Review Article

Achieving the Balance-A Systematic Review on Treating Depression Post Myocardial Infarction

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Abstract

Introduction: Post myocardial infarction (MI) depression is a known complication and its treatment is a challenging task in a diseased heart. A variety of psychotherapies and pharmacotherapies are available. Pharmacotherapies such as Selective Serotonin Reuptake Inhibitors (SSRIs) and Serotonin Norepinephrine Reuptake Inhibitors (SNRIs) are routinely used in depressive patients without heart disease. In MI patients, these drugs can cause fatal arrhythmias, bleeding and sudden cardiac death. However, psychotherapies and behavioral treatments like Cognitive Behavioral Therapy (CBT) and Exercise Therapy (ET) do not have such serious side effects. This systematic review aims to look for the most suitable anti-depressant therapy in post-MI depression, which also has a cardio-protective role. **Methods:** This Systematic Review was conducted according to Preferred Reporting Items for Systematic Review and Meta-analysis (PRISMA) guidelines. Literature search from PubMed, Medline, PubMed Central and Google Scholar was carried out. Medical Subject Heading (MeSH) technique was used with keywords like 'Myocardial Infarction', 'Heart Attack', 'Depression', 'Serotonin Levels' and 'Major Depression'. Boolean variables like 'AND' and 'OR' were used. The inclusion criteria was literature in English language published between 2018 to 2022, with studies restricted to human studies only with patient age between 45-64. **Results:** After applying inclusion criteria to initially searched 319780 articles, we were left with 1841 results. Duplicate removal gave 990 unique articles. After a thorough search for title and article relevance, only 25 most relevant studies were left. Quality assessment tools like Universal Questionnaire, Cochrane Risk Assessment, Scale for Assessment of Narrative Review Article (SANRA) and Assessment of Multiple Systematic Review (AMSTAR) were applied to our 25 articles and 15 most reliable ones were extracted. This systematic review includes 37854 patients outcome in its discussion. **Conclusions:** Depression in MI patients can occur due to multiple factors related to patients' characteristics and disease burden. SSRIs and other pharmacotherapies can cause fatal outcomes in a patient with compromised heart function. However, other therapies like CBT and ET are more suitable for MI patients due to low to no side effects profile. This systematic review helps physicians and researchers in selecting the most appropriate antidepressant treatment for MI patients.

Keywords: Myocardial infarction; Depression; Anti-depressive agents; Psychotherapy; Serotonin uptake inhibitors

Introduction

Among all causes of mortality, Cardiovascular Disease (CVD) alone is responsible for 31% of deaths globally. Among CVDs, Myocardial Infarction (MI) contributes the maximum to this percentile. MI is the death of cardiomyocytes due to a lack of nutrients [1]. The prevalence of depression in MI patients is 15-20% more than that of the general population [2]. Depressive symptoms are associated with grave outcomes in heart patients [3]. Depression in MI patients increases mortality and post-MI complications like second MI episodes. Psychological stress in the form of depressive symptoms after MI altogether decreases the quality of life [2]. Depression in MI can be due to multiple pathophysiologies, like alterations in coronary blood flow, and endothelial dysfunction [4]. Depression can prevail from three to twelve months after MI [5]. MI leads to heart failure and cognitive decline in the form of depression, which is due to systolic dysfunction and decrease blood flow to the brain. The causes of post-MI depression are: neurohormonal changes; inflammation; neuronal apoptosis; and patient's apprehensions about Percutaneous Coronary Intervention (PCI) failure [6,7]. Some studies establish that depression after MI leads to the reemergence of Coronary Artery Disease (CAD) in the future [8]. Therefore, management of post-MI depression by screening and treatment cannot be ignored [9].

To combat depression in post-MI patients, variety of interventions are in practice like Psychotherapy, Cognitive Behavioral Therapy (CBT), Exercise Therapy (ET) and Pharmacotherapy. Pharmacotherapy includes Selective Serotonin Reuptake Inhibitors (SSRIs), Serotonin Nor-epinephrine Reuptake Inhibitors (SNRIs), and tricyclic anti-depressants. These drugs have well known advantages in treating ordinary depression; however, in patients with heart disease, cardiac health should always be considered before prescribing any medications. SSRI are the most commonly used antidepressant class for post-MI depressive patients. However, some of the SSRI are associated with cardiac side effects that can be detrimental especially in post-MI population. Increased bleeding risk in patients already on blood thinners, QT prolongation, high sympathetic stimulus to a diseased heart, and lethal interactions with anticoagulants are some of the grave concerns regarding this first-line antidepressant therapy in cardiac patients [4]. CBT is generally considered as the first step in treating depression, but its beneficial effects in cardiac population are relatively unclear [4]. Exercise therapy for depression has also shown long-term cardio-protective effects [4].

