

CASE REPORT

Acute Mononeuropathy as the first presentation of Pediatric Type 1 Diabetes Mellitus: a case report

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ABSTRACT

Background: Prevalence of neuropathy in Diabetes in the pediatric age group is very low. Moreover, it is often a late complication of diabetes mellitus (DM) and usually related to the duration of diabetes, poor glycemic control and advanced age. We present here an interesting case of motor neuropathy as a first manifestation of Type 1 diabetes in an adolescent.

Case presentation: A previously fit fourteen years old girl presented with sudden onset right foot drop. There was a history of osmotic symptoms and weight loss over the preceding last few months before presentation. Investigations revealed Type 1 diabetes mellitus. So, our patient was started on Multiple Daily Insulin Injection Regimen (MDI) as per protocol and the foot drop recovered within a period of two months.

Conclusion: Mononeuropathy as a first presentation of diabetes is extremely rare. It is extremely important to assess the blood glucose in patients with peripheral neuropathy. Normalizing blood glucose levels leads to rapid neuronal recovery.

Keywords: case report, Diabetes Mellitus, mononeuropathy, foot drop, multiple daily insulin injection regimen.

Background

Neuropathy is often a late complication of Diabetes mellitus and is usually related to the duration of diabetes, poor glycemic control and advanced age [1]. Moreover, its prevalence in the pediatric age group is very low [2]. We present an interesting case of motor neuropathy as a first manifestation of Type 1 DM in an adolescent. To the best of our knowledge there is only one reported case with an identical presentation as ours [1].

Case presentation

A previously well, right handed fourteen-years-old girl presented to the pediatric department of our hospital with a right foot drop which had progressively worsened over the preceding ten days. There was no history of trauma or recent infection. The patient denied any history of pain, paraesthesia or loss of sensation. Past medical history was

unremarkable. There was no family history of note. Interestingly, the patient had been experiencing polyuria, polydipsia and weight loss over last two months. Rest of the systemic review was insignificant

On examination, the patient was bright and alert with normal cognition. On neurological examination, the patient showed a high stepping gait, absent right ankle jerk and inability to dorsiflex the right foot. The right ankle had Grade 1 motor weakness. Rest of the neurological examination including upper limbs, left foot, cerebellar functions, cranial nerves and sensory examination (including the vibration and monofilament testing) was normal. Our patient showed no other features of diabetic end organ damage i.e. no evidence of diabetic nephropathy or retinopathy.

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Preliminary tests showed random blood glucose level of 24 mmol/l (Normal <11.1 mmol/l) with HbA1c of 118 mmol/mmol (Normal <48 mmol/mmol). The patient had normal electrolytes, thyroid functions, blood counts, coeliac screen, and vitamin D, B12 and folate levels. Further investigations revealed Anti Glutamic acid decarboxylase antibody (Anti GAD) titres of >2000IU/ml (Normal 0-9 IU/ml) and positive Islet Cell antibody (ICA), thus confirming a diagnosis of Type 1 Diabetes mellitus. Nerve conduction studies demonstrated a mixed

defect of an axonal damage and focal demyelination of right peroneal nerve at the knee (Tables 1 and 2).

The patient was treated with MDI regimen as per local protocol. The foot drop started to improve within 2 days of insulin treatment and normalization of blood glucose, with complete recovery over a period of two months. The HbA1c too improved and normalized in six months. There was no relapse at 12 months follow-up.

Table 1. Sensory Nerve Conduction Study (Sensory responses from the superficial peroneal nerves bilaterally showed normal amplitudes).

Nerve/ Sites	Rec. Site	Lat. ms	Amp.1-2 μ V	Amp 2-3 μ V	Dist. cm	Vel. m/s
RIGHT SUP PERONEAL						
Lat Calf	Ant. Ankle	2.9	15.1	15.8	15	51.7
Lat Calf	Lat. Ankle	3.00	18.3	15.2	16	53.3
LEFT SUP PERONEAL						
Lat Calf	Ant. Ankle	1.95	8.6	9.4	10	51.3
Lat Calf	Lat. Ankle	1.90	31.2	25.7	10	52.6

Table 2. Motor Nerve Conduction Study. (Motor responses from EDB (extensor digitorum brevis) muscles in both feet are of low amplitude but can be a normal variation. Peroneal nerve responses to the tibialis anterior muscles were asymmetrical with normal responses on the left and reduced amplitude on the right, stimulating just below the fibular head and conduction block level with the fibular head.)

