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Management of anxiety and depression in post coronary artery bypass graft surgery

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ABSTRACT



Depression and anxiety are common events in 30-40 percent of post coronary artery bypass graft (CABG) surgery patients. Depression symptoms in patients with CAD are expected to be significantly more, comparing the public incidence rate. Impaired remedy after coronary artery events may partly be attributed to depression and anxiety. If anxiety continues, it may lead to elevate metabolism and oxygen consuming. High level of anxiety increases the pain sensation in post CABG patients. This paper aimed to review results and findings of previous studies in the field of anxiety and depression management of post coronary artery bypass graft surgery. Up to 78 credited studies collected and compared in this review. Findings revealed that depression and anxiety could more complicate medical post CABG remedy. In addition, preoperative depression and anxiety symptoms would be persisted in post CABG recovery. Therefore, prior patients training about depression and anxiety symptoms would be wise strategy to help them describe their psychological mood before and after surgery. Findings also suggest that anxiety amplified depression prevalence in post CABG patients. Among the other methods, Benson relaxation is the best complementary medicine to mitigate pre-CABG anxiety. In addition, massage and music therapy could influence on post CABG anxiety and depression. There are also some robust evidences, indicating that perceived social support could influence post CABG anxiety and depression. Furthermore, sedative (such as propofol) and opioid and non-opioid analgesics, which used in post CABG pain management, could directly reduce anxiety level. Antidepressants sertraline and citalopram are the best studied post CABG pharmacological treatments which influence on post CABG remedy and hospitalization. The results suggest that treatment for anxiety is essential for alleviating patient suffering. In addition, anxiety treatment could protect patient against depression before and after CABG surgery.

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Introduction

According to previous studies in patients with coronary artery diseases (CAD), anxiety and depression may have significant effect on mortality and hospital readmission. Results showed anxiety and depression management either reduces mortality rate or hospital readmission in these patients [1-4]. Over the 20th century, patient psychological side effects and disorders have been categorized among potential risk factors of mortality and morbidity in all acute diseases, especially to develop preoperative or post CABG cardiac events [5].

Co-morbid depression is common in patients with coronary heart disease. Survival after coronary artery bypass graft (CABG) surgery, is largely affected by depression as a major risk factor. Whether depression symptoms appeared before or after CABG surgery, it affects other recovery indicators after CABG [6].

Comparing the healthy individuals, people with depression symptoms may possibly encounter 1/5 times more risk of CAD development [7]. In patients with cardiac events, depression showed twice more occurrence probability than other medical treated patient groups [8]. The findings are consisted with Blumenthal et al., who suggested that “highest rates of depression reported in patients with unstable angina or those awaiting coronary artery bypass surgery” [9].

Today, in the United States and UK, the CABG surgery has the highest incidence rate with annually over 500,000 cases [10]. However, CABG has been recognized beneficial for physical health, but the recovery process is not fully uncovered, which may partly due to depression and anxiety unknown effects on post CABG overall health status and remedy [11,12].

Consequently, the successful diagnosis of depression in preoperative and post CABG patients has been given greater importance than ever, which is mainly due to the

high rates of depression in those patients (ranging from 27% to 61%) that is substantially higher than other patients [13-15].

The need for psychiatric intervention in patients with diseases of blood vessels is a newly emerging concept emphasized in vascular psychiatry of modern medicine [16]. Today, cardiovascular and cerebrovascular syndromes are known to cause the highest rate of psychiatric morbidity and mortality in patients [17]. However, vascular syndromes such as vascular depression, vascular cognitive impairment and depression are common expected events in heart disease, being reported by psychiatrists in daily practice. However, there is also the possibility of the simultaneous occurrence of mental and vascular disorders, most of the time “indicating common underlying etiopathological mechanisms” [17].

Surgery is one of the most stressful events that any individual can face in their lifetime, and the incidence rate of cardiac surgery is currently increasing among the general population [7-9]. It is estimated that 30-40 thousand patients have undergone cardiac surgery in Iran, of which 50-60% are CABG. The incidence rate of CABG has been increased in Iran mainly due to lifestyle changes [18]. Anxiety is one of the most common psychological responses to stress experienced by patients when faced with life-threatening situations, such as aggressive diagnostic methods and surgery [19]. The majority of preoperative patients experience a level of stress, because they have a little physiological or psychological control on what is happening or the outcomes. If anxiety continues, it may lead to elevate metabolism and oxygen consuming. In addition, the high level of anxiety increases the pain sensation in individuals [19]. The importance of depression as a risk factor for post CABG patients has led the American Heart Association (AHA) to recommend “simple screening questions and an easy-to-administer survey called the Patient Health Questionnaire (PHQ-2)” for all post CABG patients for depression screening [20].

