CASE REPORTS

MPS I and Challenges of Diagnosis and Management of Genetic Disease in Resource Constraint Developing Country

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Abstract:
Emerging of Genetic disease like mucopolysaccharidosis is a concern matter of public health now a days. Developing country like Bangladesh has no comprehensive epidemiological data on the prevalence of most of the genetic disease. A case of 3-year-old child having characteristic facial and radiological features of MPS has been discussed and obstacles regarding diagnosis & management of the phenotypes are also highlighted. It is a high time to commence proper genetic service facilities in developing country like Bangladesh.

***Key words**: Mucopolysaccharidosis.*

Introduction:
Mucopolysaccharidosis type I (MPS I) is a rare life-threatening, autosomal recessive genetic disease caused by deficiency of á-L-iduronidase (IDUA), which is responsible for accumulation of glycosaminoglycans (GAGs) dermatan and heparan sulfate in the cells resulted in progressive permanent damage throughout the body[1,2].

MPS I has an estimated incidence of 1/100,000 live births with a spectrum of phenotypes that range from severe (Hurler syndrome) to attenuated (Hurler-Scheie and Scheie syndromes) form of phenotypes.[3] It is a matter of fact that developing country like Bangladesh has no comprehensive epidemiological data on the prevalence of most of the genetic diseases like MPS.[4]

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We report the case as a MPS type 1 from clinical features, skeletal survey and positive family history and highlights the challenges faced with diagnosis where genetic and biochemical testing facilities are unavailable.

Case Report:
A three-year-old Bangladeshi girl, presented with frequent respiratory tract infections, respiratory distress, rhinitis and snoring, coarse facial features, symptoms of delayed development in pediatric department of Bahubal UHC, Habigonj, Sylhet. [Figure 1]

She is the fifth child of consanguineous parents who are first degree cousins (from maternal side). According to her parents, out of 5 children except the eldest girl (healthy),3 children died around 2.5 to 3 years of age. Among them one is boy and other 2 children were girls. Family pedigree chart showed autosomal recessive pattern.

Figure 1: Female baby with MPS showing coarse facial features, protuberant abdomen, umbilical hernia.

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Systemic examination revealed hepatomegaly and palpable spleen. Musculoskeletal examination showed limited shoulder movements and gait disturbance. Ophthalmological examination showed cloudy cornea. Intra oral examination showed decayed teeth & macroglossia.

Suspecting genetic diseases, we performed radiological investigations like skeletal survey including chest X-ray A/P view, X-ray dorsolumbar spine B/V, Xray skull B/V, X-ray hand B/V, X-ray lower limbs including pelvis Figure 2,3.

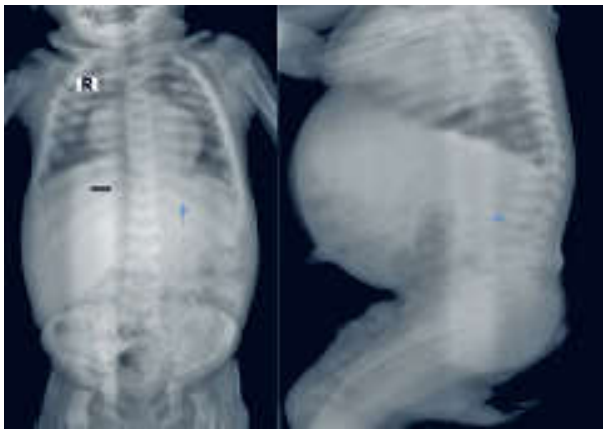

Figure 2: CXR A/P view showing oar shaped ribs with narrowing at the vertebral ends. X-ray dorso lumbar spine lateral view showing Rounded vertebral bodies with anterior beaking

