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**/ العنوان**

Association of Hyperhomocysteinemia and Adverse Postoperative Outcomes of on-Pump Primary Isolated Coronary Artery Bypass Grafting Surgery among Postmenopausal Women

## Abstract

**Background and objectives:** Studies investigating the possible role of hyperhomocysteinemia (HHC) in increasing postoperative morbidity and mortality among postmenopausal women undergoing on-pump primary isolated coronary artery bypass grafting (CABG) surgery are sparse in the literature. The knowledge about the relationship of preoperative HHC and postoperative adverse cardiovascular events is not adequately covered. This study is initiated to ascertain the hypothesized higher prevalence of HHC in postmenopausal women with ischemic heart disease (IHD) scheduled for on-pump primary isolated CABG and tracing its association to the proposed adverse postoperative complications especially thromboembolic ones linked in the literature to HHC.

**Methods:** This prospective comparative study included 77 postmenopausal women who presented with IHD requiring primary surgical myocardial revascularization (on-pump isolated primary CABG surgery). The study was conducted in the period between January 2016 and January 2019. The study population was divided into two groups based on their homocysteine (HCY) level. Group (I) included 34 patients with HCY values more than 15 micro.mol/L and group (II) included 43 patients with HCY values less than 15 micro.mol/L. The study population included patients having left main or left main-equivalent coronary artery disease, multi-vessel coronary artery disease, and one or two coronary artery disease. We excluded patients scheduled for off-pump CABG, patients with associated pathologies such as ascending aortic aneurysm/dissection, left ventricular aneurysm, and ventricular septal defects. Patients with concomitant valvular heart disease (including ischemic mitral regurgitation requiring intervention), malignancy, multiple co-morbidities e.g. liver cell failure, renal failure, respiratory failure, and patients with poor left ventricular ejection fraction (LVEF < 40%) were also excluded. The postoperative studied variables included ICU parameters (duration of mechanical ventilation, duration of inotropic support, total blood loss, blood glucose level, total duration of ICU stay), operative mortality, total hospital stay, and adverse complications (myocardial infarction, cerebrovascular accidents, pulmonary embolism, peripheral arterial/venous thromboembolism, low cardiac output syndrome, rhythmic complications, hemorrhagic complications, respiratory complications, acute renal failure, deep and superficial wound infections), overall hospital complications and overall one-year mortality and survival.

**Results:** Mean age was 64.34 ± 5.81 years in group (I) and 60.95 ± 6.54 years in group (II). Mean serum HCY level was 18.55 ± 1.11 micro.mol/L (range 15.50-23.6) for group (I) and 9.83 ± 1.03 micro.mol/L (range 5.6-12.7) for group (II). Group (I) showed statistically significant differences ($p < 0.05$) regarding preoperative variables (more previous MI attacks, more CCU admissions, lower LVEF%, higher EuroSCORE, more peripheral vascular disease and surgeries, more previous cerebrovascular accidents, more number of affected coronary vessels and higher peak serum creatinine levels) and postoperative variables (duration of mechanical ventilation, period of ICU stay, total duration of hospital stay, low cardiac output syndrome, IABP insertion, cerebrovascular accidents, acute renal failure and peak serum creatinine level). However, the overall hospital complication rate was 12 (35.29%) and 13 (30.23%) for group (I) and (II) respectively ($p > 0.05$). During the follow-up period, both groups expressed comparable results with no statistical significance, the overall one-year survival was 94.11% and 95.34% in group (I) and (II) respectively ($p > 0.05$) and the overall mortality was 4 (5.19%) (two deaths from each group; one in-hospital, and one during the follow-up period) ($p > 0.05$).

**Conclusion:** HHC was found to have high prevalence among postmenopausal women having IHD and undergoing CABG surgery. It was found to be associated with adverse postoperative complications as well as preoperative thromboembolic and cardiovascular insults. On-pump CABG aggravates the thrombotic potentiality in these patients. However, operative and postoperative mortality as well as one-year survival were not associated with HHC. Preoperative assay of HCY level and HHC stratification in the reviewed pre-CABG risk factors are recommended. Preoperative supplementation with folic acid, vitamin B12 and vitamin B6 may play a role in lowering the preoperative HCY level, thus, lowering the proposed