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Depression in Patients with Heart Failure: A Review Article

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ABSTRACT

The incidence of depression in patients with heart failure ranges from 21% to 42%. Depression is a growing independent risk factor for high mortality, re-hospitalization and deterioration of the quality of life. The advanced stage of heart failure along with the low ejection fraction and functional class has a direct correlation with the extent of depression. Medical professionals may measure depression by using the GESS I CAMP acronym (Guilt, Energy, Sleep, Suicide Interest, Concentration, Appetite, Mood, Psychomotor) as a helpful method of evaluation, or either of a variety of readily administered and graded self-report questionnaires. Cognitive behavioral counseling explores the associations with the environment, physiology, attitudes, emotions, and how these may be changed to yield changes in behavior and mood. The STEPS acronym can be helpful: Safety, Tolerability, Efficacy, Payment, and Simplicity). Pharmaceutically, selective serotonin re-uptake inhibitors are endorsed, although tricyclic antidepressants are not prescribed in patients with heart failure. The use of a potent serotonin re-uptake inhibitor and cognitive behavioral treatment is also helpful when used together.

Keywords: Depression, Heart failure, Environment, Physiology

INTRODUCTION

Almost, every disease is linked with bio-psycho-social components with a variable degree of an element of anxiety and depression. Vice versa, Psychological disorders are correlated with somatic intimacy in the context of psycho-somato-social affection. There is a strong reciprocal association and connection between the three-essential elements of somatic, social and psychological influences. Management approaches should address the three elements in an effective way, with a significant impact on clinical outcomes and economic burden [1].

Psychological disorders reported to worsen the prognosis and quality of life of coronary artery disease, myocardial infarction, heart failure, unstable angina, and coronary artery bypass graft [2]. Mental heart dysfunction has a clear negative impact on coronary disease as a consequence of inability to adapt to behavioral changes, drugs and medical severity [3]. American heart association endorse routine depression screening for cardiac patients, however only less than 15% of patients undertook such assessment. Integrating psychiatric screening is especially relevant in low-to middle-income countries where the stigma of mental disease is significantly impacted by unfavorable social and political circumstances. Mental as well as psychological disorders is also stigmatized in non-Western nations [4].

Depression is a significant issue in heart disease, the incidence of heart failure has continued to rise, and several surveys have reported worse results of patients with heart failure showing Depression of 21.5% in patients with heart failure (one in 5 patients) and differed with the diagnostic questionnaire or interview (33% *vs.* 19%) and more common with deterioration in heart failure. (11% in class II and 42% in class VI), higher mortality rates and serious injuries, more utilization of health services, high unplanned re-admission and emergency department visits. The association between depression and bad outcomes is clear and significant across several endpoints. Such outcomes affirm the significance of psycho-social study in communities with heart disease and recognize a variety of areas for potential research. Despite these interconnections between depression and heart disease, no causal association has yet

been identified [5].

Clinical Epidemiology

There is now a high prevalence of mental illnesses, especially depression and anxiety in cardiovascular disease, and this bi-dimensional association has previously been reported [6]. Approximately 15%-30% of patients with heart disease have depressive disorder, which is two or three times more than in the general population [7]. Cardiovascular disorders and depression lead to major global burden. Depression is anticipated to be the primary source of global burden disease in 2030 [8]. Depression is the most prevalent status of mental disorder among the general population [9]. It is a frequent co-morbidity in patients with heart failure [10].

Socio-economic and Demographic Factors

Demographic factors: Demographic variables that affect depression include; age, marital status, residency, educational degree, occupation, also, clinical considerations such as; prior coronary disorder, duration of cardiac failure, co-morbidity, efficacy of treatment, somatic effects, social history of cardiovascular disease, and quality of life, directly influence the depression in heart failure. Psycho-social causes such as post-traumatic stress, loss of social care, etc.

