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Research Article

Factors of Myocardial Infarction in Surgery

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Abstract:

The material for the research was the conclusion of the Grodno (Belarus) regional pathoanatomical bureau of patients with coronary artery disease after coronary bypass surgery. The cohort comprises patients with a pre-operative diagnosis of ischemic heart disease who underwent CABG and subsequently experienced a fatal myocardial infarction. Autopsy reports will be reviewed to collect data on various pre-, intra-, and postoperative factors potentially contributing to MI. This includes, but is not limited to, patient demographics, co-morbidities, coronary anatomy, surgical technique, graft patency, and histopathological findings. The aim was to investigate the factors of the developing of myocardial infarction after coronary bypass grafting surgery.

keywords: coronary bypass; hemolysis; myocardial infarction

Introduction

Coronary artery bypass grafting (CABG), including the use of internal mammary artery grafts, remains a cornerstone in the management of ischemic heart disease (IHD). CABG offers significant benefits for patients with critical coronary artery stenosis, demonstrably improving angina symptoms and long-term survival. While CABG effectively restores myocardial perfusion in many patients, postoperative myocardial infarction (MI) remains a serious complication that can adversely affect patient outcomes [1-3]. A deeper understanding of the factors contributing to peri-operative MI is crucial for refining surgical techniques, improving patient selection, and optimizing perioperative care.

Study Aim

This study aims to identify and analyze the factors associated with the development of myocardial infarction following coronary artery bypass grafting [4].

Materials and Methods

This study utilizes a retrospective analysis of autopsy reports from the Grodno Regional Pathoanatomical Bureau (Belarus). The cohort comprises patients with a pre-operative diagnosis of IHD who underwent CABG and subsequently experienced a fatal myocardial infarction. Autopsy reports will be reviewed to collect data on various preintra-, and postoperative factors potentially contributing to MI. This includes, but is not limited to, patient demographics, co-morbidities, coronary anatomy, surgical technique, graft patency, and histopathological findings [5-7].

Results

Myocardial infarction (MI) was the predominant postoperative complication (43.8%) observed in this cohort of CABG patients. Thrombosis of the bypass grafts was identified as the primary cause of MI in these cases. Notably, the majority of these infarctions (71.4%) were classified as secondary MIs, suggesting the presence of pre-existing myocardial damage. Pulmonary edema was the most frequently observed accompanying complication in patients who experienced postoperative MI, occurring in 85% of cases. Ventricular fibrillation and cardiogenic shock were also noted, present in 28.6% and 16.6% of MI cases, respectively. All patients who developed postoperative MI died in the early postoperative period due to progressive heart failure and systemic venous congestion [8-9]. Evidence of chronic heart failure was observed in a substantial proportion of patients who died from MI. These findings included hydrothorax (37.5%), hydropericardium (25%), ascites (6.3%), and anasarca (6.3%). Myocardial hypertrophy was a prevalent finding, present in 88% of these patients, while cerebral edema was observed in 25%. Preoperative coronary angiography revealed that all patients who subsequently experienced fatal MI had stenosis affecting the left coronary artery and its branches. A high prevalence of hypertension was also noted among these patients, with 87.5% having a pre-existing diagnosis of

hypertension. This included stage 2 hypertension in 71.5% and stage 3 hypertension in 28.5% of the patients [9-12].

Conclusion

1. Mitral Valve Insufficiency: All patients who died from postoperative myocardial infarction (MI) following coronary artery bypass grafting using saphenous vein grafts (CABG, UGS) exhibited mitral valve insufficiency. This was attributed to myogenic dilation of the cardiac chambers, a consequence of the ongoing myocardial ischemia and subsequent infarction.
2. Tricuspid and Aortic Valve Regurgitation: A significant proportion of these patients also presented with multivalvular dysfunction. Tricuspid valve regurgitation was observed in 75% of the patients who experienced MI, while aortic valve regurgitation was present in 58%. This suggests that the hemodynamic consequences of MI, including elevated left ventricular filling pressures and ventricular dilation, often extend to impact other cardiac valves.
3. Valve Replacement Prior to CABG: Prior to undergoing CABG, UGS, a substantial portion (67%) of the patients who later died from MI had undergone valve replacement surgery.
4. This indicates a history of significant valvular disease in these individuals, which may have contributed to their overall cardiac risk profile and potentially influenced their postoperative course.
5. The presence of prior valve surgery also raises questions about the long-term durability of valve replacements and the potential impact of pre-existing valvular dysfunction on the success of subsequent CABG procedures.

Abbreviations:

CABG: coronary artery bypass grafting

IOH: intraoperative hemolysis

CAD: coronary artery disease

MI: myocardial infarction

Conflict of Interest: The authors declare that there are no conflicts of interest

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