There are many studies regarding treatment modalities and regimens for post-MI depression. Most of these studies consider SSRIs as a first line treatment. The final aim of treating depression in MI patients is to improve the overall cardiac health [5]. In post-MI depressive patients, cardiac effects of depression treatment can also not be ignored. Unfortunately, there is limited information about the best antidepressant treatment in heart patients and any inappropriate cardiac therapy can prove fatal in patients with a compromised heart. The reason for this systematic review is to assess the most beneficial antidepressant treatment in cardiac patients.

Methods

This systematic review is conducted according to the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020 guidelines [10].

Data collection was carried out using a thorough keyword search on different databases like PubMed, MEDLINE, PubMed Central (PMC), and Google Scholar. Medical Subject Heading (MeSH) keywords like "Depression", "Low Serotonin," "Major Depressive Disorder," "Myocardial Infarction," "Heart Attack," and "Acute Coronary Syndrome" were combined with Boolean operators "OR" and "AND" to search PubMed and PMC. Data search from Google Scholar was done using the phrase "Depression in post myocardial infarction patients". Table 1 presents the search strategy used for various databases.

Database	Keywords/Phrases
PubMed, MEDLINE, PMC	["Depression" OR "Major Depressive Disorder" OR "Low Serotonin"] AND ["Myocardial Infarction" OR "Heart Attack" OR "Acute Coronary Syndrome"]
Google Scholar	"Depression in post myocardial infarction patients"

Table 1: Search Strategy for Databases

The results were screened for duplicates, and articles with relevant titles and abstracts were screened according to the inclusion criteria. The inclusion criteria was human studies in English language, published from 2018 till 2022, with free full-text available and with patients aged 45-64 years. Types of records included were randomized controlled trials, narrative reviews, systematic reviews and meta-analyses. Case reports, case series, unpublished or non-peer reviewed articles, and records not in English language were excluded. Full text search was carried out for articles meeting the selection criteria, and eligible records were chosen for a quality appraisal process.

Quality assessment for eligible studies was carried out using different freely available quality appraisal tools. These included the Universal Quality Assessment Questionnaire; the Cochrane Risk Assessment Bias Tool (RoB 2) for randomized controlled trials; the Scale for the Assessment of Narrative Review Articles

(SANRA) for review articles; and the Assessment of Multiple Systematic Reviews (AMSTAR) tool for systematic reviews. After quality appraisal, studies with good performance on quality assessment scores were included in the final review.

Results

After an initial search 319,780 records were identified (Figure 1), out of which 1841 were selected after application of the eligibility criteria. After removal of duplicates, 990 studies were assessed at title and abstract stage, and 26 records which were most appropriate were retrieved for full-text review. These 26 records were assessed for quality using the quality appraisal tools as mentioned in the methodology. Finally, 15 records were chosen for review in the study which included data for 37,854 patients.
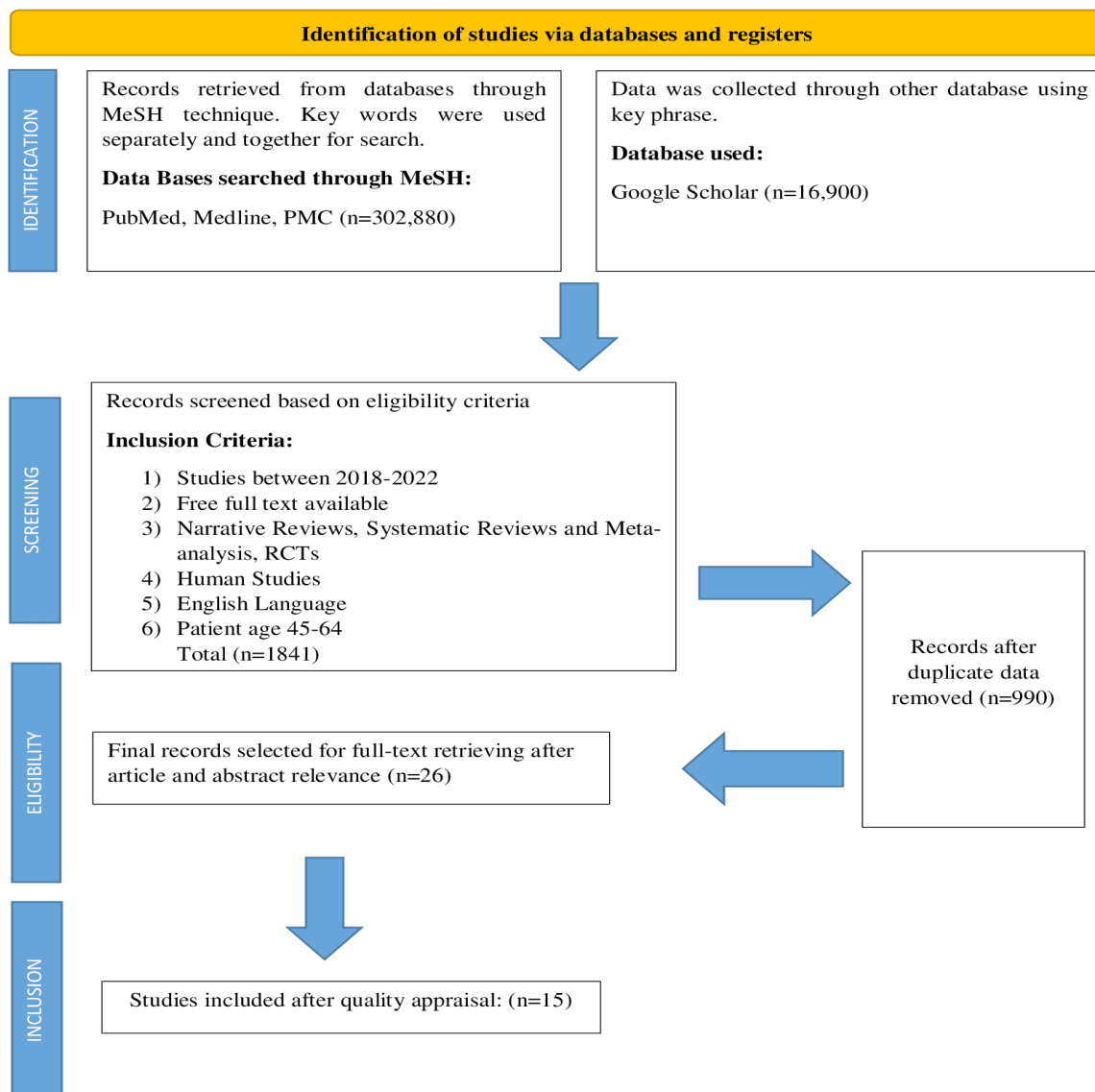

