Case Report

A rare cause of progressive gait abnormality in a case of Turner syndrome

Ajinkya Patil, Rahul Jahagirdar*, Kavita Srivastava, Sanjay Mankar

Department of Pediatrics, Bharati Vidyapeeth University Medical College, Pune, Maharashtra, India

Received: 05 April 2021
Accepted: 05 May 2021

*Correspondence:
Dr. Rahul Jahagirdar,
E-mail: rjahagirdar@gmail.com

ABSTRACT

Turner syndrome is a commonly encountered chromosomal disorder affecting females, while Duchenne muscular dystrophy is a severe X-linked recessive disorder affecting males. Although theoretically possible, very few cases of DMD associated with Turner syndrome have been reported. We report an 8 year old girl who presented with a rare association of Turner syndrome mosaicism (45X/46XringX) with Duchenne muscular dystrophy.

Keywords: Muscular dystrophy, Turner syndrome, Gait abnormality, Weakness, Pediatrics

INTRODUCTION

Turner syndrome is a disorder caused by partial or complete absence of the second sex chromosome, with or without cell line mosaicism. Initially described by Henry Turner and later reported by Ullrich, it is characterized by phenotypic features like short stature, primary ovarian insufficiency along with other physical features arising from fetal lymphatic obstruction. The overall incidence is 1:2500 live born females. Duchenne muscular dystrophy (DMD) is a severe X-linked recessive progressive myopathy with affected probands being only boys. It is caused by mutation in dystrophin gene located on Xp21.2. Among the DMD probands, 60% have deletions and 5-10% has duplication of exons with origin being the mother or de novo mutations. The overall incidence is 1/4600 live born males. The coexistence of Turner syndrome and X-linked recessive disorder is quite an unusual coincidence. Based on their incidences, both the disorders may coexist at a frequency of 4x10³. Previously, only a few cases of Turner syndrome with DMD have been reported, all with variable phenotypic and cytogenetic variations.

CASE REPORT

Current study reports an 8 year old girl with Turner syndrome with progressive gait abnormality. The patient was the 1st living issue born to non-consanguineous parents at 36 weeks of gestation via cesarean section in view of breech presentation with birth weight of 1.85 kg. With rather uneventful antenatal and early childhood history, she was referred at 5 years of age for evaluation of short stature. Considering a case of a girl with unexplained short stature and supportive phenotypic features like short neck, low posterior hairline, strabismus, disproportionate short stocky appearance (increased upper: lower body ratio) and scoliosis (Figure 1), peripheral blood karyotype was done which revealed mosaic pattern Turner syndrome (45X/46XringX) (Figure 2). Fibrous streaks of ovaries could be visualized on ultrasonography. At 6 years of age, she was initially noted to have increasing difficulty in walking and climbing stairs with resultant frequent falls and difficulty in getting up from the floor. She was evaluated at the age of 8 years at which time her examination revealed proximal muscle weakness, waddling gait, valley sign, bilateral calf pseudohypertrophy along with a positive
Gowers’ sign (Figure 3). Kocher-Debre-Semelaigne syndrome, a more plausible differential, was ruled out by normal thyroid function tests. Serum CPK levels done were raised (16012 IU/l).

**Genetic studies**

Multiple ligation probe amplification (MLPA) of the patient confirmed the diagnosis of DMD with homozygous out-of-frame mutation with deletion of 7 exons (exons 46-52).

**Treatment**

Following the diagnosis of Duchenne muscular dystrophy, the patient was started on deflazacort and rehabilitative physiotherapy.