Nerves/ Sites	Latency ms	Ampl mV	Area mV ms	Dist. Cm	Vel. m/s
RIGHT PERONEAL EDB					
Ankle	3.55	1.6	7.4		
Fib Head	11.05	1.7	6.7	31	41.3
Knee	13.05	2.4	10.2	8.5	42.5
LEFT PERONEAL EDB					
Ankle	3.60	1.6	6.7		
Fib Head	10.55	2.2	9.0	32	46.0
Knee	11.60	2.6	10.9	6.5	61.9
RIGHT PERONEAL Tib Ant					
Fib Head	3.35	1.8	18.6		
KNEE	7.20	1.4	3.1	3	46.2
LEFT PERONEAL Tib Ant					
Fib Head	3.35	5.5	33.3		
KNEE	5.00	5.2	34.4	9	54.5

Discussion

Type 1 diabetes is one of the most serious and frequent chronic disease in children. In almost half of the patients, it is detected before the age of 21 years, with a peak incidence occurring around the age of puberty [3].

Though motor neuropathy is rare, sensory neuropathy is not infrequent in children with Type 1 diabetes [4]. Several authors have shown that early abnormalities of nerve function assessed based on vibration perception threshold (VPT) or nerve conduction velocity can be detected as early as childhood or puberty [5,6].

Intensive education and treatment should be used in

children and adolescents having Type 1 diabetes, to prevent or delay the onset and progression of diabetic complications. Improvement in glycemic control will reduce the risk for onset and progression of vascular complications of diabetes [7,8].

Management involves prompt diagnosis of this entity and subsequent normalization of blood glucose with insulin.

Conclusion

Neuropathy is often a late complication of Diabetes mellitus and is usually related to the duration of diabetes, poor glycemic control and advanced age.

Mononeuropathy as a first presenting feature of diabetes is rare [2,3]. Usually it does not manifest until long after the onset of diabetes. As demonstrated in our patient, normalization of blood glucose levels leads to clinical recovery of the neuropathy.

Acknowledgements

None

List of Abbreviations

DM	Diabetes Mellitus
ICA	Islet Cell antibody
VPT	Vibration perception threshold

Conflict of Interests

None

Funding

None

Consent for publication

Informed consent was obtained from the parents of the patient to publish this case in a medical journal.

Ethical approval

Ethical approval is not required at our institution for publishing a case report in a medical journal.

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Authors' contribution

All authors contributed in the management of the patient and participated equally in writing this case

report. All authors approved the final version of the manuscript.

Received: 11 December 2016

Accepted: 13 January 2017

Published online: 19 January 2017

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Summary of the case

Patient (gender, age)	1	Female, 14 year old
Final Diagnosis	2	Acute diabetic mononeuropathy
Symptoms	3	Right Foot drop
Medications (Generic)	4	Insulin
Clinical Procedure	5	Blood investigations, Nerve conduction study
Specialty	6	Pediatric Diabetes
Objective	7	To find out the cause of mononeuropathy
Background	8	Prevalence of neuropathy in Diabetes in the pediatric age group is very rare. It is often a late complication of Diabetes Mellitus and is usually related to the duration of diabetes, poor glycemic control and advanced age.
Case Report	9	Acute mononeuropathy as the first presentation of Pediatric Type 1 Diabetes Mellitus
Conclusions	10	Mononeuropathy as a first presenting feature of diabetes is extremely rare. It is important to assess blood glucose in patients with neuropathy. Normalizing blood glucose levels leads to rapid recovery.
MeSH Keywords	11	Case report, Diabetes mellitus, Mononeuropathy, foot drop.