

Guillain Barre Syndrome following cardiac surgery: A case report

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Received date: August 06, 2020; **Accepted date:** August 12, 2021; **Published date:** August 22, 2021

Citation: Sugeevan S (2021) Guillain Barre Syndrome following cardiac surgery: A case report. Int J Case Rep Vol.5 No.4.

Abstract

Guillain Barre Syndrome (GBS) is a neurological disorder characterised by rapid onset motor and sensory polyneuropathy following an ascending distribution. The pathophysiology behind this disease is thought to be due to auto antibodies damaging the peripheral nervous system triggered by recent respiratory and gastrointestinal infections, with either bacterial or viral pathogens causing the initial illness. There have been instances of GBS following surgery; and the incidence post cardiac surgery is rare. Here we present a case where GBS developed soon after uncomplicated cardiac surgery and explore existing literature reporting similar events.

Keywords: Guillain barre syndrome, Cardiac surgery, Neurology, Neuropathy

investigated as causes. There is an argument that surgery can be a trigger factor for GBS, however there is limited study on this.

Case presentation

This particular case is one of a 78 year old male with a background of Hypertension, Hypercholesterolemia, Diabetes Mellitus, Chronic Kidney disease and an Ex-smoker. He presented to his local hospital with sudden onset chest pain and was found to have developed an NSTEMI. Angiogram revealed severe distal stenosis of the Left main stem (LMS), Severe proximal stenosis of Left circumflex artery (LCx) and Left anterior descending artery (LAD) and a dominant Right coronary artery (RCA) with severe proximal stenosis of RCA and Posterior descending artery (PDA). Transthoracic echocardiogram revealed mild to moderate LV impairment and moderate aortic stenosis. He underwent Coronary artery bypass grafting with three grafts and a tissue aortic valve replacement as an emergency case. The grafts used involved both saphenous veins and the Left internal mammary artery (LIMA). The patients eventually went to the ward where on the 8th day post op the patient mentioned lower limb weakness, upon examination at this point there was no obvious neurological deficit. On the 10th day left lower limb cellulitis was noted on the harvest site and the patient was started on oral antibiotics. By the 11th day post op bilateral lower limb weakness noted including sensory deficit and reduced tone. On the 12th day lower limb weakness has worsening further with bladder and bowel dysfunction and was transferred to the high dependency unit for neurological monitoring. By this point the patient had multiple images taken including CT Head, MRI Brain and Spine, CT Aerogram. Both the neurology and neurosurgical teams had seen him, had come to the diagnosis of a spinal infarct as the cause of his symptom's. By day 14 the patient had developed flaccid tetra paresis, weak cough, voice, areflexia but intact autonomic function. On day 14 a diagnosis of GBS was made based of clinical findings. Day 15 the patient required intubation due to worsening bulbar and respiratory function and intravenous immunoglobulin treatment was commenced.

This patient spent another 6 weeks under the care of the neurologists where he received two courses of IVIG, required a tracheostomy for prolonged ventilation, suffered a hypoxic cardiac arrest and was resuscitated following one cycle of cardiopulmonary resuscitation (CPR), not to mention a host of hospital acquired infection treated with a variety of antibiotics.

Introduction

Guillain Barre Syndrome (GBS) is a neurological disorder characterised by rapid onset motor and sensory polyneuropathy following an ascending distribution. The pathophysiology behind this disease is thought to be due to auto antibodies damaging the peripheral nervous system triggered by recent respiratory and gastrointestinal infections, with either bacterial or viral pathogens causing the initial illness. With common pathogens being campylobacter jejuni, cytomegalovirus, Epstein Barr virus, influenza. This is seen in over two thirds of cases but the primary cause of the disorder is unknown. Various tools can aid in the diagnosis of GBS including lumbar punctures, neurophysiology examinations, blood tests, however the diagnosis of GBS is ultimately a clinical one. Within the spectrum of GB syndrome there are 5 variants. Due to its rapid onset of symptoms, swift diagnosis and treatment can prevent the occurrence of serious complications seen in GB syndrome such as respiratory failure, autonomic dysfunction and bulbar symptoms.

