often noticeable. Some patients report they have become more masculine or feminine, according to the sex of

the donor, as if some of the donor's traits, both physical and psychological, could have been transmitted to them as a result of transplantation. The recomposition of the body image's integrity gradually leads to overcome the crisis induced by the transplant and allows adaptation to the new condition [4]. HT is generally followed by marked improvements in physical and mental health and emotional well-being. However, in the late years post-HT, the development of medical complications may provoke renewed distress. To this regard, Jean-Luc Nancy, a contemporary French philosopher, describes the experience of his own heart transplant in terms of the problematic gift of a foreign organ and the intrusiveness of a cancer fostered by the immunosuppressive treatment regimen [9].

Taken together, these considerations show how HT raises unique psychological issues and potential psychiatric complications which require a multidisciplinary approach.

Waiting For a New Heart

Psychosocial Evaluation of Heart Transplant Candidates

Extensive clinical literature highlighted the impact of pretransplant psychosocial factors, including patient's history of medical adherence, mental health, substance use, and social support on HT outcomes. Therefore, all HT guidelines state that pretransplant screening should include a thorough psychological assessment [10, 11]. This evaluation integrates a complex multifaceted assessment, providing information relevant for patients' selection and overall care planning. With specific regard to complex situations, it facilitates appropriate referral for treatments or interventions that may improve patients' well-being and suitability as transplant candidates. While medical criteria warranting HT candidacy have been well established, psychosocial criteria are less standardized. Recently, a consensus of expert opinion promoted by the International Society for Heart and Lung Transplantation (ISHLT) provided

recommendations for the psychosocial evaluation of adult cardiothoracic transplant candidates, addressing both the evaluation content and process [10]. Regarding content, the psychological assessment should address nine main domains, specifically patient's treatment adherence and health behaviors; mental health history; substance use history; cognitive status and capacity to give informed consent; knowledge and understanding of current illness; knowledge and understanding of treatment options; coping with illness; social support; and social history.

Predicting non-compliance has always represented one of the central issues in the psychosocial evaluation of the potential HT candidate. Repeated documented nonadherence to medications and other medical directives is a recognized contraindication to cardiothoracic transplantation, due to the associated increased risks for posttransplant morbidities and mortality. Psychiatric conditions contraindicate transplantation when uncontrolled, affecting patients' ability to adhere to the medical regimen, and are not mitigated by adequate clinical and social support [10]. Depression and anxiety are common in HT candidates [12, 13]. Even the more severe, less common psychiatric disorders, including psychosis and bipolar disorder, do not inevitably lead to posttransplant clinical outcomes if careful candidate assessment and close management of these conditions is provided. Active alcohol abuse, drug abuse, and tobacco smoking are contraindications to cardiothoracic transplantation, given the increased risks for poor postsurgical clinical outcomes and mortality, primarily mediated by relapse to use after the operation. The evaluation should carefully investigate history of use of all substances, current status, previous treatments received, periods of abstinence as well as the person's insight and willingness to receive treatment [10]. The assessment of patients' understanding, acquaintance, and capacity to engage in decision-making needs is also part of the psychosocial evaluation. Although dementia represents a contraindication to HT, patients with milder degrees of cognitive impairment or with transient impairments (delirium, encephalopathy) that resolve may have the capacity to give

informed consent and undergo HT. Moreover, previous studies suggest that intellectual disabilities per se may not adversely affect ultimate transplant outcomes if adequate social support is provided to ensure patient's medical adherence [10]. More recently, research explored the role of coping strategies, received family and social support, and social history on HT outcomes and sustained their inclusion in the formal assessment. In HT patients, the use of denial and avoidant coping before transplantation is associated with an increased risk for developing a psychiatric disorder after transplant. Optimism, active problem-solving, and having a strong sense of self-efficacy are associated with better psychological, behavioral, and clinical outcomes [10, 14]. Family and social support needs also to be assessed given its contribution to patient's adherence and the important protective role in mitigating other risk factors including mental health problems and cognitive and intellectual disability. Low level of family and social support, low socioeconomic status, and worse background health characteristics contribute to an unsatisfactory HT outcome due to worse adherence to the therapeutic regimen [10, 15].

In contrast with the large body of literature supporting the content to be explored by the psychosocial evaluation, few empirical works focus on processes and procedures [10]. According to Organ Procurement and Transplantation Network (OPTN)/United Network for Organ Sharing (UNOS) guidelines, "All transplant programs should identify appropriately trained individuals who are designated members of the transplant team and have primary responsibility for coordinating the psychosocial needs of transplant candidates, recipients, living donors and families" [11]. The evaluation protocol may follow one of the published specific screening tools, including the Psychosocial Assessment of Candidates for Transplantation (PACT) [16], the Transplant Evaluation Rating Scale (TERS) [17], and the Stanford Integrated Psychosocial Assessment for Transplantation (SIPAT) [11]. There is current insufficient evidence to support the use of any given instrument over the others [10].

