Introduction

Macular telangiectasia (MacTel) type 2 is an idiopathic bilateral condition characterized by juxtafoveal telangiectatic vessels, retinal crystalline deposits, right-angle venules, and intraretinal pigment plaques. Visual loss can often occur, and treatment is controversial.

The first description of the disease was presented by Gass et al. [2], and subsequently Gass and Boldi [3] classified this condition under idiopathic juxtafoveal telangiectasia type 2A. During the past decade, there has been notable progress in characterizing the disease and understanding its pathophysiology. It is now assumed that MacTel type 2 is a neurodegenerative disease with vascular alterations [1]. Recent genetic studies demonstrated that MacTel type 2 is a complex disease with specific involved pathways. Significant associations were identified at three independent loci at 5q14.3, 2q34, and 1p12 [4]. The 5q14.3 locus is associated with retinal vascular diameter variations, and the 2q34 and 1p12 loci are involved in the glycine-serine metabolic pathways [4]. Further investigation of this pathway demonstrated that a mutation affecting serine metabolism could lead to a MacTel type-2 phenotype [5].

In this case report, we describe a patient with MacTel type 2 and concomitant Down syndrome.
Near-infrared reflectance images of the patient’s right, (A) and left, (B) and (D) eyes showing a high number of vessels crossing the margin of the optic nerve, macular hypopigmentation and pigment clumping. Pigment depositions are visible bilaterally, most prominently in the left eye temporal to the fovea, which is a characteristic finding for type 2A idiopathic juxtapfoveolar retinal telangiectasia.

Figure 1: Color fundus images of the patient’s right, (A) and (C) and left, (B) and (D) eyes showing macular intraretinal telangiectasis. Optical coherence tomograms of the right (C) and left (D) eyes showing bilateral disruption of ellipsoid, with macular thickening. Note the migration of melanin pigment into the inner retinal layers (small round infrared reflections), a specific finding for type 2A idiopathic juxtapfoveolar retinal telangiectasia.

Figure 2: Near-infrared reflectance images of the patient’s right, (A) and (C) and left, (B) and (D) eyes showing macular intraretinal telangiectasis. Optical coherence tomograms of the right (C) and left (D) eyes showing bilateral disruption of ellipsoid, with macular thickening. Note the migration of melanin pigment into the inner retinal layers (small round infrared reflections), a specific finding for type 2A idiopathic juxtapfoveolar retinal telangiectasia.

Discussion

Although the concurrence of MacTel type 2 and Down syndrome in this patient may be coincidental, it could suggest a previously unrecognized association between the two conditions in some patients. The presented patient interestingly has a severe phenotype despite his young age. Investigators have studied macular abnormalities in Down syndrome patients during the past decade. O’Brien et al. [6] demonstrated that the central subfield thickness for the full retina and inner and outer retinal layers were all significantly greater in the Down syndrome children compared to a control group, suggesting an abnormal macular development in children with Down syndrome. In line with this study, Mangalesh et al. [7] found abnormal foveal morphology and persistence of inner retinal layers using OCT in Down syndrome children.

Recent studies also tie Down syndrome with peripheral neuropathy and degeneration due to genetic and metabolic abnormalities [8,9]. For instance, Patel et al. [8] found that abnormal increase in a regulator of calcineurin 1 -an endogenous inhibitor of the calcineurin phosphatase that is triplicated in Down syndrome- impairs neurotrophic support of neurons by inhibiting endocytosis of the nerve growth factor receptor TrkA. Furthermore, investigators have shown metabolic abnormalities involving the serine/glycine pathway in Down syndrome patients [10,11]. Given the neurodegenerative nature of MacTel type 2 and recent discoveries regarding serine/glycine pathway abnormalities in MacTel patients, it would be of potential value to further investigate the possibility of an association between the two diseases.

A common finding in Down syndrome is a high number of vessels crossing the margin of the optic nerve [12], as seen in this case. This has been attributed to the mild systemic angiogenesis deficiency associated with Down syndrome [13]. As a result of high endostatin levels in trisomy 21, bulbous expansion of the hyaloid vessels is down regulated, causing the retinal vessels to branch closer to the optic disc center and create an abnormally crowded vascular pattern on the disc [13]. Furthermore, atrioventricular septal defects in Down syndrome has been associated with abnormalities in the Vascular Endothelial Growth Factor-A (VEGF-A) pathway [14]. This pathway is crucial in endothelial cell functions involved with angiogenesis, including proliferation, migration, survival, and new vessel formation [15]. The abnormalities in the vascular system in Down syndrome patients could partially contribute to the vascular alterations seen in MacTel type 2.

Conclusion

This manuscript highlights certain similarities between the pathophysiology in MacTel type 2 and Down syndrome. We recognize that there could be other, yet unknown pathways contributing to the pathophysiology of MacTel as well. It is notable that in early stages, the clinical findings of MacTel type 2 can be very subtle, and mild changes in the macula might not always be appreciated as possible primary changes of MacTel. A detailed and comprehensive retinal examination of Down syndrome patients could help define an association between these two diseases.

Patient Consent

Informed consent was obtained from the patient and legal guardian to publish this report. This report does not contain any personal information that could lead to the identification of the patient.

References