Figure 1: PRIMSA Flow Diagram

Discussion

Pathophysiology, Causes and Complications of Depression in Post-MI Patients

MI results from cardiac cell death. One of the common complications of MI is post-MI depression. This complication results in poorer outcomes in ACS patients. There are several reasons and pathophysiological mechanisms underlying this complication. Buckland et al., (2019) included gender as one of the most common causes of post-MI depression. They debated those women with post-MI status report depressive somatic symptoms like fatigue and tiredness more often than men [3]. Another study conducted in 2019 covers many common modifiable and non-modifiable causes of post-MI depression, including socioeconomic status, ethnicity, and genetics. According to this study, diabetes mellitus (DM) and hypertension (HTN) in ACS patients increases the chances for developing depression [1]. Another study published in 2021 links MI to HF due to compromised left ventricular systolic dysfunction of the heart post-MI, and suggests that systolic dysfunction is one of the underlying pathologies of post-MI depression. The purported reason for this is decreased blood supply to brain neurons in systolic dysfunction, which causes oxidative and inflammatory damage as well as mitochondrial death in neurons, leading to psychological compromise [6].

Treatment for MI itself is also linked with post-MI depression. According to one study, percutaneous coronary intervention (PCI), which is a standard and promising treatment for early ST-elevated MI (STEMI), is linked with depression in patients. This is mainly due to the fear of treatment failure, and procedural complications [7]. Coronary artery inflammation, endothelial dysfunction, altered autonomic effects in body and platelet dysfunction have all been linked with post-MI depression in cardiac patients as well (figure 2). Platelets contain serotonin, and antiplatelet drugs in post-MI patients can change serotonin levels, which is linked directly with the onset of depression (Figure 3). Depression and mental stress in return leads to platelet hyper-coagulation and increase the risk of another MI [7].
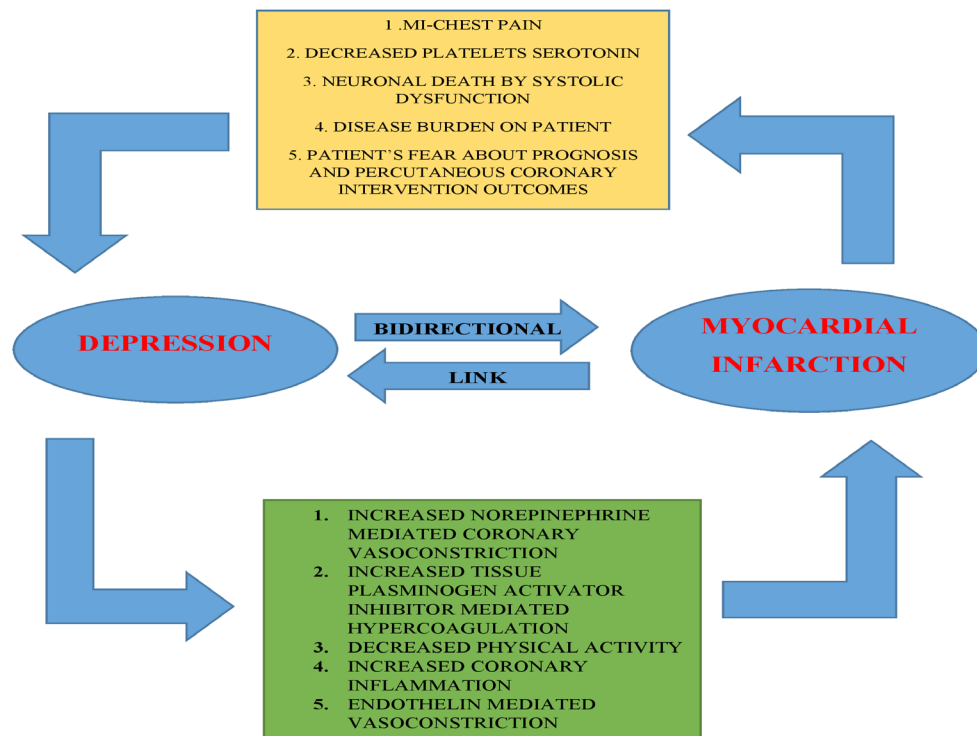