Consensus of expert opinion highlights the importance of a multidisciplinary discussion of

the psychosocial evaluation's final report. This approach provides a key opportunity to recommend treatments and interventions to ameliorate any identified psychosocial contraindication or risk factor to transplantation. With regard to mental health, pharmacological and psychotherapeutic strategies are now available and can be used safely and effectively to treat mental health issues before HT. Implementation, progress, and outcomes of recommended treatments or interventions should be monitored to allow timely updates to the transplant team [10]. Importantly, criteria for success need to consider the patient's medical urgency. In fact, HT represents a life-saving procedure: the process of conducting the evaluation therefore requires a tailored approach to the patients' ability to provide information, according to their current medical status and capacity to participate actively. In this sense, researchers and clinicians underline that strict, prescriptive guidelines for universal application are not appropriate in this field [10].

The Waiting Period: Psychopathology

Scarcity of donor organs and improvement in survival after a cardiac event due to advances in medications and technology, including ventricular assist devices (VAD), has led to an increase of average waiting times for all patients over the past years. Regarding psychopathology, the period between being listed for transplantation and receiving a heart is often particularly difficult and very stressful [12, 18]. The majority of patients experience a marked worsening in their physical condition. Previous studies reported rates of psychiatric morbidity of around 50% in HT candidates, mainly depressive and anxiety disorders [18]. The waiting period is often described as the most stressful of the entire transplant trajectory. The first allusion to the need for the intervention may generate in the patient profound discouragement and anguish, if not terror, with attempts to deny the seriousness of the situation. Denial has been observed to be a common defensive pattern and coping strategy in patients with cardiac disease and may play an initial adaptive

role, leading to a reduction in anxiety. By contrast, maladaptive denial may result in treatment non-compliance, counterphobic over efforts in work and activities, and failure to make appropriate plans. When denial is extreme, patients may refuse appropriate medical treatment and transplant [6, 12]. One of the main challenges during the waiting period is a sort of extreme uncertainty: the person lives constantly on the alert, dealing with the fear of death before an organ becomes available, while the physical status declines. Different from other solid organ transplant recipients, many patients await HT in the hospital setting. This wait, coupled with the need for intensive cardiac support, can compound the stress of the heart transplant process. Even for patients who are able to wait at home, there is significant stress associated with poor physical functioning, shortness of breath, fatigue, the stress of adhering to a medical and dietary regimen, waiting for an organ to be allocated, and contending with the possibility of death. Moreover, in recent years the implantation of ventricular assist devices (VAD) has evolved into a standard procedure to bridge patients to transplant. VAD therapy is associated with characteristic psychiatric and psychosocial issues, including additional distress due to the risk of adverse events such as infections, bleeding, neurological events, and early mortality [19]. The neuropsychologic course after VAD implantation proceeds in different stages [20]. Neurologic affections, including recurrent episodes of embolic or hemorrhagic strokes, may occur in the initial phase and can even preclude the possibility of HT [19, 21]. Subsequently, when adjustment to the life with a VAD sets in, the patient may experience an existential threat and that a machine controls his/her life. This represents a traumatic experience and implies a severe distortion of the body image [22]. This period is usually followed by a stage of stabilization, which often accompanies somatic health progress. However, this phase is characterized by continuing efforts of adaptation to life with the VAD and to the necessity to develop a new personal life concept. Patients are required to learn to manage a complex technical device where errors or inattentiveness are

potentially fatal. This results in constant psychological pressure, where pause nor oblivion is possible [20]. Long hospitalization due to recurrent VAD-related complications leads to deprivation and presents an additional negative psychological factor.