Sjoblom et al. defined in 1989 depression as an “independent risk factor for arteriosclerotic deposits in coronary arteries”. According to this definition, depression may be attributed to pathophysiological processes such as hypercortisolaemia, which may be related to insulin resistance, sympathetic-vagal imbalance (caused by inadequate regulation of blood pressure), and an unfavorable lifestyle like cigarette smoking [21].

Economic burdens increase in depressed patients with MI [22]. The results of a Canadian study of patients treated for depression symptoms after MI showed a nearly 41% increase in health care costs compared to the same patients who did not have depression symptoms [23].

However, according to several lines of evidence, anxiety is not an independent risk factor for MI, unlike depression. The risk of post-operative mortality is related

to depression in patients with MI. The same effect was found for acute preoperative mortality and morbidity [13]. Anxiety disorders can increase sudden cardiac death, which can be attributed to pathological ventricular arrhythmias [24].

Regarding the type of evidence, this study is patient oriented evidence (POEM). This review addresses important outcomes and consequences, such as changes in morbidity, mortality and quality of life, that significantly influence patient outcomes.

This paper therefore aimed to review the results and findings of previous studies in the management of anxiety and depression in coronary artery bypass surgery. The paper tried to find out to what extent anxiety and depression influence the surgical intervention after CABG. In addition, the literature was reviewed to find best practices and approaches for managing anxiety and depression.

To examine the role of anxiety and depression management in coronary artery bypass surgery, this study tried to gather the necessary information from literature data and other available internet sources. Such internet sources used in this paper to find relevant data are as follows: AHRQ-Agency for Healthcare Research and Quality: Advancing Excellence in Health Care (<https://www.ahrq.gov>), AHRQ's National Guideline Clearinghouse: A public resource for summaries of evidence-based clinical practice guidelines (<https://www.guideline.gov>), American College of Physicians Journal Club (ACPJC): Leading Internal Medicine, Improving Lives (<https://www.acponline.org>), Features short evaluations/discussions of individual articles dealing with evidence-based clinical practice, Centre for Evidence Based Medicine (CEBM) (<http://www.cebm.net>), Center for Research Support, TRIP Database, Clinical Evidence, BMJ Publishing Group (<https://bestpractice.bmj.com/info/>).

For this purpose, reliable previous clinical studies (clinical case studies and historical studies supporting the relationship between depression, anxiety, as well as the relationship between depression and anxiety management in post-CABG patients) were selected.

Discussions

Coronary artery disease is the leading cause of morbidity and mortality worldwide. For more than 15 years, WHO has sounded the alarm about the rapidly increasing burden of cardiovascular disorders. The reported prevalence of coronary artery disease (CAD) in studies of adults has increased 4-fold over the past 40 years to a current level of approximately 10%, being the leading cause of death and disability worldwide [25,26]. The incidence and prevalence in Indian population may be higher because of socio demographic reasons. The recent

past has witnessed exciting advances in cardiac care with an emphasis on prevention, early detection and new therapeutic procedures [27].

Kaul & Bhatia (2010) presented that `during early stages, management of CAD includes dietary and life style modification, lipid lowering agents, blood pressure monitoring, glycemic control, and anti-platelet agents`. As the disease progresses, these measures are not sufficient to maintain a satisfactory quality of life. Coronary angioplasty and coronary artery bypass surgery (CABG) offer a promise of improving the quality of life in such cases, although their indications are still under review according to the latest recommendations [28]. They also stated, that CABG is the commonest surgical method of management of CAD in India. Erkut et al. concluded in 2014 about this process in more detail: “over the years, refinement of surgical and anesthetic procedures has led to significant reduction in mortality and morbidity” [29]. Herrmann-Lingenin found in a 2001 study that a significant number of patients still have associated psychological morbidity that is disabling and distressing. Relationship of psychological symptoms with coronary heart disease has been well known since a long time [30]. Rugulies, emphasizing the significant role of psychological disorders, stated in 2002 that `it is important to note that psychological illness when co-morbid with cardiac illness generally leads to poorer outcomes` [31]. Researchers have also concluded that, `depression has been found to be an independent prognostic factor for mortality, readmission, cardiac events, and lack of functional benefits 6 months to 5 years after CABG` [22,32,33] These observations highlight the need for integrating psychosocial interventions to provide holistic and effective management after CABG [34].

