



Anaesthesia for Coronary Artery Bypass Grafting in Post Poliomyelitis Syndrome: 2 Case Reports and Literature Review

Authors

Abhiruchi Patki, MD, PDCC¹, Vijay R Shrorey, MD²

¹Associate Professor, Department of Anaesthesiology, Nizam's Institute of Medical Sciences, Punjagutta, Hyderabad, Telangana State

²Professor and Head, Department of Anaesthesiology, Government Medical College and Superspeciality Hospital, Nagpur, M.S.India

Abstract

Post poliomyelitis syndrome is a disorder related to the recurrence of neuromuscular symptoms in survivors of paralytic poliomyelitis. These patients are extremely sensitive to anaesthetic drugs, intolerant to cold, and often present with respiratory dysfunction. They also show a high prevalence of dyslipidemia and coronary artery disease subsequent to which they are being frequently posted for elective and emergency cardiac procedures. Anesthetic management of these cases requires great caution, as delayed emergence and respiratory complications have been reported in these cases. We report and discuss anaesthetic management of two cases of PPS which were operated for CABG in our institute.

Keywords: Anaesthesia, Post polio syndrome, Postpoliomyelitis syndrome, Coronary artery bypass grafting, CABG.

Introduction

Post poliomyelitis syndrome (PPS) is a constellation of delayed neuromuscular signs and symptoms developing almost a decade after the primary infection in a polio survivor. The most common symptoms are fatigue, pain and new onset muscle weakness usually presenting 15 years or more after neurological stability from the first episode. The giant motor units that develop in the central nervous system after recovery are presumed to be unable to sustain the increased metabolic demands, or protein synthesis as the survivor grows, thus, resulting in deterioration of motor function. These patients are extremely sensitive to anaesthetic drugs, intolerant to cold, often present with respiratory dysfunction, sleep apnoea, dysphagia, fatigue, and increased

sensitivity to pain. Along with limb paralysis, these patients also frequently present with spinal curvature deformities of varied degrees at different levels of the spine. ^[1]

A study carried out in 2003, ^[2] reported poliomyelitis infection survivors, to have a high incidence of dyslipidemia and a high prevalence of two or more coronary artery disease risk factors. With advancing age, this population, of the past century, now frequently presents to us for elective cardiac or emergency cardiac surgical procedures. A literature search revealed that, only 5 case reports of anaesthetic management in PPS have been reported so far, none of them reporting anaesthetic management of a cardiac surgery patient with PPS. ^[3-7]

We thus report two cases of anaesthetic management for coronary artery bypass grafting in postpolio syndrome which were carried out successfully in our institute and discuss the implications of the condition on anaesthetic management.

Case Report 1

Our first patient was a 56-year old man, weighing 62 kgs, with a height of 158cms, with an ASA II and NYHA I status. He presented with one episode of chest pain a month prior to his current admission, which was followed up by coronary angiography to reveal a significant stenosis (90%) in the left anterior descending (LAD) and smaller occlusions in two of the marginal arteries (30-40%). Transthoracic Echo showed good biventricular function with a LV ejection fraction of 58%. A logistic Euro score II was calculated and that placed our patient in low risk group (0.58%). His past history included an episode of paralytic poliomyelitis at the age of 9 years, which manifested as high grade fever and paralysis of all the major muscle groups, but not requiring assisted ventilation. This was followed by gradual recovery over a period of 2-3 weeks. Recurrence of the paralytic symptoms occurred after 16 years, leaving paralysis primarily in his extensor muscles of left thigh and flexor muscles of left knee. He had no other comorbidities, drug allergies and lung function tests were within normal limits.

An off-pump coronary bypass grafting was done using the left internal mammary to the left anterior descending. Intraoperative monitoring included swan ganz catheter, SVO₂, TEEcho, arterial blood gases, and cardiac output monitoring. He was ventilated in the postoperative period for 6 hours and extubation was done only after ensuring adequacy of respiratory muscle function and arterial blood gas analysis. Post extubation period was uneventful.