The prevalence of anxiety in patients with heart failure ranges between 9% and 53%, and moderate anxiety has been reported in the majority of transplant candidates [18, 23]. Symptomatic cardiac disease may itself trigger anxiety. Angina, arrhythmia, and acute heart failure produce anxiety related to fears of heart attack, disability, and sudden death. New potential sources of anxiety in the waiting period include long waits for the donor organ, the informed consent process, and the experience of the death of other patients [6]. Of note, anxiety has been identified as an independent predictor of all-cause mortality in patients with heart failure [19]. The prevalence of major depressive disorders ranges from 20% to 40% in patients with heart failure and 24% to 38% of patients on a heart transplant waiting list, with further increases in the intensity of the symptoms during the waitlisted period [13, 15]. Sanchez et al. in a cross-sectional study of 125 subjects found 30.4% of HT candidates reported a DSM-IV-TR Axis I disorder and 31.2% were on psychopharmacological treatment, mainly benzodiazepines (16%) and selective serotonin reuptake inhibitors (6.4%) [18]. Preoperative depression predicts higher risk for unfavorable outcome after HT, in terms of poor medication compliance, higher rates of hospitalization, and mortality [13, 15]. Appropriate identification and treatment of depressive and anxiety disorders is therefore essential. Psychotropic medications provide an effective option, combined with psychotherapy or alone. The choice of psychotropic agent requires careful consideration of the risk for QTc prolongation and of pharmacokinetic issues. In the waiting period, end-stage organ disease represents the primary focus, given the potential alterations in drug absorption, distribution, and clearance [19, 24]. Selective serotonin reuptake inhibitors (SSRIs) are well tolerated and efficacious for depression, panic disorder, and post-traumatic stress disorder. Adjustments in dosage

are required when renal or hepatic impairment is present. For acute or short-term control of anxiety with these patients, benzodiazepines provide the most rapid and effective relief. First-generation antipsychotics, most atypical antipsychotics, tricyclic antidepressants, and the SSRIs citalopram and escitalopram have been associated with QTc prolongation and ventricular arrhythmias, thus requiring a careful analysis of the necessity of immediate treatment and the availability of alternative treatment options. Furthermore, specific caution and awareness of the QTc-prolonging effects of cardiac medications, particularly class I and class III antiarrhythmics, are required to guide appropriate drug choice in case of coadministration [19, 24].

Living with a New Heart

Early Postoperative Period

In the early phase following heart transplantation, many recipients report feelings of euphoria, omnipotence, and immortality, linked to the dramatic improvements of their physical conditions. These feelings are often accompanied by a temporary denial of worries about the risk of rejection, the need for lifelong pharmacological therapy, and the extraneous nature, not only biological, of the transplanted organ. The very early period after HT has been described as a sort of “honeymoon,” a phase of transient idealization of the recipient’s condition following the triumph over death. This feeling of rebirth may resemble the characteristics of a hypomanic state, most likely reactive to the intense anguish and threat experienced throughout the waiting period [4, 25]. Previous studies showed a significant decline in anxiety and depressive symptoms and the return to a psychological status comparable to that in the absence of illness [2, 25].

Neurological complications represent the main neuropsychiatric disturbances in the immediate postoperative period, with a 9% prevalence of delirium or encephalopathy in HT recipients [26]. The pathogenesis of delirium after HT is complex and involves neurotransmitter

alterations, physiological stressors, metabolic derangements, electrolyte imbalances, potential neurocognitive side effects of immunosuppressive regimens and antibiotics, and the use of extracorporeal circulation [25, 27]. Of note, postoperative delirium has been reported in 36.8% of lung transplant recipients in a recent study by Anderson et al. (2018), with pretransplant benzodiazepine prescription found as an independent risk factor. There are few data to guide the treatment of delirium in cardiac intensive care unit patients [28]. Non-pharmacological strategies to reorientate the patient should be preferred. There are conflicting and limited data to guide the use of antipsychotics. Atypical antipsychotics may reduce the duration of delirium, but these should not be used in patients at significant risk for torsades de pointes [27]. Brief psychotic disorders may also occur in the immediate postoperative period or within 2–4 weeks after the intervention, mainly in patients with a previous history of psychiatric disorders or secondary to steroid treatment. Although rare, the early and correct identification of psychotic disorders deserves attention, given the potential for appropriate good management rather than the very negative effect on HT outcomes if not treated [25, 29].

First Year After Transplant

The first year following HT is characterized by a complex strict clinical follow-up, including laboratory tests, pharmacological monitoring, electrocardiograms and echocardiograms, chest radiography, and biopsies. The need for accurate close clinical surveillance is due to the risk of acute rejection and the higher recipients’ frailty in this phase, especially if hospitalized in the period before the intervention. The need to adhere to frequent, continued medical controls and immunosuppressive regimens, the threat of acute rejection, and possible hospital admissions due to infectious complications may all lead to the loss of the initial feeling of omnipotence and contribute to the genesis of feelings of depression and uncertainty. The perception of the graft itself may change, from a magic and powerful organ to

