# DOPA-RESPONSIVE DYSTONIA OF CHILDHOOD: A CASE REPORT

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*ABSTRACT*

***A 5-year-old Chinese boy presented with difficulty in walking and weakness of his lower limbs for one year, especially towards the evening. Bilateral equinovarus posturing of the feet and tremors of the upper limbs were noted on physical examination. Dopa-responsive dystonia was diagnosed after a remarkable symptomatic response to levodopa. This disorder is reported here to highlight an often misdiagnosed condition in children which is important because it is treatable. Dopa-responsive dystonia should be considered in the differential diagnosis of gait disturbance in children.***

***Keywords:*** *dopa, levodopa, dystonia*

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## INTRODUCTION

Dopa-responsive dystonia (DRD) of childhood is a disorder characterised by childhood-onset dystonia, the concurrent or later development of parkinsonism and a positive therapeutic response to levodopa[1]. Marked diurnal fluctuation of symptoms and a complete alleviation of the symptoms with small doses of levodopa are characteristic clinical features of this disorder[2]. Inadequate recognition of this treatable condition may result in erroneous diagnoses of cerebral palsy, familial spastic paraparesis or psychogenic disturbance, leading to disabling consequences[3]. It is therefore important to identify children with DRD as early as possible since they can benefit from small doses of levodopa. Early diagnosis and prompt treatment are emphasised in the following case report.

## CASE REPORT

A 5-year-old Chinese boy was referred to the Penang General Hospital with difficulty in walking associated with weakness of his legs for one year. He was able to walk with support in the morning but could only stand with support towards the evening, when the weakness of his legs became worse. There was no similiar family history or parental consanguinity. The perinatal and birth histories were unremarkable. There was no significant past medical history. The developmental milestones were normal and the immunisation status was up-to-date.

Examination showed a wide base gait and bilateral equinovarus posturing of the feet. Tremors of the hands were noted at rest and on action. Muscle tone was increased and power was 4/5 in both upper and lower limbs. Deep tendon and plantar reflexes were normal.

The sensation was intact and Romberg's test was negative. The cranial nerves were normal. The higher mental functions were clinically normal. Slit-lamp examination of the eyes did not show any Kayser-Fleischer ring and the fundus was normal. Examination of the other systems did not reveal any abnormality.

The haemoglobin, white cell count, erythrocyte sedimentation rate(ESR), urea and electrolytes, plasma calcium, phosphate, creatine phosphokinase and liver function tests were normal. The serum caeruloplasmin and 24-hour urinary copper were within normal limits. Radiographs of the lumbosacral spine and computed tomography of the brain were normal.

Madopar(levodopa 50mg, benserazide 12.5mg) 62.5mg twice a day was started as a diagnostic trial for the possibility of DRD in view of the generalised dystonia associated with diurnal variation and after having excluded Wilson's disease. The weakness of his legs improved remarkably and the tremors resolved within 48 hours after starting treatment. The patients was now able to walk without support, even in the evening. He was discharged well with remarkable alleviation of his symptoms. He had remained well on this dose and was able to walk normally, with no neurological deficits on examination, when last reviewed in the follow-up clinic a year after discharge.

## DISCUSSION

DRD was first reported by Segawa in 1971 in a group of children with progressive dystonia associated with marked diurnal fluctuation of symptoms and a complete resolution of the symptoms with small doses of levodopa[2]. Various designations have been ascribed to this disorder, including hereditary progressive dystonia with marked diurnal fluctuation, Segawa syndrome, hereditary dystonia-parkinsonism syndrome of juvenile onset, dopa-sensitive progressive dystonia of childhood and autosomal dominant torsion dystonia[1]. DRD is a very important disorder because it is easily treatable and its diagnosis is often delayed or even totally missed. Many cases reported have not been diagnosed until adulthood and there is often a significant delay from symptom onset to first treatment with levodopa, ranging from 10-58 years[4]. Awareness and knowledge of how to recognise and treat children with DRD is therefore needed among doctors working with children. It has been estimated that DRD represents 5-10% of patients presenting with primary dystonia in childhood and adolescence[5]. Age at onset is usually between 4 and 8 years but may be as early as

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infancy[6]. Girls are more often affected than boys, the ratio is 2 to 3:1[1]. Gait disturbance, as was the case in our patient, and equinovarus posturing of a foot were the presenting complaints in 63 out of 66 patients in one series[4]. Gait and balance are mainly affected at the onset of DRD, owing to marked dystonia of the legs and equinovarus of the feet[1]. Toe-walking is often the first sign and the gait tends to have longer strides and a wider base, with a tendency to fall[1]. Features of parkinsonism such as postural instability, cogwheel rigidity, hypomimia, bradykinesia, and rest tremor may also be seen[1]. However, parkinsonism features are seen at the first examination in only one-fifth of patients with DRD[7]. Diurnal fluctuation in symptoms occurs in more than half of patients and symptoms are improved on awakening and become worse later in the day, as was the case in our patient[6]. There are no prenatal or perinatal abnormalities or any precipitating illnesses in the past of children with DRD[1].

The pathogenesis of DRD has been speculated to be hypofunction of the terminals of dopamine neurones in the striatum, although the exact mechanism remains unknown[8]. DRD appears to be inherited as an autosomal dominant trait with reduced penetrance, although sporadic cases have also been documented in the literature[4,9]. The differential diagnosis of DRD include childhood-onset idiopathic torsion dystonia, childhood-onset parkinsonism, diplegic cerebral palsy, familial spastic paraparesis and psychogenic disturbances[1]. Frequent diurnal fluctuation of symptoms and a dramatic and prolonged response to small doses of levodopa serve to differentiate DRD from other extrapyramidal disorders of children and young adults, particularly idiopathic torsion dystonia[10].

DRD is easily treatable with a small dose of levodopa which provides immediate and complete relief in most patients, even when treatment is started long after symptoms begin[6]. Rapid and dramatic improvement with complete or almost complete remission of symptoms usually occur within days or weeks[2]. Levodopa carbidopa at a dose of 25mg/ 6.25mg two to three times a day, or levodopa/benserazide at corresponding doses, is recommended for treatment[1]. Gradual titration to higher doses may be required according to response. The effect of levodopa does not depend on the degree of disability at the time of diagnosis or duration of the disease and does not seem to wear off with time[7,8]. Long-term therapy is beneficial and required and symptoms return when the drug is discontinued[2,6]. Treatment with other drugs such as trihexyphenidyl, benztropine, carbamazepine and haloperidol have produced variable results[4].

A diagnostic trial of levodopa, as recommended by others, is indicated in children presenting with dystonia associated with diurnal variation or any unexplained sporadic or familial dystonia especially if symptoms and signs are predominantly in the legs[11,12]. An immediate improvement in symptoms will usually confirm the diagnosis. The diagnosis of DRD should be considered in any child presenting with gait disturbance because morbidity is avoidable due to the availability of effective treatment. A high index of suspicion is necessary in order to avoid making a late diagnosis of DRD with its disabling consequences.

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