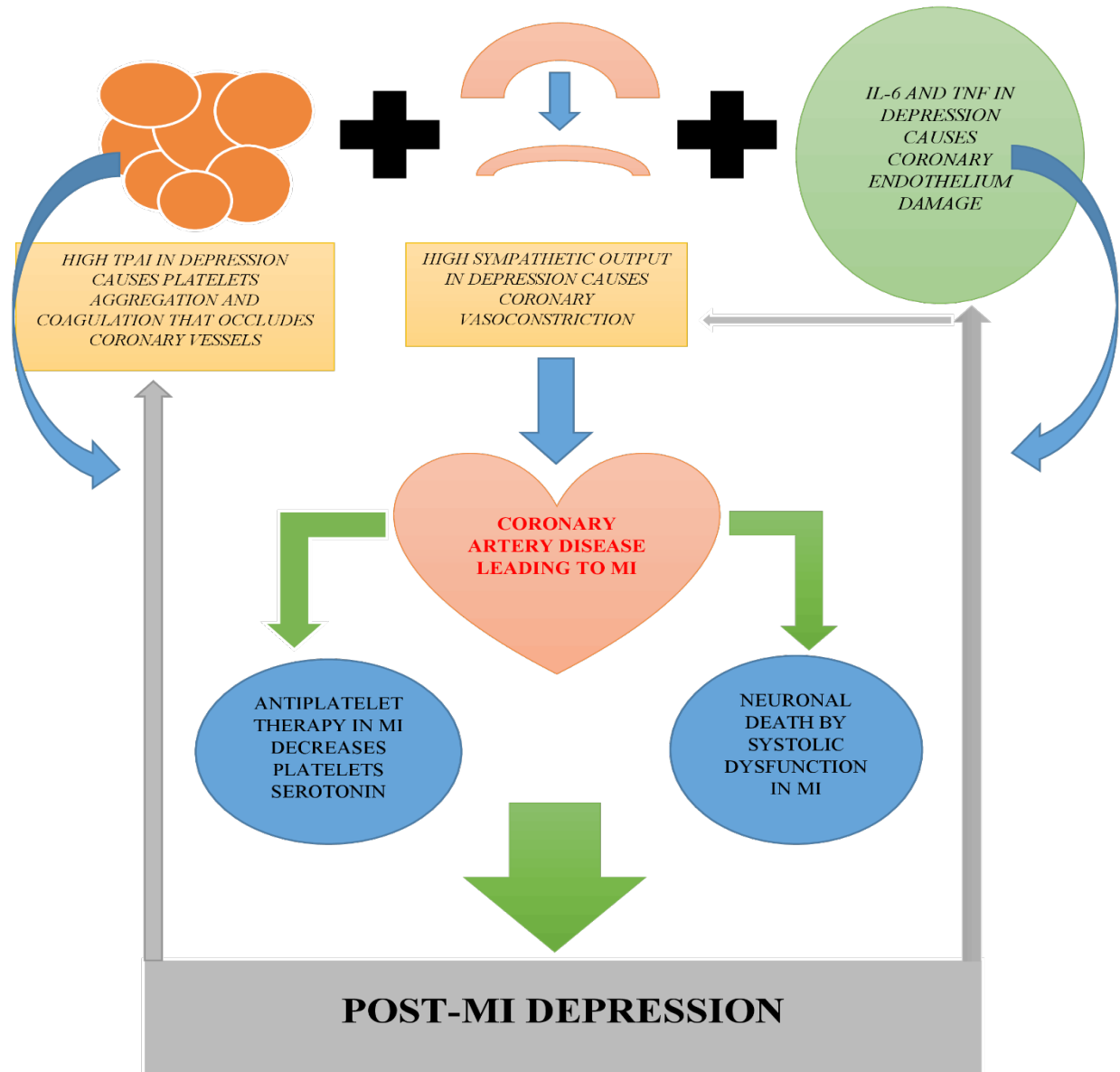**Figure 2:** Bidirectional link between MI and Depression

