



Clinical Case Reports

A Case Report on Artherosclerotic Disease Leading to Polyneuropathy: A Comprehensive Overview

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Abstract:

The objective is to describe an uncommon case of polyneuropathy, where the peripheral nerves weaken and cause numbness and burning pain in roughly the same place on both sides of the body.

In this report, a 57-year-old male patient was identified with type 2 diabetes mellitus as well as a neuromuscular illness with polyneuropathy. The patient had a history of gunshot wounds. The primary cause could be type -2 diabetes mellitus which turned out into diabetic neuropathy and possibly macrovascular complication as obstruction of arteries contributed to worsening the condition which gives a clear depiction of mixed causes. An arteriolar Doppler test was performed on the patient, and the report suggests diffuse narrowing with atherosclerotic wall thickening and calcified plaque thrombosis in the distal anterior tibial artery and dorsalis pedis which is the confirmatory test of the above cause. The distal left anterior tibial artery is completely blocked. The CT angiography of the bilateral lower limbs suggests the following: - Atherosclerotic disease affects the ileac and abdominal aorta, The patient got relief from the evidence-based symptomatic treatments, which include anticonvulsants (e.g., pregabalin, gabapentin), The patient should go for the surgical procedure as soon as possible to get relief from the condition.

The patient's showed a mild improvement by the medication prescribed to him and also certain non-pharmacological approaches like healthy diet and routine blood sugar checks assisted in the relief of patient's condition. The surgical Procedure prescribed should be preferred by the patient for early recovery.

Keyword: Polyneuropathy, Peripheral nerves, Neuromuscular disorder, Diabetes mellitus, macrovascular complications

Introduction:

Peripheral neuropathy is characterized by symmetrical sensory symptoms such as numbness, paresthesia, pain, and muscle weakness that are primarily felt in the distal portions of the arms and legs which restrict a person's quality of life adversely ^[1] Peripheral neuropathies encompass disorders of peripheral nerve cells and fibers, which manifest secondary to a wide range of pathologies. These nerves include cranial nerves, spinal nerve roots & ganglia, nerve trunks & division, along with nerves of the autonomic nervous system ^[2] Several methods are used to classify peripheral neuropathies, categorizing them as mono-neuropathies, multifocal neuropathies, and polyneuropathies. Further subclassifications can be made by separating peripheral neuropathies as axonal, demyelinating, or mixed, which is essential for treatment and management purposes ^[3] In this case, the patient had mixed etiologies possibly diabetic neuropathy along with macrovascular complications such as obstruction of the artery ^[4] The prevalence of polyneuropathy is 1%–7% higher among the elderly than in the general population. Diabetes mellitus is a major contributor to peripheral neuropathy as a neuromuscular consequence. According to a study, diabetes was one of more than 100 potential causes of polyneuropathy ^[5] A variety of medical conditions and other factors can cause polyneuropathy, including diabetes, Alcohol abuse, Autoimmune conditions (Guillain-Barré syndrome), Bacterial or viral infections, Bone marrow disorders, Exposure to toxins, Hereditary disorders, Hypothyroidism ^[6] The aging population in many developed countries needs to diagnose and treat the disease on time. In clinical practice differentiating between acquired and inherited, chronic and acute, and axonal and demyelinating variants is essential for making an accurate diagnosis. An electrophysiological examination can help identify axonal neuropathies which are characterized by reduced sensory and motor nerve action potential amplitudes, however about 20-30% of

patients with a slowly progressive axonal neuropathy has no identifiable cause which can be found resulting in a diagnosis of chronic idiopathic axonal neuropathy ^[7]

Case Report:

A 57-year-old male patient was identified as having type 2 diabetes mellitus as well as a neuromuscular illness with polyneuropathy. Before 1.5 months, the patient was in good health. Recently, the right lower leg of the patient started to tingle and become numb. In addition, the patient reported having a scorching sensation in the right lower limb. The patient had suffered bullet wounds to his right thigh 10 year back. The patient was anorexic, experienced constipation, and smoked continuously for 30 years (2 bundles per day). He has a normal sleep pattern. On examination, it was discovered that the patient's right dorsal pedis was not palpable, whereas the left was. On local examination, ulcers were seen in the right leg lateral vallecule, right knee, right great toe tip, and right 3rd metatarsal, which were dry and scaly, which lead to gangrene, and the vital signs were normal, the haematological study revealed that the ESR was raised to 25 (1st hour mm)(Normal range: 0–20 1st hour mm), the TRBC range was reduced to 3.72 million/cumm (Normal range:- 4.5–5.5 million/cumm), and the haemoglobin level was reduced to 11.0 g/dl (13–17 g/dl)Further, a decrement in PCV (33.3%) (38–45%) , RDW–CV (11.5%) (12.0–18.0%) were seen. The patient, being diabetic, has an HbA1c that is above the normal range at 7.6% (normal range 6.5%). The RFT result also indicates elevated levels of urea, creatinine, salt, and potassium. The CT angiography of the bilateral lower limbs depicted in (Figure 1).