a weak and fragile one [4, 8]. The development of anxiety and depressive symptoms may be influenced by the unique experience of end-stage heart failure and subsequent transplantation, which can be highly traumatic. Competing senses of hope and gratitude mixed with guilt and grief regarding the acceptance of a heart from a deceased donor may contribute to psychopathology in this population. A review of qualitative studies on recipients' perception of the transplant reported a complex variety of experiences, ranging from positive feelings and emotions, connected with a sense of gratitude, pride, and altruism, to more negative ones, such as feeling fearful, depressed, and guilty. Of note, a sense of grief seemed to relate to the loss of the donor's life as well as for the recipient's own heart that had needed to be replaced [30, 31]. Overall, several studies reported a significant improvement in depressive and anxiety symptoms within the first postoperative year compared to the waiting list period [2]. However, HT recipients may experience a higher prevalence of depressive symptoms at hospital discharge and in the early period after HT, with a rapid decline over time. Mood and anxiety disorders, as well as subclinical psychological symptoms, are relatively common in the first year after HT. About 4% of recipients meet criteria for major depressive disorder in the first month after transplant, rising to about 8% by the middle of the first year and to about 14–20% by 12–18 months after transplant [32]. The prevalence of anxiety disorders is similar, with 1.5–7% of recipients meeting criteria for either phobias, panic, generalized anxiety disorder, or post-traumatic stress disorder specifically related to the transplant experience (PTSD-T) during the first month posttransplant, rising to at least 17–18% by the end of the first year [29].

Despite recipients' awareness of being survived to a disabling condition, early problems with medical compliance may already arise during the first year after HT. Previous research found that 20% of recipients reported difficulties with pharmacological adherence, 19% restarted smoking, 18% did not follow nutritional advice, and 9% did not present to scheduled appointments regularly [33]. Data on the occurrence of

psychosis beyond the postoperative period, not ascribed to acute organic etiology, are scarce and appear to occur almost exclusively in individuals with a pretransplant history of illness [25, 29].

Long-Term Follow-Up

According to the International Society for Heart and Lung Transplantation (ISHLT) registry, the average life expectancy after cardiac transplant is 10.9 years [34]. With improvement in patients' survival after heart transplant, the quality of life and psychosocial well-being emerged as important outcome measures in the long term. Despite a general improvement in functional and psychosocial status following the intervention, the posttransplant adaptation trajectory may be threatened by the onset of medical complications due to the immunosuppression regimen, pharmacological side effects, and comorbidities. As a result, many patients may experience psychological and psychiatric morbidity in the subsequent years.

Mood and anxiety disorders are the most common ascertained psychiatric conditions after HT. During the first several years following the intervention, up to 63% of recipients have been reported to experience depressive disorders, mainly major depressive disorder or persistent depressive disorder, while up to 26% suffered from one or more anxiety disorders, including generalized anxiety disorder, panic disorder, and post-traumatic stress disorder [29]. Dew et al. (2001) found that 3 years after HT, the cumulative rate of major depressive disorder (MDD) was 25%, slightly higher than that of all anxiety disorders (21%). The levels of distress and impairment due to depressive and anxiety disorders in HT recipients appeared to be severe in terms of length, number of symptoms, and presence of suicidality [32]. Risk factors for depression in the early post-transplant period include worse physical functioning, longer hospitalization, lower level of social support, and inadequate coping strategies [32]. Within 5 years after HT, the estimated frequency of major depression is 41% and 12% for transplantation-related post-traumatic stress disorder (PTSD) [35]. In the last decade, a growing body

of research explored psychological outcomes more than 10 years after HT [36]. Dobbels et al. reported a prevalence of depressive symptoms of 30% at 5 years and 22% at 10 years after surgery, with 20% of the entire study cohort showing symptoms at both time points, according to the Beck Depression Inventory, one of the most used self-administered questionnaires in the field. The use of passive coping strategies, a tendency to express more negative emotions, and lower club membership were associated with the presence of depression at both time points. None of those patients was taking antidepressants or had received psychotherapeutic treatment during the follow-up period [37]. Similar rates of depressive symptoms (30%) were reported by Fusar-Poli et al. in a sample of 137 recipients more than 10 years after HT [38]. A recent cross-sectional study by Conway et al. involving mostly HT long-term survivors found that 10% of participants suffered from major depression according to a structured clinical interview and 18% were receiving antidepressant medications, with depressed HT recipients experiencing worse pain control after controlling for clinical and psychological variables [3]. Of note, depression and anxiety are recognized risk factors for morbidity and mortality after organ transplantation [39]. Predictors of poor psychological functioning after HT include the onset of posttransplant secondary medical complications, poor physical functioning at time of HT or perioperatively, pretransplant history of psychiatric disorder, poorer social supports, use of avoidant/passive coping strategies, lower sense of personal control/self-efficacy, and lower optimism and sense of hope. Cumulative cyclosporine dose and pretransplant VAD support may affect neurocognitive status following HT [40]. Older patients reported better quality of life, psychosocial adjustment, and adherence after HT than middle-aged and younger patients [41, 42].