Figure 3: Pathogenesis of Post-MI Depression

Why post-MI depression should be a matter of great concern for physicians and patients is answered by Moise et al., who argue that depression in post-MI patients is linked with increased morbidity and mortality in cardiac patients as compared to ordinary depression patients. Increased chances of rehospitalizations with subsequent MI episodes, financial burden on patients and most importantly, a low quality of life (QOL) are complications arising from post-MI depression [9]. Personal and family history of mental health disorders are important risk factors for post-MI depression. Depression in otherwise healthy individuals results in poor functioning and (QOL); and in ACS patients, it increases disease burden and mortality. (Table 2) compares characteristics and results of studies related to pathophysiology and risk factors of post-MI depression:

Serial No.	Author	Year	Study Type	Number of patients	Study Purpose	Results	Conclusion
1	Jinawong, et al., [6]	2021	Review Article	Not Reported (NR)	Information about systolic dysfunction as a reason of post-MI depression and treatment strategies.	Brain hypo-perfusion produces reactive oxygen species (ROS). ROS results in mitochondrial death in neurons that eventually leads to cognitive decline and depression	*MI results in HF that leads to Systolic dysfunction which results in neuronal inflammation and destruction. Angiotensin converting enzyme inhibitors (ACEIs) and SSRI improve this cognitive decline.*
2	Moise, et al., [9]	2019	RCT	1500	Depression after ACS causes increased mortality, low quality of life, and other health-related burdens. This trial is aimed to search for the factors behind post-MI depression.	Out of 1500 patients, (28.3% women; 16.3% Hispanic), 7% presented with depression.	This trial aimed to find post-MI depression consequences and treatments. In the future, this will help in the treatment of post-MI depression
3	Feng, et al., [1]	2019	Meta Analysis	3818	This study aims at the early detection of post-MI depression because it reduces long-term life quality and compromises physical and mental capabilities	Post-MI depression increases mortality by 2.25 times and cardiac mortality by 2.71 times. It increases risk of ACS within two years by 1.59 times.	Post-MI depression is associated with increased mortality and grave outcomes, dependent on race, sex, and diagnostic tools.
4	Buckland, et al., [3]	2019	Systematic Review	NR	Sexual differences and prevalence of depression in MI	Post-MI depression is more prevalent in women as compared to men. Incidence in women is 35.75%.	There is higher Post-MI depression incidence in women, which is underreported and links non-depressive somatic symptomatologies with depression.

5	Liu, et al., [7]	2019	Systematic Review	NR	To elucidate PCI as a cause of Post-MI depression.	This review links PCI as one of the causes of depressive symptoms in MI. It also enforces treatment strategies to reduce depression.	PCI is associated with risks of procedural complications and failure risks. A patient assuming these drastic outcomes can go into Post PCI depression. So timely counseling and treatment are needed.

Table 2: Pathophysiology and causes of post-MI depression

Management and Prevention of Depression in MI:

Depression is a modifiable risk factor for post-MI complications. It should be treated properly by pharmacological as well psychological interventions. This not only improves depressive symptoms but also cardiac outcomes. There are a variety of treatments for post-MI depression. A study in 2018, however, suggests that pharmacotherapy does not have much impact on post-MI depression but (CBT) does alleviate depressive symptoms [4]. Another study in 2021 suggests that internet-based CBT does have some effect, but does not significantly decrease post-MI depression. However, the reason could be non-adherence to internet-based CBT [5].

Due to its severe impacts on patient management and outcomes, post-MI depression should be screened in ACS patients and this screening should be included in cardiac care models in order to decrease complications related to post-MI depression. This screening also helps in treatment of depression [8]. Moise et al., however, suggest that depression screening does not have any significant role in post-MI patients, as only 7% of the subjects in the Quality-of-Life cost outcomes trial (CODIACS QoL) were found to have depressive symptoms after screening, thereby indicating that screening is not essential [9]. Another study in 2019 introduces Mindfulness Based Stress Reduction (MBSR), which has a significant role in cardiac patients. It results in improvement in depressive symptoms of cardiac patients during first year post-MI. However, sometimes booster of MBSR is also needed at a nine-month interval [11].

Norlund et al., argued that Internet Based CBT does not decrease the symptoms of post-MI depression as compared to Treatment as Usual (TAU) [12]. CBT is a well-known therapy for depressed patients, especially when it is combined with wellbeing therapy (WBT). The combination of these two therapies alleviates depressive features, significantly in post-MI patients. This combination outweighs the clinical management of post-MI depression with pharmacological agents [13]. A study in 2018 discussed the delivery of Enhanced Psychosocial Care (EPC), which plays a significant role in cardiac rehabilitation by decreasing post-MI depressive symptoms. However, the only limitation is the delivery of EPC. The nurses who are deputed on the delivery of EPC have high work load, and hence they cannot deliver EPC punctually; this limitation decreases its effectiveness [14].