Evidence has shown (in addition to increasing first-time CHD) that treating depression also correlates with secondary and tertiary prevention success [35]. Below are some data that support these observations.

1. Data indicating presurgical depression [11], in addition to post-surgical depression, elevated `physical and psychosocial morbidity six month and five years after CABG-surgery` [20].

2. Evidence that revealed the relationship between preoperative depression and `mortality in the period 30 days after CABG-surgery` [36].

3. Evidence indicating direct impact of depression to interrupt `functional status` [37] and `health status benefits` [38], six months after CABG surgery.

Burg et al. found in 2003 that depression significantly influences either short-term or long-term recovery after CABG surgery [11]. They also found evidences of increased `medical complications` in patients with preoperative depression before CABG, following six months postoperative medical care. The potential of `poor

quality of life` and bad remedy was higher in those patients, as well [11,38]. These findings are consistent with the data obtained by Saur et al. in 2001 [39].

Other studies have shown a link between depression and short-term recovery symptoms, such as postoperative prolong hospital residence, pain, infected graft site and surgery wound [40-42].

Blumenthal et al. (2003) found in 2003 a similar linkage between depression and long-term recovery symptoms such as hospital recourse rates, prospective cardiac disorders, life quality (QoL) depreciation and elevated mortality [9], data that overlaps those obtained by Connerney et al. in 2001 [12].

Whellan & Mark pointed out in 2003 to complexity of biologic, behavior and social mechanisms relating depression and CABG consequences [43], conclusions later confirmed by Lett et al. in 2004 [32].

In an attempt to study the impact of anxiety and depression on post CABG patients, Blumenthal et al. studied in 2003 (on a sample that included 817 participants) the patients waiting for CABG before surgery until averagely 5.2 years postoperative recovery [9]. Results showed elevated mortality risk in CABG candidates with preoperative depression, among the other causes, comparing with non-depressed patients. Connerney et al. collected 309 post-CABG patients in 2001 to track their recent and previous depressive history [12]. Using the standard diagnostic interview method, after up to 6 and 12 months postoperatively, postoperative depression, among other risk factors such as malignancy, independently influenced cardiac disorders. Stenman et al. in a relatively recent case study from 2014 among CABG patients found a clear relationship between preoperative depression and postoperative mortality [44].

In addition, there are many studies about the effect of anxiety and depression on post CABG patients, but there is relatively little knowledge of depression and anxiety effects on CABG patients. Studies have suggested that malignancy is not a direct cause of cardiac disorders, but psychological disorders clearly influence this pathology [45,46]. In subsequent studies, the role of social support, social class, and economic class in post-CABG health status has been emphasized, thus suggesting the impact of psychological factors on post-CABG recovery [42,47].

However, not all post-CABG recovery symptoms have been adequately detected, depression and anxiety may still be the most reliable and accurate predictors of post-CABG symptoms [48,49]. Koivula et al. found in 2010 that preoperative depression predicted postoperative CABG depression 5 years postoperatively, such that 20% of patients with preoperative depression reported continuing postoperative depression [50]. Depression and anxiety in the other hand, have been thought emotional dysfunction disorders [51]. Therefore, affect-regulatory factors might

be considered to be predictive of postoperative CABG symptoms [50].

Predictors of depression and anxiety `in addition to preexisting mood` certainly play a significant role in the development of related patterns and in detecting variation in symptoms reported in preoperative and postoperative CABG patients.

Interpreting the data

Coronary artery disease (CAD), is the most important cause of morbidity and mortality in recent global population. Medical and hospital care for CABG patients is experiencing a super-fast revolution in current years. This paper provides a multidimensional view of the management of depression and anxiety in post-operative CABG patients, trying to conclude with a comprehensive perspective of the management of psycho-emotional disorders, especially depression and anxiety. The results showed that depression and anxiety could influence either preoperative or postoperative medical care, as well as the potential for morbidity and mortality in CABG patients [52,53]. There was also some strong evidence that depression and anxiety could complicate a more complicated post-operative medical treatment. Based on the findings, it would be recommended to closely monitor the psychological states of preoperative and post CABG patients. Preoperative symptoms of depression and anxiety have also been shown to persist into postoperative recovery. Therefore, it is advisable for preoperative depressive and anxious symptoms to adopt a dual approach of psychological and somatic treatment in long-term postoperative medication, as it is more useful and cost-effective compared to other monomodal therapeutic methods [54,55].

