Mini Review

CLINICAL INVESTIGATION

An overview of cardiac surgery

Abstract

When a surgeon performs surgery on the heart or main vessels, this is referred to as cardiac surgery. It's commonly used to treat ischemic heart disease complications, congenital heart disease, and valvular heart disease caused by a variety of factors such as atherosclerosis. Cardiovascular disease is the leading cause of death worldwide. Access to cardiac surgery is still severely limited, if not non-existent, in low and middle-income countries. Cardiac surgery varies from other types of treatment due to advances in techniques and materials that have resulted in safer procedures and fewer perioperative risks. Despite the lower risk, postoperative treatment has been associated with a variety of issues, including acute renal failure, multiple organ system failures, neurological issues, and heart pump failure. Suture leaking can cause cardiac tamponed, occlusion of an artery graft, and paravalvular regurgitation, which are all common surgical complications. High-dose steroids minimize inflammation after cardiopulmonary bypass. Delirium is a common side effect after cardiac surgery that has been related to delayed recovery and a worse long-term outlook.

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Introduction

Cardiovascular Disease (CVD) is the leading cause of death worldwide, accounting for over 17.5 million fatalities each year, with 80% of deaths happening in low and middle-income countries. This burden is increasing as a result of the epidemiologic shift from communicable to non-communicable diseases in low- and middle-income countries, with CVD and stroke mortality rates increasing at an alarming rate [1]. Despite the fact that surgery is now widely acknowledged as a vital component of national health systems, more than 5 billion people still lack timely access to safe and affordable surgical care when it is required [2]. Despite the World Health Organization's prediction that heart disease will soon overtake cancer as the top cause of death in low and middle-income countries, access to cardiac surgery in these countries is extremely limited, if not non-existent [3].

Cardiac surgery, also called cardiovascular surgery, is surgery performed by cardiac surgeons on the heart or main blood vessels. It's commonly used to treat the effects of ischemic heart disease (for example, with coronary artery bypass grafting) to correct congenital heart disease or to treat valvular heart disease caused by a range of illnesses including endocarditis, rheumatic heart disease, and atherosclerosis. It also includes heart transplantation.

Following WWII, cardiac surgery centered on two main goals: repairing congenital heart defects and restoring the function of Rheumatic Heart Disease (RHD) affected heart valves. Increased prosperity in industrialized countries led to the near-abolition of RHD and the emergence of degenerative and lifestyle illnesses as primary reasons for open-heart surgery as the discipline evolved into an integral part of medicine [3]. Cardiac surgery varies from other types of treatment due to advances in techniques and materials that have resulted in safer procedures and fewer perioperative risks. Despite these developments, postoperative complications are prevalent and play a role in the length of stay in the hospital as well as functional recovery [4]. It showed that 58% of 204 patients who underwent cardiac surgery experienced postoperative complications, the majority of which were pulmonary (31 %), cardiac (15.8%), and neurological (15.8%), (15.8 %), (13.9 %) [4]. Bed rest for an extended period of time is a well-known source of postoperative complications.

Complication

Following heart surgery, complications involving the circulatory and respiratory systems, as well as the kidneys and central nervous system, are prevalent. After cardiac surgery, Acute Renal Failure (ARF) is still a prevalent and serious side event. After cardiac surgery, the incidence of ARF is believed to be between 1% and 30%. Renal failure that occurs after cardiac surgery and is severe enough to require hemodialysis is associated with an increased risk of death, hospitalization, and cost [5]. Bed rest causes several organ systems to malfunction after surgery. Immobility lowers oxygen transport, including lung and tissue oxygenation, increases the risk of Deep Vein Thromboembolism (DVT) and pulmonary thromboembolism, and depletes muscle mass and strength. Despite its drawbacks, bed rest is recommended following surgery. Individuals following heart surgery should have their mobility restricted to minimize cardiac overload [6].

Neurological problems are a major cause of concern after heart surgery, and it's unclear which perioperative factors are to blame for this poor outcome. As surgical techniques are getting more advanced neurological complaints and poor cognitive results become common [7]. The average age of cardiac surgery patients has increased from 64 in 2001 to 67 in 2010. The frequency of patients with neurological diseases grew dramatically before surgery from 1.4% in 2001 to 2.8% in 2010. The number of patients undergoing solo Coronary Artery Bypass Graft (CABG) procedures decreased by around 20% between 2001 and 2010, indicating that cardiac surgical techniques have become more difficult. Despite higher patient risk profiles, death rates have fallen slightly, from 4.0% in 2001/2002 to 3.1% in 2010/2011 [8].

Heart pump failure is one of the most common and significant complications that can occur quickly after cardiac surgery, aside from concerns directly related to the surgical approach, such as cardiac tamponed owing to suture leakage, occlusion of an artery graft, or paravalvular regurgitation [9]. Heart failure develops in roughly 20% of patients in the postoperative period, leads to early mortality, and is caused by a variety of causes, including increased ventricular after-load, insufficient ventricular preload, and ineffective ventricular contraction [10].

Steroids in Cardiac Surgery

High-dose steroids minimize inflammation after cardiopulmonary bypass. Delirium is a common adverse effect after heart surgery that has been associated with delayed recovery and a worse long-term outlook [11]. Dexmedetomidine is an anti-anxiety sedative and pain reliever. It's known for being able to induce drowsiness without causing respiratory depression, as well as providing cooperative or non-compliant sedation. In multiple trials, Dexmedetomidine has been recommended as a treatment for the unfavorable cardiovascular consequences of heart surgery. This medication's use in clinical practice has been limited due to common side effects such as hypotension and bradycardia, as well as increased financial costs [12]. Intraoperative use of high-dose methylprednisolone before cardiopulmonary bypass did not improve postoperative recovery quality or reduce the incidence of delirium [11].

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