Many causes that affect depression in patients with heart failure include gender (women suffer more extreme depression than men), younger patients typically encounter more stress, reside alone, low social interaction, weak self-care behavior, poor heart failure awareness, disease frequency, and lifestyle problems such as alcohol and tobacco smoking [5]. Aging tends to play a significant role because older patients with heart disease (over 65 years of age) become more depressed due to the reality that they suffer physical and cognitive disability (poor memory or attention difficulties) that render their everyday lives more difficult. Rozzini, et al. noticed that hospitalized patients over 70 years of age have 67% of heart failure prevalence [11].

Socio-economic factors: Surveys incorporating socio-economic, psychiatric and private assessments are useful for the evaluation of depression, anxiety, post-traumatic stress, emotional care, endurance, self-esteem, somatic symptoms and lifestyle habits [12].

Poor socio-economic and educational status have a major effect on depression in patients with heart failure, because these patients typically do not readily recognize the disorder, do not comply to the medications, do not mention depressed symptoms or loss of financial support, and seek professional help after the illness has reached an advanced stage.

Faller, et al. demonstrated that low socio-economic status was associated with extreme depression which was correlated with higher risk of death even after correction of confounding factors such as age, sex, pathophysiology of heart failure, degree and form of left ventricular impairment, and the New York Cardiac Association functional level [13].

Life Style and Social Care Considerations

Life style considerations, such as smoking status diet, fat intake, vegetable intake, fruit consumption, drug use, physical activity, and BMI [14]. Sedentary lifestyle is a contributing factor for depression in both the general public and those with chronic disease.

Aerobic exercise activity reduced signs of stress over a 12-week span in a limited non-randomized clinical trial of patients of heart disease. In breast cancer research [15], encouraging physical exercise could have an added advantage in enhancing self-esteem, a factor correlated with depression and anxiety. The level of social care plays a significant role in this. Overprotective actions of partners may have a detrimental impact; Patients with weak self-management behavior, people with insufficient social interaction, and history of smoking and persistent cardiac disease >1 year of age require special treatment. A lot of time is then required to concentrate on these problems in order to treat depression properly [16].

Etiology and Patho-Physiology

Neuro-hormonal pathophysiology: Heart failure and depression share multiple biological pathways in the form of autonomic nervous dysfunction with diminished parasympathetic activity, stimulation of the sympathetic nervous system [17].

The rise in sympathetic tone would raise the heart rhythm, reduce the amplitude of the pulse rate, lower the threshold for myocardial ischemia and increase the adverse event in patients with heart disease. Sympathetic activity would also raise the rates of cortisol, dopamine, renin, angiotensin, aldosterone and free radicals [9]. Elevated rates of circulating catecholamine are correlated with the pro-coagulant influence enhances the accumulation of platelets and reduces the release of eicosanoids in reaction to hemodynamic vascular wall stress [18].

Hyper-activity of the hypothalamo-pituitary-adrenal axis often mediates hyper-reactivity of the sympathetic nervous system as demonstrated by elevated plasma level nor-epinephrine and elevated catecholamine reaction to orthostasis [19]. Research confirms the association between mortality and elevated rates of catecholamines, most definitely attributed to a reduction in the amount of β1-adrenergic receptor, reduced response to adrenergic stimuli, myocardial remodeling, myocardial damage, and increased susceptibility to ventricular arrhythmia [20].

Hyper-cortisolism and elevated level of nor-epinephrine activate the blood clotting factors. Hyper-cortisolism triggers a rise in factor VIII and von Willebrand factor levels and a reduction in fibrinolysis. Elevated amounts of nor-epinephrine are correlated with abnormal coagulation and fibrinolysis [21].

Immunological pathophysiology: Depressed patients have shown a decrease in the suppression of macrophage production by cholinergic anti-inflammatory system contributing to elevation of pro-inflammatory markers like C-reactive protein (CRP) and cytokines such as interleukin-1-beta, tumor necrosis factor alpha, and interleukin-6 [22]. TNF-alpha administration has been shown to suppress serotonin release in normal subjects and induces depressive mood, sleep disturbances, and malaise [23].