**DISCUSSION**

Duchenne muscular dystrophy is a severe X-linked recessive disorder characterized by progressive proximal myopathy. It is known to affect males with females being the carriers. However, various genetic abnormalities in cases of female DMD have been documented previously: X-autosomal reciprocal translocation and a preferential inactivation of normal X chromosome; classical 45 XO Turner karyotype or Turner mosaicism; skewed X inactivation of a normal X chromosome of female DMD mutation carriers; uniparental disomy with DMD mutation in both X chromosomes; co-occurrence of both dystrophin and androgen-receptor genes; homozygous dystrophin mutation due to consanguinity.4 Our case is similar to the case of Turner syndrome with dystrophin gene mutation in the remaining X chromosome. The available cohort of studies suggests that girls with classic Turner karyotype have a severe course of the DMD while those with mosaicism have a milder course as is seen in our case.5 Existing literature shows few reported cases of DMD with Turner syndrome. However, most of them were based on clinical diagnosis of DMD as no molecular diagnosis was available at that time. Present cases as well as a few other case reported previously have documented cytogenetic evidence of DMD (Table 1).

**Table 1: Documented cytogenetic evidence of DMD.**

| Author            | Turner karyotype | DMD mutation   |
|-------------------|------------------|----------------|
| Walton (1957)     | 45X              | Unavailable    |
| Ferrier et al (1965) | 45X/46XrX     | Unavailable    |
| Jalbert et al (1966) | 45X/46XX/47XXX | Unavailable    |
| Bortolini et al (1986) | 45X/46XX/47XXX | Unavailable    |
| Chelly et al (1986) | 45X             | Unavailable    |
| Ou et al (2010)   | 46XisoXq         | Deletion       |
| Kaczorowska et al (2016) | 45X         | Point mutation |
| Verma et al (2017) | 45X             | Deletion       |
| Kesavan et al (2019) | 45X            | Deletion       |
| Present case      | 45X/46XrX       | Deletion       |

**Neuromuscular studies**

Electromyography of upper and lower limb muscles confirmed non-inflammatory (proximal>distal) myopathy.
Use of oral corticosteroids has been mentioned in only 1 of the mentioned cases. In the current case too, Deflazacort was started to improve ambulatory and cardiovascular muscle function.

**CONCLUSION**

The possibility of X linked recessive disorders such as dystrophinopathies should be considered in females with Turner syndrome presenting with myopathy. Available correlation between chromosomal abnormality and disease severity helps in guiding therapeutic interventions and prognostication. However, phenotypic affection due to various dystrophin gene mutations is an area which warrants further exploration.

**Funding:** No funding sources  
**Conflict of interest:** None declared  
**Ethical approval:** Not required

**REFERENCES**

1. Nielsen J, Wohlert M. Chromosome abnormalities found among 34910 newborn children: results from a 13-year incidence study in Århus, Denmark. Human Genetics. 1991;87(1):81-3.
2. Den Dunnen JT, Grootscholten PM, Bakker E, Blonden LA, Ginjar HB, Wapenaar MC, et al. Topography of the Duchenne muscular dystrophy (DMD) gene: FIGE and cDNA analysis of 194 cases reveals 115 deletions and 13 duplications. Am J Human Genetics. 1989;45(6):835.
3. Dooley J, Gordon KE, Dodds L, MacSween J. Duchenne muscular dystrophy: a 30-year population-based incidence study. Clin Peditr. 2010;49(2):177-9.
4. Ou Z, Li S, Li Q, Chen X, Liu W, Sun X. Duchenne muscular dystrophy in a female patient with a karyotype of 46, X, i (X)(q10). Tohoku J Experiment Med. 2010;222(2):149-53.
5. Kaczorowska E, Zimowski J, Cichoń-Kotek M, Mrozińska A, Purzycka J, Wierzba J, et al. Co-incidence of Turner syndrome and Duchenne muscular dystrophy-an important problem for the clinician. Dev Period Med. 2016;20(4):273-8
6. Verma S, Goyal P, Beam C, Shah D. Turner syndrome and Duchenne muscular dystrophy. Muscle Nerve. 2017;56(2):E12-5.

Cite this article as: Patil A, Jahagirdar R, Srivastava K, Mankar S. A rare cause of progressive gait abnormality in a case of Turner syndrome. Int J Contemp Peditr 2021;8:1131-3.