Ocular Manifestations of Mucopolysaccharidosis

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Mucopolysaccharidoses (MPS) are classified according to the symptoms, the enzyme deficiency and the type of glycosaminoglycans (GAGs) excreted in urine (Table I).[1] Most of these disorders have a chronic and progressive course. Abnormal accumulation of GAGs in the affected tissues may cause blindness, hearing loss, respiratory disease, thick hair, inguinal and umbilical hernias and spinal cord compression.[2]

A study was carried out on a series of cases diagnosed on clinical grounds as having MPS in order to observe their ocular features at Paediatric Ophthalmology Department of Al-Shifa Eye Hospital, Rawalpindi between November 2005 and May 2006. Ocular and systemic findings of all the patients were recorded (summarised in Table I). Investigations carried out included urine for metabolic screening, liver and kidney function tests, echocardiography and radiological skeletal survey. One patient was lost to follow-up before his radio-diagnostic and laboratory tests became available. Along with management of the ocular disease, referral to internist for systemic manifestations was also made.

The patients included 3 (42.8%) females and 4 (57.2%) males, aged 4-15 years with a median age of 10 years. All patients presented with bilateral stromal corneal haze and decreased vision noticed first at ages between 1.5-4 years. Progressive multisystem involvement with complaints of photophobia, sleep apnoea and rhinorrhoea were common. Parental consanguinity was present in all. Four (57.2 %) patients had other affected family members while 3 (42.8%) did not have any family history of the disease. Deterioration in visual acuity ranged from 8 cpcm recorded binocularly with Lea gratings to 6/15 with Lea numbers in the better eye. Intraocular pressure (IOP) was normal in 5 patients. One patient had glaucoma with buphthalmic left eye and a history of trabeculectomy in the normal-sized right eye (Figure 1). In one patient IOP was 27 mm Hg bilaterally, as measured by Perkins tonometer, which could be falsely high as central corneal thickness was 1.009 mm in both eyes. Pachymetry readings were not possible in the other patients because of cloudy cornea. Retinal view was hazy in all seven patients, therefore, no pigment retinopathy was appreciated in any of the cases, although decreased night vision was a presenting complaint in one patient (Table I).

General and systemic physical examination showed coarse facial features with flared nostrils and enlarged tongue as a common finding in all cases. Umbilical hernia, claw-shaped hands, short neck, thoracolumbar scoliosis and dwarfism were noticed in 6 (85.7%) patients (Table I). The seventh one had no skeletal deformities apart from pes cavus. Hepatosplenomegaly was found in 2 (28.5%) patients out of 7. Six patients had normal intelligence while one female had subnormal intelligence.

Urine metabolic screening test revealed negative results in the 6 patients subjected to it. Renal profile and liver function tests were within normal limits in 6 cases. Echocardiography was performed in 3 patients only and showed normal results in 2 and mild mitral valve thickening in one patient.

On spinal roentgenology, oar-shaped ribs, kyphosis, scoliosis, beaking of vertebral bodies and platyspondyly were seen as common findings. Widely flared iliac bones, J-shaped sella turcica and thickening of the vault were noticeable in 3 (42.8%) patients. One case revealed fused block vertebrae on X-ray of cervical spine. Bullet-shaped metacarpals were seen in radiographs of the hands of 6 cases with claw-shaped deformity. In 6 patients, height and weight were less than the 3rd percentile and head circumference exceeded the 90th percentile.

Although various ocular manifestations seen in MPS are not very specific but are in general very typical, therefore ophthalmological examination has a vital role in early detection of MPS and controlling disease progression. The cases described above presented from various parts of northern Pakistan, which constitutes the catchment area of the study centre. Based on clinical findings after paediatric, radiological and orthopaedic

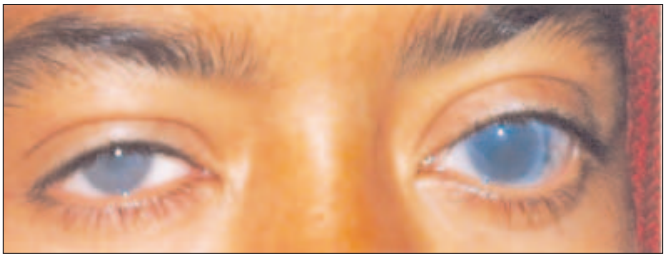

Figure 1: Bilateral corneal and buphthalmic left eye in a female patient.

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Table I: Ocular and systemic features noted in the patients of MPS .

Patient	Age (years)	Gender	Corneal haze	Pigment retinopathy	Glaucoma	Urine metabolic test	Umbilical hernia	Hepatosplenomegaly	Skeletal deformity
1	4	F	+	-	-	-	+	-	+
2	4.5	M	++	-	-	-	+	-	+
3	5	F	++	-	-	-	+	+	+
4	10	F	++	-	+	-	+	+	+
5	12	M	++	-	-	-	+	-	+
6	14	M	++	-	-	Not done	+	-	+
7	15	M	++	-	-	-	-	-	Pes cavus

M= Male, F=Female, + = present, - = absent

consultations, the differential diagnosis in the cases described above was narrowed down to MPS I H (Hurler), MPS I H-S (Hurler-Scheie), MPS IV (Morquio) and MPS VI (Maroteaux-Lamy). The confirmation of diagnosis is done by quantitative and qualitative assessment of glycosaminoglycanuria, enzyme assays and gene analysis, the facility of which was unfortunately not available to us. Others in Pakistan have faced similar difficulty in laboratory diagnosis of MPS.[3]

Ocular complications of MPS can lead to severe reduction of vision.[4] The role of ophthalmologist is to manage corneal haze and glaucoma, if present. Corneal opacification causes diagnostic difficulty in monitoring glaucoma and retinal evaluation. Increased corneal thickness can lead to falsely high intra-ocular pressure levels as also noted in one patient.

Four patients had a history of MPS in the family. The other 3 patients had no affected family member. The types of MPS considered in differential diagnosis have autosomal recessive patterns of inheritance. The parents of those patients could be assumed to be heterozygous and were offered genetic counselling.

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