It has been proposed that inflammation could be accountable for a poorer result in patients with severe heart disease. High rates of cytokines are objective indicators of heart failure associated mortality and adverse effects. Despite these recommendations, research connecting results of heart disease with depression to specific bio-markers is also uncertain [24].

Hemo-dynamic mechanisms: Endogenous neuro-hormones are stimulated in patients with heart failure due to elevated left ventricular filling pressure that activates the release of norepinephrine, renin angiotensin-aldosterone, vasopressin and endothelin [1]. The stimulation of these mechanisms results in both vasoconstriction and expansion of volume [25]. Depressed people undergo excessive stimulation of the nervous system by hyper-reactivity on the hypothalamo-pituitary-adrenal axis, contributing to elevated release on cortisol into the blood. Elevated amounts of serum cortisol induce elevated blood pressure, high blood lipids, insulin intolerance, and abdominal obesity. Such influences had a strong harmful impact over time [26].

The consequence of decreased blood supply to the hippocampus, which plays a significant role in mood and memory, has been proposed as a potential cause for stress and cognitive impairment in patients with heart failure [27]. There is compelling evidence of the modulating function of the immune system in the correlation between depression and heart disease through the hypothalamic-pituitary-adrenal axis and the autonomic nervous system [28]. Several laboratory parameters (including hemoglobin and leukocytes) associated with the number of inflammatory markers that have been linked with depression [29].

Platelet function disorders associated with chronic depression can induce platelet aggregation contributing to thrombus formation. Depressed patients have raised the amount of serotonin 5-HT2A platelet receptors, but the association between these receptors and platelet stimulation is not established, platelet reactivity is decreased in patients treated with Selective serotonin inhibitors of reuptake (SSRIs). Further research is required to establish the association between depression, platelets, and complications in patients with heart failure [30].

Clinical Picture

Signs and symptoms: According to the Medical and Predictive Manual of Psychiatric Illnesses, the clinical picture of depressive illness n heart failure includes the following: (a) hypersomnia (b) reduced engagement or enjoyment of tasks (c) severe or insufficient remorse (d) lack of power or exhaustion (e) reduced attention (f) reduced or raised appetite and subsequent weight loss or gain (g) psycho-motor retardation / restlessness (h) frequent thoughts of death, suicidal thinking or attempts [31,32].

Such symptoms must be apparent nearly every day over 2-weeks duration, and at least one of the manifestations

must be either distressed mood or lack of interest or enjoyment. Such signs may reflect a deviation from prior activity resulting in social, occupational or other life disability and must be the direct product of a drug, medical disorder, or bereavement [25].

The measurement of depression is frequently misunderstood for a variety of factors. Medical signs of depression may be associated with signs of cardiac failure. Doctors give greater attention to the diagnosis of the disorder when symptoms are misdiagnosed with medical conditions especially when the root cause persists. The same was for lack of awareness about typical and atypical symptoms of depression. In fact, patients are still hesitant to reveal their personal discomfort to the psychiatrist for fear of being stigmatized with mental disorder [33].

Heuristic GESSI-CAMP scale: The heuristic GESSI-CAMP (Guilt, Energy, Sleep, Suicidal Interest, Concentration, Appetite, Mood, Psycho-motor) is a good way to recall certain parameters [25]. Other research indicated that heart failure patients with depression have worse outcome and 29% greater treatment expenses than non-depressed patients [34]. Depression has been shown to be a powerful and independent marker of unfavorable results in adults with heart disease, such as severe cardiac attacks, re-hospitalization and death [35].

Misdiagnosis of depression in heart failure patients: Depression may go misdiagnosed in cardiac patients because: 1) physicians ‹reluctance; 2) patients› inability to mention depressive symptoms; 3) doctors and patients might falsely conclude that depression is a natural reaction rather than a more severe yet treatable disorder; and 4) other signs, such as nausea, weakness, sleep problems, weight loss or gain; the loss of attention and cognitive disorder, which are normal in both CHF and depression, may only be attributed to heart failure [36].