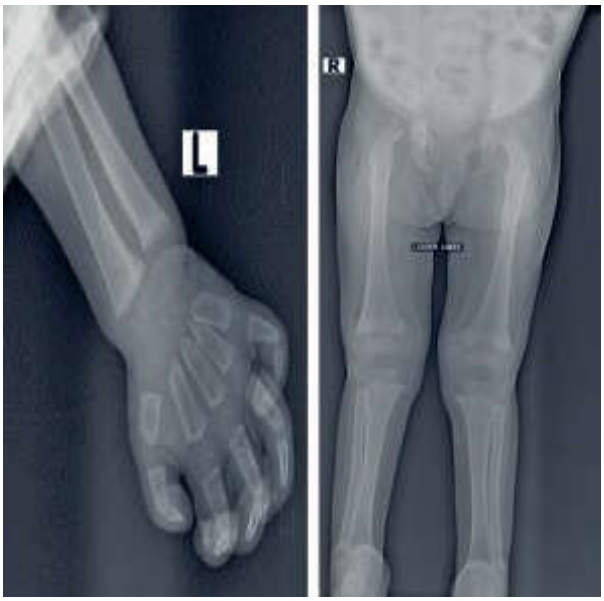

Figure 3: X-ray left hand B/V showing V-shaped deformity of the hypoplastic distal ulna and radius Hypoplastic and irregularly shaped carpal bones Proximal pointed metacarpals, Bullet-shaped phalanges.

Xray Lower limbs including pelvis findings: Rounded iliac wings, inferior tapering of the ileum, poorly developed acetabulum, underdevelopment of the medial portion of the proximal femoral epiphysis, metaphyseal flaring or Erlenmeyer deformity of metaphysis of both distal femurs

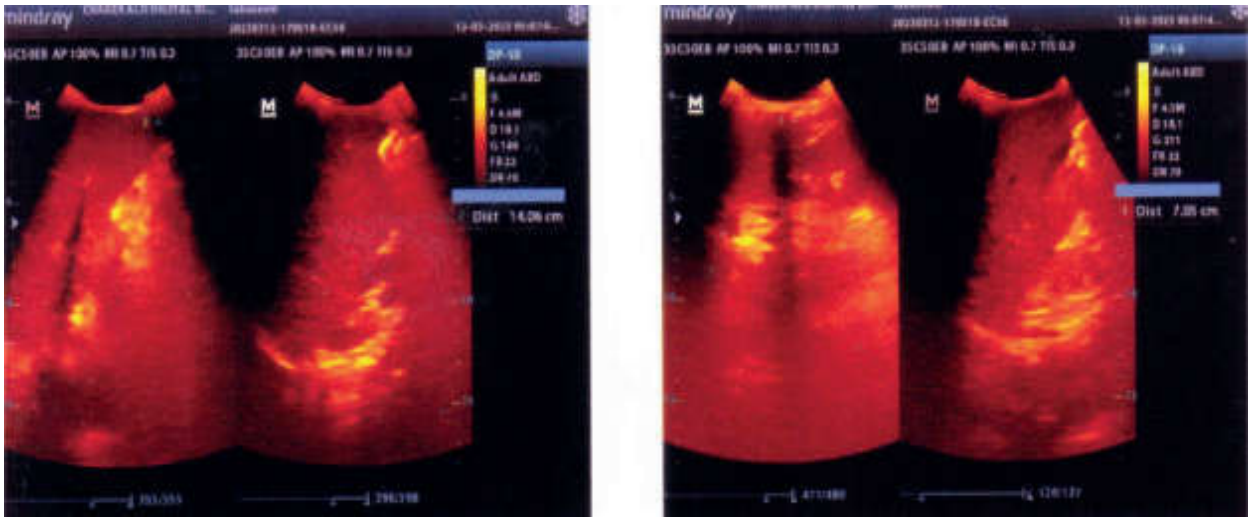

Figure 4 : USG of whole abdomen showed huge hepatomegaly (14 cm), prominent spleen (7.05cm).