There is a possibility of neglecting the symptoms of depression and anxiety in most preoperative and post CABG patients, because they may not understand the indicators or describe the related symptoms, due to the busy hospitalization or the agitated mental or physical situation they are facing. Consequently, educating patients beforehand about symptoms of depression and anxiety would be a wise strategy to help them describe their psychological state before and after surgery [34]. It is generally accepted that depression and anxiety are included as routine indicators of acute coronary disease [56].

The main question in this review was whether depression and anxiety management can influence morbidity, mortality or complexity of medical care in post CABG patients. To answer this question, the results of up to 40 relevant studies on this topic were collected and compared. Then, the common ideas and conclusions most frequently reported in all these studies were identified, thus representing the findings and conclusions of this review.

Based on the results of the reviewed studies, remarkable mental distress is common in preoperative

CABG patients, which should inevitably be detected and monitored by a psychiatrist. The findings also showed that age is an important factor in the recovery of mental distress. Thus, when comparing older patients who have less symptom variation, associated clinical symptoms would still be alleviated more rapidly in younger patients. However, special symptoms of anxiety, such as tachycardia, are more critical in young preoperative CABG patients. In preoperative CABG patients, anxiety is also a concern that is quite important, so treatment should be administered immediately to avoid potential risks [57]. In this situation, building a relationship of trust between the patient and the doctor is as important as the treatment stage. Furthermore, a stable long-term cure after CABG would require treatment of depression as the first and foremost priority, compared to anxiety. Although there may be some deviations, most patients would respond best to a combination of antidepressant and psychological therapy. Consequently, the key to successful treatment is reliable physical and psychological examinations for a correct diagnosis of symptoms [58].

Smoking, alcohol, diet, compatibility with medical and physical exercises, as well as a possible inflammatory status, are among the most important risk factors for post-operative CABG patients. Such manifestations and symptoms therefore require additional investigations by researchers in this strategic field of medical studies [59]. Current knowledge of depression and anxiety risks for CAD is limited to the existing biochemical model and assessment of depression and anxiety, while factors such as social status, social participation or isolation, economic status, ethnicity, single or married status have not yet been taken into consideration [60]. Seemingly, the observation of this interaction may shed some further clarifications on the underexplored role of depression and anxiety in patients with CAD. Furthermore, previous studies have mainly focused on depression, so studies on the effect of anxiety and depression-anxiety interaction in CAD patients have been insufficiently explored to date [60]. It is assumed that studying the simultaneous effects of depression and anxiety on post-CABG patients is likely to provide additional knowledge about the risk of psychological disorders for these patients. Psychologists and psychiatrists could provide valuable insights into the approaches and impact of depression and anxiety management for preoperative and postoperative CABG patients in close collaboration with cardiac surgeons, cardiologists, and cardiac nurses [61].

Depression and anxiety disorders have been revealed to be common events in 30-40% of post-CABG patients, which appears to be much more than it should be in community samples [62]. Furthermore, the findings suggest that either depression or anxiety have increased morbidity risks in CABG patients through biological and

behavioral mechanisms that are still insufficiently understood. Psychosocial intervention may mitigate adverse effects of depression and anxiety, such as morbidity and mortality in post-CABG patients [60]. Among other factors, early diagnosis and appropriate treatment of depression and anxiety can alleviate suffering and its effects in post-CABG patients, thus decreasing the mortality rate and the complexity of medical treatment in such patients [63].

Conclusions

These findings have encouraged doctors and clinicians to develop interdisciplinary medical and psychological treatment approaches, in order to minimize the risks and complications of depression and anxiety in post-CABG patients [19]. Increased short- and long-term anxiety in CABG patients has been shown to be related to both depression and anxiety symptoms (after controlling for baseline indicators of depression and anxiety), which are certainly additional risk factors regarding the evolution of these patients [64-66]. In addition, the findings showed that anxiety amplified the prevalence of depression in post-CABG patients [18]. The interaction between symptoms of depression and anxiety can complicate the cognitive assessment process, while clinicians are conducting post CABG patient's health care follow up process [64].

The results suggest that treatment for anxiety is related to the alleviation of distress while the patient is experiencing major stress. In addition, treatment for anxiety could protect the patient against depression before and after CABG surgery.

Conflict of interest disclosure

There are no known conflicts of interest in the publication of this article. The manuscript was read and approved by all authors.

Compliance with ethical standards

Any aspect of the work covered in this manuscript has been conducted with the ethical approval of all relevant bodies and that such approvals are acknowledged within the manuscript.

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