Identification of a Novel MATN3 Gene Mutation associated with Perthes Disease: A Retrospective Case Series of Three Sisters

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INTRODUCTION:

Legg-Calve-Perthes disease, also known as Perthes disease, is a juvenile form of idiopathic avascular necrosis affecting the proximal femoral epiphysis. The exact cause of Perthes disease is still unknown, although genetic factors have been implicated, including mutations in genes such as factor V Leiden (*F5*), type II collagen (*COL2A1*), toll-like receptor 4 (*TLR4*), interleukin-6 (*IL-6*), and bcl-2-associated x protein (*BAX*). However, mutations in the matrillin-3 (*MATN3*) gene, associated with multiple epiphyseal dysplasia (*MED*), have not been previously linked to Perthes disease.

METHODS:

In this retrospective case series, we present three sisters who all developed Perthes disease of the right hip around 10 years of age. All three sisters were found to carry a novel 653A>G mutation in the *MATN3* gene. Data regarding their symptoms, diagnostic workup, treatments, and outcomes were extracted from their electronic medical records.

RESULTS:

The three sisters presented with episodic right leg pain and a limp for 3 months around 10 years of age. Physical examination revealed reduced right hip internal rotation. X-rays showed Perthes disease with MRI revealing avascular necrosis (AVN) involving the entire femoral head. They all underwent Petrie casting for 2 months, followed by nighttime bracing for 5 months. At an average follow up of 42 months, all three sisters are asymptomatic, exhibit equal range of motion in both hips, and have resumed all activities.

DISCUSSION AND CONCLUSION:

While several genetic mutations have been associated with the development of Perthes disease, we report, for the first time, a mutation in the *MATN3* gene (c.653A>G, P.Y218C) found in three sisters with Perthes disease. Further research is needed to determine the prevalence of MATN3 mutations in Perthes patients and understand the underlying mechanism by which this mutation contributes to the development of the disease.

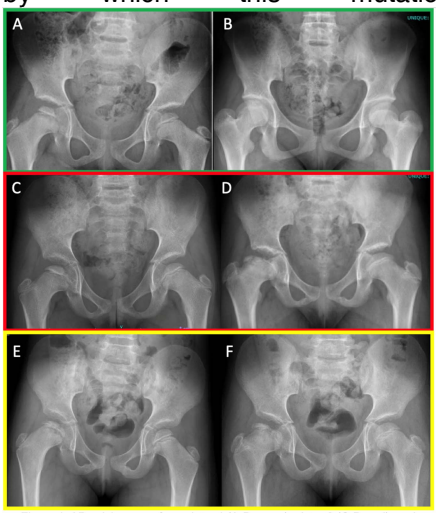

Figure 1. AP pelvis x-rays from sister 1 (A-B green), sister 2 (C-D, red), and sister 3 (E-F, yellow) at initial presentation and most recent follow-up