Case Report 2

The second patient was a 52-year-old man, weighing 56 kgs, with a height of 150 cms, with an ASA II and NYHA III status and a 2 month old

history of chest pain. His coronary angiography revealed a significant stenosis (88%) in Right coronary artery with smaller occlusion (50%) in the left anterior descending artery. Echocardiography showed a LV ejection fraction of 53% and no evidence of PH. Euroscore II placed him in low risk group (0.99%). He did not have any other comorbidities. His physical examination revealed a scoliotic thoracolumbar spine involving 7 vertebrae (T8-L2) with a Cobb's angle of 30%. His past history revealed an episode similar to the first case of high grade fever with flaccid paralysis of lower limbs when he was 6 years old, the fever subsided within a week, leaving behind residual paralysis which gradually progressed to the present state where major muscles in both his lower limbs were affected. He was using the support of crutches since the age of 10 years.

Pulmonary function tests were carried out and they revealed a normal FVC(4.2L), FEV₁(3.05L), FEV₁/FVC(77.3%), PEF(12.2/min), DLCO(16.2 ml/min/mmHg). Arterial blood gases on room air were within normal limits (paO₂: 110mmHg paCO₂: 46mmHg). A coronary bypass grafting was performed by using the off-pump method (OPCAB) and two grafts, Left internal mammary artery to Left anterior descending and saphenous vein graft to right coronary artery were placed. Intraoperative monitoring was similar to the first case and intraoperative period was uneventful. This patient was ventilated for 10 hours and discharged 3 weeks later.

In both these cases, efforts were taken while positioning of the patient with protective cotton paddings, especially in the second case where supine position had to be maintained with cotton rolls under the thoracolumbar region. The operation room temperature was maintained at 10degrees below normal room temperature.

Discussion and Literature Review

Patients with PPS have residual lesions involving the reticular activating system (ARAS), and since most of the anaesthetic agents act on the ARAS, altered sensitivity to induction drugs, muscle relaxants, maintenance agents and opioids is a

major possibility. In addition to that, 40% of PPS patients have some degree of respiratory dysfunction.^[1] Emergence from anaesthesia is thus, the period where utmost caution has to be exerted. Two of the case reports^[5,7] available and mentioned earlier have reported unanticipated postoperative respiratory failure, one of them reporting a cardiopulmonary arrest one hour postoperatively where the patient could not be revived.

As a team we chose to use the off pump technique in both the cases so as to avoid the undesirable effects of prolonged hypothermia and the preoperative pathophysiologic condition of both the hearts allowed us to go for the same. Our patients had to be mechanically ventilated postoperatively (6 hours and 10 hours respectively) a little longer than our usual protocol, in spite of careful titration of anaesthetic drugs and opioids. Altered sensitivity to the standard anaesthetic drugs which were used could be a possible explanation for the same. This altered sensitivity is presumed to be because of changes in acetylcholine receptor site and number, a decrease in acetylcholine synthesis and a decrease in acetylcholine transferase activity in these patients.^[1]

Conclusion

We thus conclude that post polio syndrome patients have a greater likelihood of presenting with respiratory complications in the postoperative period due to increased sensitivity to anaesthetic drugs and underlying respiratory dysfunction.

References

1. Lambert DA, Giannouli E, Schmidt BJ. Postpolio syndrome and anaesthesia. *Anesthesiology* 2005; 103 suppl 3:638-44.
2. Gawne AC, Wells KR, Wilson KS. Cardiac risk factors in polio survivors. *Arch Phys Med Rehabil* 2003;84 suppl 5:694-6
3. Liu S, Modell JH. Anaesthetic management for patients with postpolio syndrome

receiving electroconvulsive therapy. *Anesthesiology* 2001;95:795-801.

4. Higashizawa T, Sugaira J, Takasugi Y. Spinal anaesthesia in a patient with hemiparesis after poliomyelitis. *Masui* 2003;52:1335-7.
5. Magi E, Recine C, Klockenbusch B, Cascianini EA. A postoperative respiratory arrest in post poliomyelitis patient. *Anesthesia* 2003;58:84-105.
6. Suneel PR, Sinha PK, Unnikrishnan KP, Abraham M. Anaesthesia for craniotomy in a patient with previous paralytic polio. *J Clin Anesth* 2008;20 suppl 3: 210-3.
7. Janda A. Postoperative respiratory insufficiency in patients after poliomyelitis. *Anaesthetist* 1979; 28:249.