Management

Pharmacological and non-pharmacological depression treatment has contributed to a substantial decrease in morbidity and likely death in patients with heart disease. On the other side, dietary improvements, self-care awareness and physical fitness are essential considerations in the treatment of heart disease [37,38].

Preliminary assessment: Physicians should evaluate patients for their irrational ideas, and then support them to encounter their beliefs by presenting accurate facts according to their actual functional abilities. Physicians will also motivate patients to undertake effective physical and social tasks. Such initiatives will increase patient self-esteem, contribute to improved adherence, and contribute to a more positive attitude to safety [37].

Cognitive behavioral therapy (CBT): Cognitive behavioral therapy (CBT) is the most effective psychosocial medication for depression. CBT believes the patients are positive donors to therapy. Cognitive behavior treatment explores the connections between the climate, biology, attitudes, emotions, and how they can be changed to generate improvements in conduct and attitude. CBT emphasizes the short-term, problem-oriented growth of skills. Through CBT, doctors are advised to help people track their thoughts regarding their condition and/or daily events that may contribute to depression. Patients are encouraged to establish an effective means of understanding their condition and take necessary measures. For instance, depressed patients with CHF sometimes experience diminished functional capacity given objective evidence to the contrary [39].

CBT can be regarded if all of the following symptoms exist: 1) mild to moderate depression; 2) acute or recent depression; 3) No psychotic characteristics; 4) past successful reaction to CBT; 5) availability of CBT services; 6) contraindication to drugs; 7) lack of response to drugs; and/or 8) complex psychosocial circumstances.

Pharmacologic treatment: Physicians will recognize effectiveness and side effect of Pharmacologic treatment Before choosing an antidepressant for patients with heart failure. There are little variations in effectiveness between groups even among members of the same class. No variations were observed in the management of mild to moderate depression. Side effects and medication reactions are now of great concern in patients with heart failure [40]. Patients of heart failure are most likely to be aged and with several comorbidities. In fact, the protocol for medicinal treatment includes the use of poly-pharmacy. Any of these factors raise the risk of adverse effects and reactions with antidepressants [41].

Drug metabolism via the P450 cytochrome is a common process. Antidepressants are not the same regarding their effect on the CYP450 mechanism. Fluvoxamine is more prone to cause medication interactions. Citalopram, sertraline, and venlafaxine tend to have the least effect on P450 interactions. Fluoxetine and paroxetine are inhibitors of 2D6 iso-

enzymes. This isoenzyme is directly involved in the breakdown of a variety of essential medications, and its inhibition of can result in drug breakdown, higher drug serum concentrations, and the possible toxicity of 2D6 substrates [42].

Also, there is no agreement about how best to handle HF patients with depression. Trials have revealed depression control with the use of SSRIs [43]; however, major studies of Sertraline Against Depression and Cardiac Disease in Persistent Heart Failure (SADHART) and Morbidity, Mortality and Attitude in Depressed Heart Failure Patients (Attitude-HF) have not demonstrated any substantial advantage over placebo. There was no significant advantage between the ordinary care (optimal HF therapy without antidepressants) and the usage of SSRIs in SADHART or MOOD-HF.

Large trails showed that antidepressant medications decreased depression, but not morbidity or mortality. Physicians extrapolate data from myocardial infarction and depression clinical studies to address depression in patients with heart failure. In the Sertraline Antidepressant Heart Attack Randomized Study (SADHART), sertraline has no detrimental effects on left ventricular ejection fraction with no significant adverse cardiovascular event than placebo in patients with acute coronary syndromes. The Canadian Cardiac Randomized Assessment of Antidepressant and Psychotherapy Efficacy (CREATE) study, patients with coronary artery disease (N=284) with citalopram (SSRI) had dramatically decreased depression over placebo for 12 weeks; short-term psychotherapy provided little effect. In the Enhancing Recovery in Coronary Artery Disease (ENRICHD) clinical trial,123 cognitive behavioral treatment, complemented by SSRI, dramatically reduced depression but did not change cardiovascular morbidity or mortality in patients with myocardial infarction (N=2481) [43]. When picking an antidepressant consider the STEPS acronym (Safety, Tolerability, Efficacy, Payment, and Simplicity) [44]. A dual CBT and medication may be a useful tool when severe chronic depression associated with psychosocial element which did not respond therapy [38].

