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## Perioperative Depression and its Effect on Survival after Coronary Surgery

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### Short Commentary

Previously, we proved that a stressful event as cancer diagnosis was associated with a poor outcome as suicide [1]. In the current study, we sought to assess the association between a stressful event coronary surgery and depression. Literature review was done, and 2 meta-analyses were identified with particular interest in this topic.

Depression and coronary artery disease are highly comorbid and often observed harmoniously in patients [2,3]. Thus, making it imperative to follow the course of depression postoperatively. Ravven et al. [2], conducted a meta-analysis about depressive symptoms after CABG surgery; in which out of 1883 searched abstracts, 39 studies on depression after CABG that included 8633 patients were identified (Figure 1).

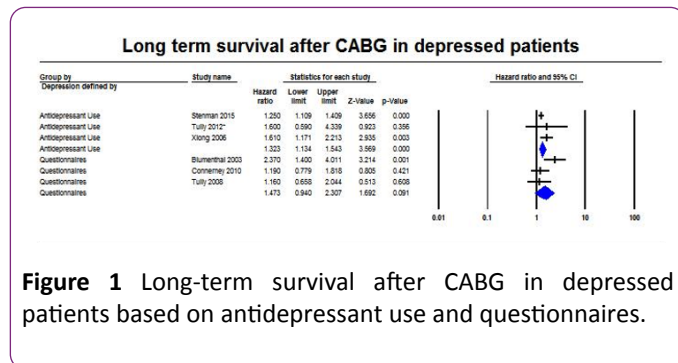


Figure 1 Long-term survival after CABG in depressed patients based on antidepressant use and questionnaires.

Risk of depression was increased early (1-2weeks postoperatively; relative risk [RR]=1.27; 95% confidence interval [CI], 1.01-1.61). There was a significantly decreased risk of depression at recovery (>2weeks-2months postoperatively; RR=0.78; 95% CI, 0.67-0.90), mid (>2months-6months postoperatively; RR=0.64, 95% CI, 0.58-0.70) and late (>6months postoperatively; RR=0.68; 95% CI, 0.58-0.79) time points (Table 1).

This study helps to establish the importance of preoperative diagnosis of depression, which aids in determining patients at risk for poor recovery, mortality, morbidity, subsequent depression and delirium. It also highlights the influence of timing on measuring clinically significant depression which might yield false positive when assessed  $\leq 1$  week prior to surgery or within 2 weeks post-op [4-7]. According to this

study there was an overall improvement in the CABG patients, however majority of patients still experience persistent depressive symptoms [3-6].

Table 1 Depression at different time intervals after CABG surgery [2].

Group by post-op time	Relative risk	Lower limit	Upper limit
Early (1-2weeks)	1.27	1.01	1.61
Recovery (>2weeks-2months)	0.78	0.67	0.9
Mid (>2months-6months)	0.64	0.58	0.7
Late (>6months)	0.68	0.58	0.79

Studies also demonstrated the presence of elevated CRP (C-reactive protein) in depressed patients, which is also a biomarker for chronic inflammation [8-10]. This study helps point out the difficulty in diagnosing depression in coronary artery disease patients as symptoms such as fatigue and poor appetite overlap. Further, the positive association between depression and all-cause mortality can also result from higher consumption of alcohol referred by Jacobs, Praag, Gage, Elhwuegi, Green, et al. [11-14], tobacco referred by Glassman [13], decreased physical activity and lack of adherence to medications in depressed patients [15]. The effect of socio-economic factors on long term survival following CABG has been identified as an independent factor [16]. Stenman et al. [17], conducted a meta-analysis. 4215 patients were diagnosed with preoperative depression out of 89,490 patients from seven included studies. All included studies found a positive relation between depression and all-cause mortality with statistically significant association in four. Patients diagnosed with depression had a pooled hazard ratio of 1.46 (95% CI: 1.23-1.73,  $p < 0.0001$ ) for all-cause mortality.

Depression was diagnosed based on anti-depressant use in 3 studies, self-assessment in 3 studies and through diagnosis in the Swedish National Patient Registry in 1 study. Sub group analysis revealed HR of 1.47 (95% CI 0.94 to 2.31) in the group with depression based on questionnaires and HR of 1.32 (95%

CI 1.13 to 1.54) in the group with depression defined by the anti-depression use.

Stress activates the hypothalamus-pituitary-adrenal (HPA) axis and the sympathetic system which returns to baseline following surgery but patients with depression are perceived to be under constant stress therefore experiencing constant upregulation [11,12].

## Conclusion

Both studies suggest a positive correlation between depression and coronary artery disease, indicating a reciprocal relationship. Depressed patients with CAD exhibit higher mortality rates estimating around 14% to 47% [3]. These studies further emphasize the importance of diagnosing depression at appropriate time intervals pre and post-operatively in an attempt to decrease associated all-cause mortality.

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