Despite being recommended by the clinical guidelines for caring for heart transplant recipients, regular screening for anxiety and depression is not a currently standard practice. Although underrecognition and treatment of major depression is a well-known phenomenon in many

clinical populations, it may be particularly problematic in transplant recipients due to clinicians' concerns about recommending the addition of psychopharmacological agents to the complex regimen of medications. Treating depression in this patient population is challenging due to drug interactions from patients' antirejection medications. Cyclosporine and tacrolimus are both metabolized utilizing the hepatic CYP450 3A4 pathway: inhibitors of this enzyme increase the risk of their toxicity, while, by contrast, medications that induce 3A4, such as many antidepressants, determine subtherapeutic levels of these immunosuppressants, increasing the risk of graft rejection. Selective serotonin reuptake inhibitors (SSRIs) are the first-line treatment for depression in postcardiac transplant patients. The serotonin-norepinephrine reuptake inhibitor (SNRI) venlafaxine can be safely used in most transplant recipients. Mirtazapine has been suggested as a second-line treatment to be reserved for patients suffering from cachexia who may benefit from its appetite-stimulating effect [24, 43, 44].

However, transplant patients experience unique issues that may benefit from a psychotherapeutic approach. Interesting findings and potential suggestions come from qualitative research exploring recipients' perceptions of the factors that contributed to their past and present emotions. Adequate support from family, friends, previous HT recipients, and the transplant team has been reported as essential. However, too much support from caregivers at a time when the HT recipient was trying to readjust back to normal life was noted as an obstacle to recovery and a source of potential conflict within family dynamics [31]. These considerations highlight the importance of tailored support transitioning to a level that promote recipients' sense of independence and perceived control over health and daily life. As a practical implication for healthcare providers too, these findings suggest that during hospitalizations the staff should provide the HT recipient with as many opportunities to care for themselves as possible. Other interventions, which have been shown to increase perceived control in cardiac populations, include reframing techniques in which an acute event is viewed not as something

that is uncontrollable out of control but as an isolated exacerbation of a chronic condition that can be controlled managed with adherence to prescribed medications and lifestyle modifications. Receiving support from others who had previously undergone HT was also considered particularly beneficial as HT was viewed by recipients as a unique experience. Further research is needed to explore the impact of peer support programs and group interventions [31].

Data on the impact of non-pharmacologic interventions on psychological outcomes for heart transplant recipients are limited, and insufficient evidence is currently available. This is surprising, given the long term since ISHLT first calls for more research in the field. Moreover, no study specifically addressed the impact of non-pharmacological interventions on psychological outcomes in heart transplant recipients fitting the criteria for psychopathology [40, 45]. Possible reasons include feasibility of psychosocial interventions, including psychiatric evaluation and psychotherapeutic treatment in the hospital setting, accessibility for patients living at a long distance from the transplant center or coming from other regions of the country, restrictions due to physical illnesses, costs, and availability of dedicated trained staff.

Exercise programs, a web-based intervention, cognitive behavioral therapy (CBT), interpersonal psychotherapy, and mindfulness-based stress reduction techniques have been shown to improve depressive symptoms and quality of life in solid-organ transplant and cardiovascular disease patients [45–47]. Recently, a pilot study by Conway et al. found that telephone-delivered CBT was not acceptable in HT recipients [48]. More research into how depression manifests after heart transplantation is required in order to determine the most effective supportive strategies.

Conclusion

HT raises unique psychological issues and potential psychiatric complications which originate from the human source of the graft, together

with the complexity of the entire clinical and therapeutic trajectory. HT therefore deserves a multidisciplinary approach, including psychological and psychiatric competences.

Cross-References

- ▶ [Antipsychotics and Cardiac Side Effects](#)
- ▶ [Anxiety, Anger, Personality, and Heart Disease](#)
- ▶ [Cardiovascular Manifestations of Panic and Anxiety](#)
- ▶ [Depression and Cardiovascular Diseases](#)
- ▶ [Major Psychiatric Complications of Cardiac Surgery](#)
- ▶ [Psychiatric and Neurological Effects of Cardiovascular Drugs](#)
- ▶ [Psychiatric Aspects of Sudden Cardiac Arrest and Implantable Cardioverter-Defibrillators](#)
- ▶ [Psychological and Cardiovascular Effects of Meditation and Yoga](#)
- ▶ [Psychotherapy and Psychological Support for Severe Heart Conditions](#)

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