The incidence of GBS in the setting of cardiac surgery is rare, and only a handful of cases have been presented in medical literature. In the differential diagnosis of the post cardiac surgery patient with sudden onset neurological symptoms, GBS is a condition which is far below anyone's list with conditions such as stroke, cauda equina and spinal infarct more commonly

Fortunately, by the end of this period he had made a full recovery and was transferred to another hospital to receive rehabilitation. This patient experienced the full range of symptoms known to GBS: upper and lower limb paresis, areflexia, sensory loss, bladder and bowel dysfunction, autonomic dysfunction, bulbar symptoms and respiratory failure. Most textbooks will refer to the symptoms of GBS as having a time period of 24-48 hours, however in this case symptoms had developed/worsened over a 3 day period, with a varied array of symptoms. A total of 6 days was required to reach a clinical diagnosis and treatment was commenced on the 7th day.

In searching previous literature and instances of GBS following cardiac surgery there is a suggestion that cardiac surgery can trigger a major inflammatory response. In a report by Cingoz et al they mention a patient who had undergone off pump coronary artery bypass grafting and developed GBS despite an uneventful procedure and even had GBS confirmed by electromyography (EMG), the patient made a full recovery with plasmapheresis and discharged on the 10th post-operative day. Though there may be only one reported case the fact that this patient had an off pump procedure is a significant detail, possibly raising the question whether the mechanics of cardiopulmonary have an involvement in GBS. [1] Another important factor is that GBS was diagnosed by an electrophysiology test, whereas in the case that's presented GBS was a clinical diagnosis. Vettah et al also mention a case of GBS following an off pump CABG with symptom presentation on day 7. [2]

Gensicke et al studied the incidence of GBS following surgery, they collected 63 patients with GBS and found that 6 had recent surgery within 6 weeks to the development of GBS, calculated a relative risk of 13.1. What is important to note is that this study does not include 63 surgical patients, rather post-surgical patients and non-exposed patients, and of the 6 patient there is no mention as to which had cardiac surgery. [3]

Hekmat et al presented a gentleman who had undergone coronary artery bypass grafting and was discharged on the 5th day, only to develop weakness on the 20th day. His diagnosis of GBS was a combination of clinical and EMG. 18 months following this event he still had weakness despite treatment, though he developed GBS the patient did not suffer from the full spectrum of the disease. An interesting point is the onset of symptoms which varies in literature. In this case there were 20 days, in other cases symptoms appeared within 5 days. Whereas Campbell et al present a case of GBS with symptom onset in 48 hours following surgery. [4]

Nagarajan et al sampled 208 patients of which 31 developed post-surgical GBS, 9 of 31 of which had concomitant autoimmune disease, and 5 of 31 had cardiac related procedures, however only 1 case underwent cardiac surgery which was coronary artery bypass grafting. Symptoms were noted within 8 weeks of surgery. They hypothesised that despite a high incidence of GBS (15%) in surgical patients, that GBS were more common in those who had concomitant illnesses such as malignancy, autoimmune disease or immunosuppression. [5]

The rarity of GBS post cardiac surgery can be seen in a case reported by Algahtani et al who had 2 patients in a span of 20 go on to develop GBS. Both cases had no known infection prior to surgery, both had Cardiovascular risk factors and while one was treated with Intravenous immunoglobulin (IVIG), the other was treated with plasmapheresis. [6] They make an interesting point where in the setting of ITU neurological disorders such as critical illness polyneuropathy, acute myopathy, or acute quadriplegic myopathy are more often in the differential rather than GBS, with critical illness polyneuropathy the more common of the diseases mentioned

Aldag et al mention a case of Miller Fisher syndrome (one of the variants of GBS) characterised by areflexia, ataxia and ophthalmoplegia present in a patient following cardiac surgery. [7] This serves as a reminder that GBS can present in 5 subtypes each with their own particular neurological symptoms can present in post-surgical patients, and it is difficult to differentiate them without appropriate testing such as anti-gangliosides from lumbar punctures.

Conclusion

In this patient the initial cause which triggered GBS could not be identified, he had recovered well from the initial cardiac surgery, and though he suffered from lower limb cellulitis; this is not known to be one of the precipitants of GBS. Since he transferred from another hospital there could be an argument that he had developed a respiratory or gastrointestinal infection prior to his surgery which was not identified, however his clinical status at the time of transfer meant that he required urgent surgery. One third of patients do not have a direct cause of GBS. Upon searching medical literature, I could not identify a causative link between cardiac surgery and GBS. However, this does not mean that there is no link, just that these cases have never been thoroughly investigated. The argument remains that major surgery including cardiac surgery can provide stress onto the body triggering an autoimmune reaction. In this patient's case swift action, regular and thorough neurological assessments and diagnosis could have prevented the multiple complications this patient suffered. In future cases of neurological complications in cardiac surgery patients GBS must be in the differential diagnosis, especially if the symptoms fit.

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