Side effects: Despite a lot of available agents for treatment of depression, the presence of heart failure confounds selection. Given the frequency of TCA-related side effects, the SSRIs should be preferred. Further attention should be given to a drug with minimal side effect and interactions in the treatment of heart failure [45-51]. Antidepressants might be considered with any of the following conditions: 1) severe depression ; 2) chronic or recurrent depression; 3) presence of psychotic features; 4) a previous positive response to medication; 5) a family history of depression; and/or 6) the patient is unable to do the work required in psychotherapy [51].

Hypotension: Hypotension is one of the most common side effects associated with antidepressants. An adrenergic blocking action of Tricyclic antidepressants (TCAs) can induce hypotension. Differences occur between the TCAs for hypo-tension, with the least influence of nortriptyline. Such hypotension episodes predispose patients to falls and higher levels of hip fractures, particularly in the elderly. Atypical antidepressant trazodone has also been known to induce hypotension [45].

While Selective serotonin reuptake inhibitors (SSRIs) have a marginal impact on blood pressure, Bupropion often does not lower the blood pressure. Nonetheless, bupropion and venlafaxine were correlated with the occurrence of hypertension in about 6% and 3% of patients, respectively [46].

Heart block and arrhythmias: Cardiac conduction problems are evident in patients obtaining TCAs. Delayed conduction can contribute to serious disease in the presence of pre-existing conduction abnormalities. 18% of patients with pre-existing bundle branch blocks treated with imipramine (TCA) doses experienced a worsening of their conduction abnormalities, such as a second grade Mobitz II or a 25% prolongation in QRS duration [47]. Alteration of heart conduction of SSRIs, even when overdosed, is negligible. Symptomatic bradycardia has been identified in patients obtaining fluoxetine but has not been confirmed in clinical trials. In 234 incidents of fluoxetine poisoning recorded to poison control centers, there was no proof of QRS prolongation or conduction delays [48].

The existence of life-threatening arrhythmias was noted as an obstacle to TCA overdose due to their pro-arrhythmic influence. Atypical drugs, such as trazodone and bupropion, as well as SSRIs, have not been reported to induce arrhythmias [49]. There is no strong evidence of left ventricular systolic impairment of antidepressant in patients with heart failure [50]. With the introduction of each medication, the clinician will be conscious of the possibility for serious product reactions.

Discharge plan for heart failure patients with depression: Three contributing factors linked to post-hospital dis-

charge depression, including ischemic heart disease diagnosis, limitation of activity and lack of adequate social care. Such potential factors will be taken into consideration in the creation of the post-discharge treatment plan [51].

The prevalence of depression in heart failure is higher for inpatients than outpatient. Definitely, the evaluation of depression in heart failure clinics are more reliable as the signs of heart failure are controlled. Accordingly, the evaluation and management of depression is essential to begin early after the diagnosis and throughout the course of the disease as the intensity of depression is frequently altered [52].

CONCLUSION

Depression is an independent threat factor for morbidity and mortality in heart failure patients. Frequently, depression is underestimated, underdiagnosed and undertreated. Clinicians may gather information on depression by using the GESS I CAMP mnemonic and/or by one of self-report questionnaires. CBT is an effective treatment for depression. SSRIs, are preferred over the TCAs, which should not consider for treating depression in patients with heart failure.

Recommendations

Biological, psychological and social dimensions of heart failure should be examined and treated in tandem. The full model of care, aside from traditional cardiac evaluation, diagnosis and therapy, should provide rehabilitation, and psychiatric treatments, with supporting people. Management of Depression in heart failure should be regarded an important and a necessary component of a clinical approach for the management of heart failure and should be as a part of protocols of heart function clinics.

DECLARATIONS

Conflicts of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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