As a modifiable risk, depression should be addressed promptly in post-MI patients and treated. Vaccarino et al., recommend in their study that treatment for depression with SSRIs or psychotherapy not only alleviates depression but is also helpful in decreasing cardiac morbidity [15]. Treatment adherence is the most important deciding factor in assessing treatment effectiveness in post-MI depression. Patients must be compliant to the pharmacotherapy as well as CBT for promising outcomes. A study in 2018 argues the importance of treatment adherence and reflects that while Internet delivered CBT was considered an effective treatment for post-MI depression patients, it has been possibly rendered ineffective due to non-adherence [16]. Effective and a complete treatment of depression in MI helps in decreasing depression but also improves cardiac outcomes. (Table 3) compares different treatment strategies in post-MI depression:

Study	Author	Year	Study Type	Patient Number	Study Purpose	Results	Conclusion
1	Humphries, et al., [5]	2021	RCT	239	This study is about Internet-Based CBT and its impact on alleviating chances of 1-year post-MI depression and risks of cardiovascular morbidities.	Hospital Anxiety and Depression Scale (HADS) scores were the same in the treatment and control groups. Internet-based CBT improves Cardiac Anxiety Questionnaire (CAQ) scores (β=-2.58, 95% CI -4.75 to -0.42, P=0.02)	Internet-Based CBT is not found to significantly impact post-MI depressive symptoms and cardiac mortality.
2	Marin, et al., [8]	2020	RA	21790	This review is to assess the benefits of depression screening in post-MI patients	21790 patients were screened through different depression tools. In eleven studies, 2181 participants were included using HADS. The State-Trait Anxiety Inventory was used to screen 444 patients.	There are no clear instructions to screen for depressive symptoms in patients with MI
3	Rafanelli, et al., [13]	2020	RCT	100	This trial tells about a new terminology and therapy of psychological well-being in post-MI patients and its impact on cardiac health.	Compared to clinical management, CBT and WBT have much more effects on depression improvement. However, a similar frequency of cardiac adverse effects is seen in both groups.	Applying psychological well-being therapy to ACS patients with depression has immense benefits.
4	Vaccarino, et al., [15]	2020	RA	NR	This paper talks about mechanisms and methods to decrease depressive symptoms and how to improve care in post-MI patients.	Depression and MI are interlinked and depend upon multiple factors. Further search is needed to evaluate those factors.	Depression in MI patients is associated with poor outcomes, and there are several factors related to them. This paper is about some of those factors. It also talks about how improved care can be provided to post-MI depressive patients.
5	Eisenberg, et al., [2]	2020	RCT	175	Bright light therapy is effective in almost all types of depression. However, its implication for cardiac patients has not been investigated yet. This article is about BLT trials in cardiac patients	Fifteen participants were in the trial. Eight (53.3%) were randomized to the bright light therapy and. 7 (46.7%) were in the dim light control arm. Ten participants were of ACS.	This trial is about the effectiveness of Bright Light Therapy among cardiac patients having depressive symptoms.

6	Nijjar, et al., [11]	2019	RCT	47	This trial is about the effectiveness of Mindfulness-Based Stress Reduction Therapy in diseased cardiovascular patients.	Mindfulness-based Stress Reduction Therapy is effective in reducing cognitive symptoms, particularly depression. As well as cardiovascular morbidity.	MBSR is a good treatment of depression for cardiac patients. This RCT gives information about the effectiveness of MBSR therapy in improving psychosocial outcomes in cardiac patients
7	Moise, et al., [9]	2019	RCT	1500	This trial aims to assess the benefits of depression screening on post-MI patients.	Only 7% of the patients enrolled in this trial had elevated depressive symptoms.	The results of this trial tell about depression screening recommendations in patients with cardiac diseases.
8	Wallert, et al., [16]	2018	RCT	90	This trial aims to learn about the effectiveness of adhering to CBT in MI patients	The ages of Patients o an average is 58.4 years (SD 9.4), 62% (56/90) of men, and 48% (43/90) were compliant with the treatment. Accuracy is 0.64, 95% CI 0.61-0.68, P<.001)	To find the effectiveness of CBT, factors associated with adherence are essential. Future research should look into these factors.
9	Celano, et al., [4]	2018	RA	NR	This review assesses current evidence of treatment in post-MI patients.	Although limited evidence is present about the pharmacological treatment of post-MI depression, CBT and SSRI have more effectiveness.	Investigations regarding the treatment of depression and other cognitive dysfunctions are needed.
10	Richards, et al., [14]	2018	RCT	203	This trial checks the effectiveness and feasibility of enhanced psychological care in cardiac rehabilitation centers.	Enhanced Psychological care is openly acceptable to those who are receiving it and those who are delivering it.	Although nurses can deliver EPC to patients, nurses find it challenging to do so due to workload. Future research should be focused on means of effective EPC delivery
11	Norlund, et al., [12]	2018	RCT	3928	The main reason behind this trial is to look for the effectiveness of internet-based CBT in patients with post-MI depression.	It is observed that HADS was reduced (mean delta=-5.1, P<.001). However, treatment adherence was low.	This trial shows no significant benefits of iCBT in post-MI patients. This finding can be due to treatment non-compliance.

