

Combining Correction of Pectus Excavatum and Open Heart Surgery in a Single-Stage Procedure

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Abstract

A major and often fatal consequence of heart surgery is postoperative cognitive impairment. In individuals with Alzheimer's disease, serum levels of glial cell line-derived neurotrophic factor are lowered, however it is unclear how these levels and postoperative cognitive deterioration are related. With patients with rheumatic heart disease having heart valve replacement, the current study sought to determine the predictive usefulness of postoperative serum glial cell line-derived neurotrophic factor levels to forecast postoperative cognitive impairment.

The primary strategy for treating postpneumonectomy syndrome (PPS) involves mediastinal repositioning and the placement of allogeneic implants to completely fill the postpneumonectomy gap. Here, we describe a rare instance of a PPS combined with a congenital pectus excavatum. Simple heart repositioning is not achievable without sternum elevation because the pectus excavatus deformity restricts retrosternal space.

Keywords: High-sensitivity troponin T; Creatine-kinase MB; Heart valve surgery; Perioperative myocardial infarction; Universal definition

Abbreviations: ACT: Activated Clotting Time; AS: Alzheimer's disease; CSF: Cerebrospinal Fluid; GDNF: Glial Cell line-Derived Neurotrophic Factor; MMSE: Mini-Mental State Examination; POCD: Post-Operative Cognitive Dysfunction

Introduction

Pectus excavatum is a condition that frequently affects patients with connective tissue disorders and can arise in conjunction with congenital or acquired cardiac disease. Concavity of the sternum caused by severe pectus excavatum affects cardiopulmonary function and may exacerbate symptomatic cardiac diseases by compressing the heart chambers and causing restrictive lung disease. Concomitant cardiac surgery is debatable, despite the fact that solitary correction of pectus excavatum is well established. Potential issues include bleeding, difficult sternal re-entry, sternal wound infections, and unstable chest walls, according to those who favour a two-staged strategy. On the other hand, we favour a one-stage method that uses simultaneous healing to restore normal cardiopulmonary physiology. There is no agreement on the best surgical approach to handle these patients [1-2].

The great majority of people with complicated Congenital Heart Disease (CHD) now live well into adulthood as a consequence of improvements in the care of this condition throughout time. As a result, there has been a dramatic shift in the demographics, with adults now outnumbering children who have CHD. According to estimates; there were 2.4 million CHD sufferers in the US in 2010, with 290,000 of them having complicated CHD [3].

Adults with CHD use healthcare resources more frequently than people in general, and it is becoming more typical for adult healthcare practitioners to encounter regular medical and surgical diagnoses in this patient group. Despite the fact that consensus guidelines and expert evaluations have stated that people with CHD undergoing non-cardiac surgery are at a greater risk of peri-operative complications there is no proof or data on the results to back up these statements. We are aware of just one earlier study that focused exclusively on the results of persons with CHD who underwent non-cardiac surgery. In this investigation, Maxwell and colleagues identified persons with CHD who received non-cardiac surgery using the Nationwide Inpatient Sample database

and discovered that, in comparison to a matched control, group, adults with CHD experienced increased morbidity and mortality. Prior research has not particularly addressed adult survivors of more complicated CHD who receive non-cardiac surgery. Adult medical and surgical practitioners will be better able to counsel and inform patients and their families by having a better grasp of the outcomes for these individuals [4-5].

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Materials and Method

Patients with congenital heart disease or connective tissue abnormalities frequently get pectus excavatum, which can occasionally be severe enough to require treatment. There is currently discussion regarding the best surgical plan. We discuss our simultaneous repair experience. 11 patients (median age 35.18 years, range 12-74) received a modified Ravitch treatment for severe pectus excavatum between

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January 2012 and January 2020, which was carried out by a single thoracic surgeon at the same time as difficult cardiac surgery. Eight patients (73%) had connective tissue disorders that were confirmed, and two patients (18%) had recurrent pectus excavatum as a result of a failed Nuss operation during adolescence.

At the Affiliated Hospital of Southeast Medical University, 80 patients who were having elective heart valve replacement surgery between June 2015 and June 2016 participated in this prospective observational study. One day prior to surgery and seven days thereafter, cognitive abilities were evaluated. Glial cell line-derived neurotrophic factor concentrations in serum were assessed using an enzyme-linked immunosorbent test before to (T1), as well as one, two, and seven days (T2, T3, and T4) following surgery [8-9].

Results

To determine the connection between glial cell line-derived neurotrophic factors and surgical cognitive impairment, perioperative variables were examined. Seven days following surgery, postoperative cognitive impairment was seen in 38 patients (47.5%). The average levels of glial cell line-derived neurotrophic factor in the postoperative cognitive dysfunction group were lower than those in the no postoperative cognitive dysfunction group at the same time periods (P .001) at 2 and 7 days following surgery. With threshold for postoperative cognitive dysfunction detection of 49.10 and 60.90, respectively, glial cell line-derived neurotrophic factor (T1-T3) [10].

Conclusions

To the best of our knowledge, this is the first report of the effective treatment of PPS in an adult patient that was made worse by a preexisting pectus excavatum. Concerns about the longevity and migration of silicone implants as well as the volume reduction of the pericardial sac during attachment to the sternum still exist.

Glial cell line-derived neurotrophic factor (T1-T4) was shown to be reliable predictors of postoperative cognitive dysfunction. Surgical glial cells Patients with postoperative cognitive impairment had lower levels of l line-derived neurotrophic factor than patients without such problems. The presence of postoperative cognitive impairment may be

accurately predicted by glial cell line-derived neurotrophic factor. The findings suggest that lower levels of glial cell line-derived neurotrophic factor may play a significant role in postoperative cognitive impairment and provide potential therapeutic targets.

Acknowledgement

None

Conflict of Interest

None

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