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STUDY TO KNOW THE NEUROLOGICAL DEFICIT EXTENT IN PATIENTS HAVING DIABETIC FOOT

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Abstract:
Objective: *To determine the degree of neurological deficit in patients with diabetic foot according to neuropathy insufficiency score and nerve conduction studies.*
Study design: *A case Series.*
Place and Duration: *In the Surgical Unit II of Services Hospital Lahore for two year duration from March 2017 to March 2019.*
Methodology: *This two-year study included 30 patients admitted to the Department of Surgery for the treatment of diabetic foot. Inclusion criteria were in patients aged 35-60 years with diabetic foot complications.*
Results: *Clinically, neuropathy was detected in all patients; the disability score was mild in 3 patients (10%), moderate in 8 patients (26.66%), and severe in 19 patients (63.33%). Nerve conduction studies in these patients have shown that the sural (sensory) nerve is severely affected in all cases. Peroneal and tibial nerves (motors) were also involved in all cases, but had a variable extension.*
Conclusion: *This study demonstrated that neuropathy is an independent and independent risk factor for the development of diabetic foot injuries. It is important to determine and measure the role of neuropathy in planning effective strategies to prevent and delay foot complications.*
Key Words: *Diabetic foot, neuropathy.*

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INTRODUCTION:

Diabetes mellitus with related problems is an important cause of mortality and morbidity, especially in foot problems. Diabetic foot is one of major cause for hospitalization; Complications include cellulitis, abscess, gangrene and ulceration formation[1-3]. The risk of amputation of the lower extremity is 15 to 40 times greater in a diabetic patient than in normal patients. Peripheral neuropathy is most commonly seen in cases of diabetes producing distal bilateral sensory changes, such as paresthesia, foot pain and neuropathic ulcer. It causes the skin of the extremities to change, which is hardened and colored by uniform reabsorption of the tissues. Detection and early detection of the neuropathic process may change the course of the disease. There is a deterioration in the axonal structure, which is reflected in the myelination of the segment nerve and the decrease in nerve conduction velocity and the amplitude of the nerve in depression. The "A" fibers, which give a sense of strength, are more affected by the "C" fibers, which transmit the feeling of pain[4]. Neuropathy is evaluated clinically by (NDS) neuropathy disability scor and (NCS) nerve conduction studies[5-6]. NDS is based on the sensory methods and tendon reflexes examination such as a puncture with a pointed wooden pin or metal, with a cotton ball, a light touch, vibration with an adjustment fork, and temperature examination with tube filled with hot or cold water. With NCS, we can usually differentiate between primary demyelination and primary axonal injury[7]. In polyneuropathies, this has an important diagnostic and prognostic significance. NCS also aids in the location of the lesion (nerve, neuromuscular junction, muscle), its severity, and its transient course (acute, hyperacute, subacute, chronic[8-9]). The underlying cause correct diagnosis is the 1st priority towards a fruitful management plan. Preventive care consists of defining the risk factors in the feet of diabetic patients. Implementation of measures for preventive care of feet, patient education, regular child care, use of special footwear and frequent revisions; and it will go a long way to significantly reduce the development of complications in diabetic feet[10].

MATERIALS AND METHODS:

This two-year prospective descriptive study included 30 cases on the accepted to the Surgical Unit II of Services Hospital Lahore from March 2017 to March 2019 for the treatment of diabetic foot. The inclusion criteria were patients of both sexes aged 35-60 years with diabetic foot complications, and patients excluded from the study were patients with renal and cardiac complications, immunosuppressive pharmacological treatment, and other metabolic and hormonal disorders. From all cases; Informed consent was taken. Comprehensive history and clinical examination Disability neuropathy score, hot and cold-water temperature, including cotton, forceps, test tubes, sensation of position, and vibration sensation through the 128 Hz tuning fork; and knee and ankle reflexes in all patients. Complete routine laboratory investigations were performed. Neurostar Medelec-92B was used to conduct nerve conduction studies. The sensory and motor nerve conduction velocities were calculated with respect to the tibial nerve, peroneal nerve and sural nerve. The temperature of the skin remained in an air-conditioned room between 35-36 ° C. Data were analyzed using SPSS versoin-18 for explanation and analysis.

RESULTS:

Among diabetic foot patient, 30 diabetic foot patients with complications such as abscesses, cellulitis, ulcers and gangrene were evaluated to determine the degree of neuropathy. Of the 30 patients, male were 22 (73.33%) and female were 8 (26.67%). Incidence by age and other epidemiological findings are presented in Table I.