Table 3: Treatment strategies for post-MI depression

Side Effects of Antidepressant Treatment

Treating depression in otherwise healthy population relies on various treatment modalities, with limited side effects on organically healthy patients. However, when dealing with depression in the presence of concomitant morbidities such as ACS, treatment becomes challenging. Generally mild side effects profile linked to anti-depressant therapy can cause fatal effects in post-MI population. One RCT supported SSRIs as the first line of therapy in treatment of depression in post-MI patients [16]. However, SSRIs can have serious adverse cardiac effects; for instance, citalopram and escitalopram are known to prolong QT interval by 6.11 mm/sec and can lead to fatal arrhythmias in MI patients. SSRIs increase bleeding tendency in MI patients already on blood thinners like Aspirin and Clopidogrel. Lethal drug interactions with warfarin, Angiotensin Receptor Blockers (ARBs) and antiarrhythmic drugs are associated with SSRIs like Fluoxetine and fluvoxamine [4]. Moreover, escitalopram compared to placebo group did not show any significant improvement in depression in a study; although Paroxetine was shown to improve depression but its cardio-protective role is doubtful. In these scenarios, Sertraline is the only SSRI that can be preferred over other mentioned SSRIs [4]. (Figure 4) highlights some of the cardiac side effects that can result from different antidepressant treatments.
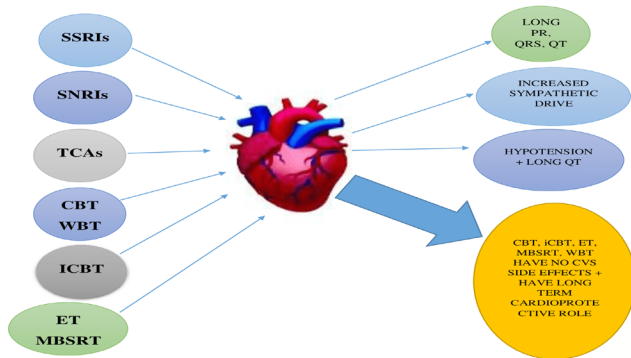

Figure 4: Side effects of antidepressant treatments.

Choice of Antidepressant Therapy for Cardiac Patients

Vaccarino et al., discussed the effectiveness of various antidepressant therapies including pharmacotherapies like SSRIs, SNRI and TCA and behavioral therapy like ET. They considered TCA as a 'contraindicated drug' in cardiac patients, since TCAs prolong PR and QT intervals and QRS duration, and can cause sudden cardiac death especially in post-MI compromised heart [15]. According to their study, all SSRIs do not have any privilege over placebo group due to similar outcomes in both groups. They advised not to stop SSRIs or TCA immediately in cardiac patients after observing side effects, because of severe withdrawal signs and increased suicidality. They also argued that sexual side effects linked with SSRIs can increase depressive features in post-MI population. SNRIs, even with serious cardiac side effects, were found to be more effective in treating depressive features in cardiac patients [15]. However, they are not a treatment of choice for MI patients.

ET includes aerobic exercises and stress relieving exercises. Aerobic exercise has a well-known cardio-protective role along with alleviating symptoms of depression. However, treatment compliance is a focal point in their efficacy [14]. Internet-based CBT, has not been shown to have a significant cardioprotective role [5] Bright Light Therapy has known benefits in treating depression effectively, especially seasons variants, but has limited effectiveness in post-MI depression, and in diabetic patients can cause or worsen retinal damage [2].

A study in 2020 presented a new idea of combining CBT with WBT. This combination therapy has promising cardiac outcomes along with significant improvements in depressive features of post-MI depression patients. CBT alone improves psychological stress and depression, and is considered a first line therapy in treating depression. Well Being Therapy (WBT) evokes wishes about better overall health, treatment compliance and maintaining cardiac health after MI. When both of these effective therapeutic measures are combined together, it improves depression and lowers cardiac mortality as well. One big plus is that both psychotherapies are free from a lethal side effect profile as compared to pharmacotherapies [12]. Nijjar et al., in their RCT reflect that post-MI patients with depression scale (PHQ-9 score) > 5, can benefit from Mindfulness Based Stress Reduction Therapy (MBSRT). This therapy improves depression and overall cardiac health without causing side effects [10]. A study in 2018, emphasizes the importance of physical activity and psychotherapy like internet-based CBT or face to face CBT, in treating post-MI depression. These measures improve overall health in such a patient population. However, linguistic differences and illiteracy are two main limitations in executing these therapies in MI patients [15].