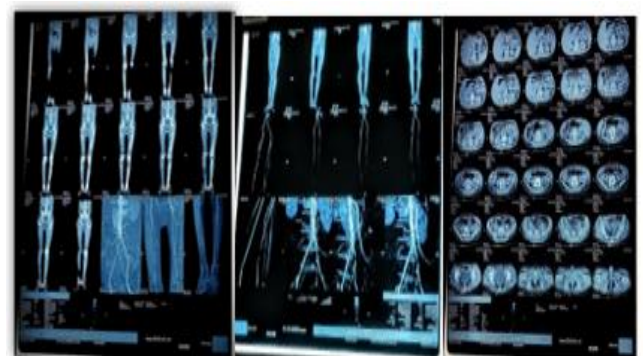


FIGURE 1:- CT angiography of the bilateral lower limbs shows Atherosclerotic disease affects the iliac and abdominal aorta

It suggests the following: Atherosclerotic disease affects the ileac and abdominal aorta, complete blockage of the left internal iliac arteries' ostioproximal section; total occlusion of the right femoral artery in the mid-thigh; as well as scattered disease of the left femoral artery, left peroneal artery and left anterior tibial artery with several stenotic segments. The patient had undergone an arteriolar Doppler study, which showed diffuse narrowing with atherosclerotic wall thickening and calcified plaque thrombosis in the distal ATA (anterior tibial artery) and dorsalis pedis. The dorsalis pedis artery is not obstructed, while the distal left anterior tibial artery is completely blocked. The following medications are being administered to the patient: - INJECTION PANTOPRAZOLE 40 mg, INJECTION TRAMADOL 1 ampoule, INJECTION ONDANSETRON 1 ampoule, INFUSION of NORMAL SALINE with MULTIVITAMIN, GABAPENTIN 400 mg, TABLET AMITRIPTYLINE 25 mg, tablet JALRA-M (VILDAGLIPTIN AND METFORMIN HYDROCHLORIDE) (50/500 mg), CAPSULE B2D (Calcitriol. Calcium carbonate, Zinc, Magnesium, Vitamin K2-7, METHYLCOBALMIN, L -Methyl folate), Tablet GLIMEPERIDE 2 mg, and TABLET CILOSITAZOL 50 mg. The patient was advised to have a femora-femoral crossover bypass but was unable to do so due to financial constraints. Although polyneuropathy is incurable, symptomatic treatment, such as for diabetic symptoms and pain, may improve the patient's condition.

Discussion:

In our case report, the patient had diabetes for a long and was suffering from polyneuropathy. In a study by Feldman. L. E et al. it was stated that the most common complication of diabetes is neuropathy, of which distal symmetric polyneuropathy is often noted in the diabetic population.⁸

According to another study done by Chawla. A et al .it has been emphasized that. The

pathogenic hallmarks of diabetic microangiopathy include alterations in the microvasculature due to extracellular matrix protein production and thickening of the capillary basement membrane. Macrovascular problems may result from these alterations in combination with low-grade inflammation, oxidative stress, advanced glycation end products, and neovascularization of the vasa vasorum. In contrast, the patient in this case report exhibits signs of a macrovascular problem. Atherosclerotic wall thickening, and calcified plaque thrombosis in the distal ATA (anterior-tibial- Artery) and dorsalis pedis.⁹

The patient had been shot by a bullet eight to ten years prior, the wound had developed chronically and gone untreated, which caused the patient's health to deteriorate progressively. Additionally, it was also stated in a study by Berg R.J et al. that the Gunshot-related fracture, occurring in one-fifth of patients, increases the risk of vascular and nerve injury.¹⁰

While neuropraxia is thought to be common, some large studies have reported a high incidence of nerve lacerations after Gun shot Wounds. Additionally, a study by Pannell WC et al. found that there is no reliable way to distinguish between neuropraxia, axonotmesis, and neurotmesis through clinical examination.¹¹ Furthermore, he stated that although the best course of action for treating lacerated nerves is still unclear, surgery is the best option for those who want to recover. The results of a research by Daneyemez M et al., Kim D et al., and Kim D et al. indicate that internal neurolysis or simple decompression produces favourable clinical outcomes.^{12,13,14} Additionally, Panell WC et al. state that a significant portion of palsies have historically been treated without surgery, with 70% of cases regaining function after three to nine months of observation. Some surgeons advice against postponing the assessment of completely lacerated nerves since doing so may have worse clinical outcomes.¹¹ Moreover , it will be reasonable to assume that the patient's condition worsened as a result of

the gunshot he sustained ten years prior and did not receive treatment. In this case the option of surgery will significantly improve the health.

In this case the patient also complaint for episodes of hypoglycemia. Profound Hypoglycemia can also be accounted for the structural and functional disturbances in both the central (CNS) and the Peripheral nervous system (PNS) which can also be a cause of nerve damage in the patient as stated in a study by Simin Mohseni et al.¹⁵. To observe a rapid recovery in the patient, the patient was provided with proper counseling regarding his diet and treatment regimen. Following up was scheduled appropriately. In this case a well coordinated healthcare team has improved the patient situation a lot. A remarkable improvement can be seen in patient's health if patient opted for a femero –femoral surgery as various prior studies suggested that delay in surgery can significantly affect the patient's health.¹¹

Conclusion:

According to our studies, the patient's showed a mild improvement by the medication prescribed to him and also certain non-pharmacological approaches like healthy diet and routine blood sugar checks assisted in the relief of patient's condition

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Declaration: -

Ethics approval and consent to participate

Not Applicable

Consent for publication:

Not Applicable

Availability of data and material: -

The case report has been carried out by us and we assure you that it can be provide to you whenever required.

Competing interests:

Not applicable

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