

Factors associated with delirium after cardiac surgery: A Prospective cohort study

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DESCRIPTION

We recently published our research article about risk factors associated with delirium after cardiac surgery. Knowing that postoperative delirium in this population is associated with a higher incidence of morbidity and mortality and a prolonged hospital stay, we decided to explore the perioperative risk factors independently associated with this complication.

Our hospital is a referral tertiary care university hospital with a cardiovascular focus located in Bogotá which is the capital city of Colombia, South America. We recruit a total of 311 consecutive adult patients undergoing any type of cardiac surgery for the evaluation and examined them at regular intervals in the postoperative period using the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) tool.

The incidence of Postoperative Delirium (PD) was 10%. Among the 18 pre-, intra- and postoperative variables evaluated, the logistic regression analysis showed that low education level, history of diabetes or stroke, type of surgery, prolonged extracorporeal circulation, or red blood cell transfusion in the intra- or postoperative period were independently associated with delirium after cardiac surgery. An increased body mass index was identified as a protective factor.

About those variables, a very low education level (illiteracy/incomplete primary education) was one of the factors most strongly related with the onset of postoperative delirium: Odds Ratio (OR) 12.2 (95% CI: 2.3-63.4), this finding has been described in a few previous studies. However, the pathway through which this phenomenon intervenes in the pathogenesis of PD has not yet been defined. Jones et al. proposed the concept of brain reserve to explain individual differences in the risk of delirium [1]. This is a generic term that refers to passive and active processes in the brain that modify an individual's risk for the expression of clinical signs and symptoms associated with brain injury or neurological disease. The key concept in brain reserve models is that there are differences in the amount of damage the brain can endure before reaching a critical threshold for clinical expression. The differences would be caused by structural characteristics such as brain volume and synaptic density [1].

PD is related to more advanced carotid, aortic, and intracerebral atherosclerosis, which increases the risk of cerebral hypo perfusion. Decreased cerebral blood flow, together with factors such as perioperative hypotension or hypoxemia, puts brain oxygenation at risk and may facilitate the development of postoperative cerebral dysfunction.

Diabetes as well as several of the risk factors identified in this study is potentially associated with atherosclerosis of the central nervous system (history of stroke, cognitive decline, and old age). Therefore, the higher burden of atherosclerosis observed in patients with diabetes may be associated with a combination of risk factors that predispose patients to delirium.

We found that more complex surgical procedures (combined surgeries: CABG along with valve surgery, double valve replacement or similar) had a higher incidence of PD than did single procedures. Cardio Pulmonary

Bypass (CPB) could play an important role; several studies have found an independent association between the duration of CPB and PD [2, 3].

Our results confirm that the transfusion of one or more red blood cell units in the intra- and postoperative period is associated with the onset of PD. Katznelson et al. found that transfusions greater than 5 red blood cell units were associated with a 3-fold increased risk of PD [4]. Similarly, Stransky et al. reported that each unit of red blood cell transfused was associated with an 18% increase in the onset of PD [5]. The explanation for this association is complex; blood transfusions may reflect the greater technical difficulty of surgery with an increased inflammatory response, leading to multiorgan dysfunction and delirium.

One of the most interesting findings of our study is that being overweight or obese seems to have a protective effect against the onset of PD; the explanation could be related to a subclinical nutritional deficit state among subjects who presented this outcome. This relationship has been studied in patients hospitalized in nursing homes, finding that lower body mass and body fat were related to the onset of delirium [6,7].

CONCLUSION

The authors propose that given that many drugs are transported to their effector sites linked to plasma proteins, having low levels of albumin or total protein could alter pharmacological actions and increase the risk of delirium. An alternative hypothesis has to do with the differential immunity characteristics in overweight subjects; experimental studies have found changes in the function of T cells, characterized by slow proliferation and decreased ability to produce chemical messages to communicate with other immune cells; it has already been described that inflammatory mediators could play an important role in the onset of PD.

Based on the actual knowledge of PD is highly relevant to identify the factors related to it and if possible, avoid them or treat them to reduce the associated complications and improve the care of patients undergoing cardiac surgery.

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