Table I. Site of lesion

Feature	No.	Percentage
Gender		
Male	22	73.33
Female	8	26.67
Age Group		
35–40 Years	1	3.33
41–45 Years	5	16.67
46–50 Years	7	23.33
51–55 Years	2	6.67
56–60 Years	15	50.00
Diabetes		
Type I	10	33.33
Type II	20	66.67
Smoking		
Smokers	13	43.29
Non-Smokers	17	56.61

Symptoms data showed mild pain in 9 patients (30%) and severe pain in 21 patients (70%). 17 (56.66%) patients were noted with fatigue and mild numbness in 12(40%) was reported. The mild weakness was noted in 13 (43.33%) patients and severe weakness in 16 (53.33%). Nerve conduction studies in these patients showed 100% participation in sensory nerve (sural) and motor nerve (peroneus and tibial). Data on tibial nerve conduction study were mild neuropathy in 3 patients (10%), moderate in 9 patients (30%), severe in 19 patients (63.33%), and involvement of the peroneal nerve was mild. It was moderate in 6 (20%) patients, moderate in 6 (20%) patients, and severe in 18 (60%) patients. Involvement of the sural nerve was considered to be severe in all patients. The summary of neuropathy results is shown in Table II.

Grading	Peroneal Nerve	Tibial Nerve	Sural Nerve	Neuropathy Disability Score
Mild	9.99%	19.99%	0.00%	0.00%
Moderate	26.66%	19.99%	0.00%	0.00%
Severe	63.33%	59.99%	99.99%	99.99%

Table II. Results of neuropathy in diabetic foot lesions

DISCUSSION:

Foot complications can be prevented and treated in patients with diabetes with an integrated and multidisciplinary approach. It necessitates the participation of a chain ranging from pediatrician and general practitioner to vascular surgeon, rehabilitation specialists and general surgeon. Patients with diabetic foot have high morbidity and mortality rates due to multiple operations and prolonged hospital stay, so the underlying cause correct diagnosis is the 1st priority towards a fruitful management plan[11]. To prevent diabetic foot complications; most important is early detection of high-risk patients and recommendation to the multidisciplinary team. Timely management reduces the fatal outcome risk, ie amputation[12]. Type II diabetic patients have a higher incidence of foot complications. Persistent hyperglycemia is an important etiologic factor in the development of neuropathy in these diabetic patients[12]. A total of 30% patients were included in this study, 33% belonged to type II diabetes mellitus and 67%. This showed a higher prevalence among people with type II diabetes. This finding has been reported in other studies. Aging is associated with neuropathic ulcers in individuals with diabetes. Few studies have been published on the prevention of foot injuries and even neuropathy in people with diabetes. Most of our patients with diabetic foot (56.67%) were over 50 year old[13]. The duration of diabetes was more than 12 years in most patients. This indicates an increase in the incidence of diabetic feet as the duration of diabetes increases. This shows the link between the duration of the disease and the development of diabetic complications109. We know that the incidence of type II diabetes is high in the elderly. The risk of ulcer formation in the legs is definitely increased in people with diabetes for more than 10 years. In this study, the neuropathy score for clinical disability was mild in 3 (10%) patients, moderate in 8 (26.67%) patients, and severe in 19 (63.33%) patients. Nerve conduction studies also showed 100% involvement of sensory (sural) and motor (peroneal and tibial) nerves[14]. Sural nerve was severely affected in all cases. Data from the motor nerve conduction study showed that the tibial nerve was mildly affected in 3 (10%) patients, moderate in 9 (30%) patients, and severely affected in 19 (63.33%) patients, with peroneal nerve involvement. 6 (20%) patients were mild and moderate, severe in 18 (60%) patients. It has also been demonstrated by other authors, such as Veves and Ficicaglu, at the motor nerve conduction rates of the deep peroneal nerve and tibial nerves and the sensory nerve conduction rates of the sural nerve. These findings are based on the metabolic basis of the pathogenesis of diabetic neuropathy, that is, persistent hyperglycemia in these patients. It is universally accepted that peripheral neuropathy is an important pathophysiological risk factor for the development of ulcers in the feet[15]. There are no specific electrodiagnostic results for diabetic polyneuropathy. However, electrodiagnostic evidence of axonal degeneration and a significant reduction in conduction in the appropriate clinical setting indicate a diabetic polyneuropathy. In summary, this study demonstrates that neuropathy is an important risk factor in diabetic foot injuries.

CONCLUSION:

This study demonstrated that neuropathy is an independent risk factor for the development of diabetic foot. It is important to determine and measure the role of neuropathy in planning effective strategies to prevent and delay foot complications.

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