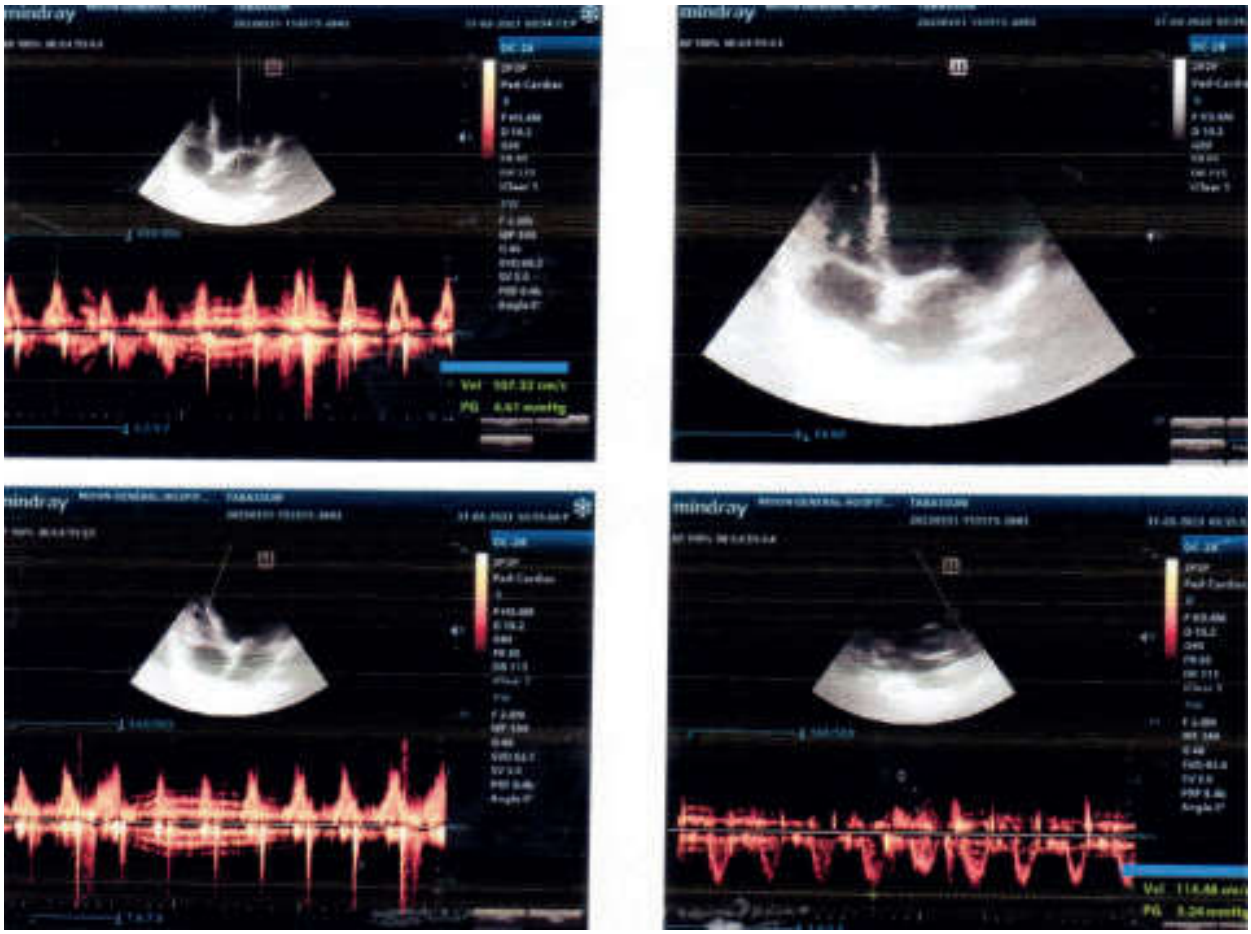

Figure 5 : Echocardiography showed thickened mitral valve with calcification of anterior mitral leaflet & trivial tricuspid regurgitation. [Figure 5]

Laboratory examination findings: Full blood count, thyroid function tests, liver function tests including Serum bilirubin, SGPT were within the normal range for age.

CT, MRI of brain and spine, audiological examination, and urine glycosaminoglycans, blood lysozyme investigation could not be done due to test unavailability and financial constraints.

Discussions:

MPS is divided into 7 types and 11 subtypes differentiated biochemically by the relative enzyme deficiency.[5] Different MPS types exhibit comparable symptoms, especially MPS I and II; however, severe neurological issues are seen in MPS III and hydrops fetalis in MPS VII.[6] Except for Hunters syndrome (MPS type II) all of the MPS are inherited in autosomal recessive manner.[7]

The presentation of this case clearly stated that our patient had corneal clouding and other clinical facial features which are consistent with MPS type I. The family pedigree analysis also confirmed its autosomal recessive pattern.

Though patient was detected early by the clinical and radiological features, because of the lack of testing facilities like cultured fibroblast activity to exclude mucolipidosis, blood enzyme assay, urine glycosaminoglycan test to determine the type of the MPS are not possible in limited resource settings of Bangladesh. Moreover, treatment of genetic disease like MPS is not possible in our country due to financial constraints in most of the cases.

Conclusion:

Early diagnosis and treatment of MPS type 1 is challenging in Bangladesh. Practice of premarital genetic counselling and awareness regarding prenatal & newborn screening of genetic disease, genetic service should be commended for

prevention. For evaluation of genetic metabolic diseases like MPS needs systemic clinical approach along with testing facilities supported by government as well as private sectors.

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