The majority of data about the best suitable antidepressant therapy in post-MI patients is deficient and unclear. Some studies favor pharmacotherapies like SSRIs while others are in favor of psychotherapies like CBT, WBT or ET. In the light of the discussion above, the choice of best suited antidepressant therapy in post-MI depressive patients varies depending upon patient characteristics, treatment availability, expertise and extent of heart disease or previous heart conditions. However, psychotherapies no doubt can give promising results if given with due protocols and compliance is ensured, especially because the side effects profile of pharmacotherapies like some SSRIs are of huge concern in cardiac patients. The cardiac effects and comparisons of various therapeutic regimens are given in Table 4 below:

Study	Author	Year	Study Type	Patient Number	Study Purpose	Results	Conclusion
1	Humphries, et al., [5]	2021	RCT	90	This study is about Internet-Based CBT and its impact on alleviating chances of 1-year post-MI depression and risks of cardiovascular morbidities.	HADS scores were the same in the treatment and control groups. Internet-based CBT improves CAQ. (β=-2.58, 95% CI -4.75 to -0.42, P=.02)	Internet-Based CBT is not found to significantly impact post-MI depressive symptoms and cardiac mortality.
2	Vaccarino, et al., [15]	2020	RA	NR	This paper talks about mechanisms and methods to decrease depressive symptoms and how to improve care in post-MI patients.	Depression and MI are interlinked and depend upon multiple factors. Further search is needed to evaluate those factors.	Depression in MI patients is associated with poor outcomes, and there are several factors related to them. This paper is about some of those factors. It also talks about how improved care can be provided to post-MI depressive patients.
3	Eisenberg, et al., [2]	2020	RCT	175	Bright light therapy is effective in almost all types of depression. However, its implication for cardiac patients has not been investigated yet. This article is about BLT trials in cardiac patients.	Fifteen participants were in the trial. Eight (53.3%) were randomized to the bright light therapy and. 7 (46.7%) were in the dim light control arm. Ten participants were of ACS.	This trial is about the effectiveness of Bright Light Therapy among cardiac patients having depressive symptoms.
4	Rafanelli, et al., [13]	2020	RCT	100	This trial tells about a new terminology and therapy of psychological well-being in post-MI patients and its impact on cardiac health.	Compared to clinical management, CBT and WBT have much more effects on depression improvement. However, a similar frequency of cardiac adverse effects is seen in both groups.	Applying psychological well-being therapy to ACS patients with depression has immense benefits.

5	Nijjar, et al., [11]	2019	RCT	47	This trial is about the effectiveness of Mindfulness-Based Stress Reduction Therapy in diseased cardiovascular patients.	Mindfulness-based Stress Reduction Therapy is effective in reducing cognitive symptoms, particularly depression, as well as cardiovascular morbidity.	MBSR is a good treatment of depression for cardiac patients. This RCT gives information about the effectiveness of MBSR therapy in improving psychosocial outcomes in cardiac patients
6	Wallert, et al., [16]	2018	RCT	90	This trial aims to learn about the effectiveness of adhering to CBT in MI patients	The ages of Patients on an average were 58.4 years (SD 9.4), 62% (56/90) of men, and 48% (43/90) were compliant with the treatment. Accuracy is 0.64, 95% CI 0.61-0.68, P<.001)	To find the effectiveness of CBT, factors associated with adherence are essential. Future research should look into these factors.
7	Celano, et al., [4]	2018	RA	NR	This review assesses current evidence of treatment in post-MI patients.	Although limited evidence is present about the pharmacological treatment of post-MI depression, CBT and SSRI have more effectiveness.	Investigations regarding the treatment of depression and other cognitive dysfunctions are needed.
8	Norlund, et al., [12]	2018	RCT	3928	The main reason behind this trial is to look for the effectiveness of internet-based CBT in patients with post-MI depression.	It is observed that HADS was reduced (mean delta=-5.1, P<.001). However, treatment adherence was low.	This trial shows no significant benefits of iCBT in post-MI patients. This finding can be due to treatment non-compliance.

Table 4: Treatment Regimens for Depression in Post-MI Patients.

Limitations

The population covered in this review involves 45 to 64 years old i.e., middle aged population at highest risk of cardiac arrest. The review does not consider other comorbidities such as involving liver and kidney diseases, which could have attributed to adverse outcomes. Also, this review does not address the most appropriate time for antidepressant treatment intervention in post-MI patients. Further research is needed to overcome these limitations. Future studies should also look for the differences in treatment response and long term prognosis in MI patients as compared to otherwise healthy patients.

Conclusions

Appropriate selection of antidepressant treatment in post-MI patients is crucial to prevent morbidity and mortality. Post-MI depression is associated with genetics, gender, neurohormonal disturbances and patients' apprehension about disease burden and outcome. Pharmacotherapies like SSRIs, SNRIs and TCAs, can have detrimental side effects like fatal arrhythmias, bleeding risk, increased drug-drug interactions and sudden cardiac death in cardiac patients. Other behavioral interventions like CBT or WBT are considered safe and cardio-protective in MI patients. A baseline heart evaluation and a thorough insight of the side effect profile of the treatment plan must be carried out prior to treatment.

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