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*Case Report*

# Macroglossia With Hyper Salivation: Can It Be Mucopolysacchridosis?

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**Abstract**

**Introduction:** Mucopolysacchridosis is a lysosomal storage disorder due to deficiency of lysosomal hydrolase class of enzymes mucopolysaccharidases. It is rare, inherited autosomal recessive disorder results from abnormal accumulation of undegraded GAGs in lysosome of various tissues.

**Patient Info:** Skeletal abnormalities, macroglossia, facial dysmorphia, Scoliosis, excessive salivation are few of the characteristic symptoms which make one to suspect this disorder. We present 9 year old male child having macroglossia and hyper salivation.

**Diagnosis:** He was diagnosed as a case of Mucopolysacchridosis after Berry's Toluidine blue spot test and urine electrophoresis results.

**Keywords:** Mucopolysacchridosis, Glycosaminoglycan, Lysosomal storage disorder,Electrophoresis, metabolic disease, screening tests, Carbohydrate, Heparan sulphate, Dermatan sulphate, Mucopolysaccharide,

## Introduction

Glycosaminoglycans (GAG) are negatively charged, sulphated polysaccharides, consist of repeating disaccharide units; present in connective tissue, extracellular matrix and on the surface of cell and tissue. They are also called as Mucopolysaccharides due to their association with mucous. Lysosomal (Hydrolase) enzymes collectively called mucopolysaccharidases are responsible for their degradation. Deficiency of these enzymes results in a storage disorder called Mucopolysacchridosis (MPS). MPS is a group of lysosomal storage disorder in which there is abnormal accumulation of GAGs in the tissue. This is one of the rare diseases, inherited in the autosomal recessive manner, having incidence ranging from 1 in 25,000 live births to 1 in 132,000 live births.[1] Based on deficient enzymes they are further sub-classified into nine different types.[2] Based on mucopolysaccharidurias they are of four types.[3] Clinical anomalies can be seen in almost all tissue due to their wide distribution in almost all human tissue. Though physical and mental symptoms are common; severity of symptoms vary depending on type of MPS and which GAG is involved. Dye binding screening test[4] and urine electrophoresis[5] are diagnostic tests routinely done in metabolic clinics.[6] We present a provisionally suspected case of Mucopolysacchridosis confirmed by Toluidine blue Dye binding and urine electrophoresis.

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## Case Report

A 9 year old male child was brought to paediatric dental clinic with complaint of irregular, protruding teeth and excessive salivation. Mother told he was normal till one year of age but, later his growth mile stones were delayed. Birth history of child was insignificant, no familial history of similar symptoms. Child had dysmorphic facial features, protruding fontal skull, thick lips, macroglossia and constant dripping of saliva from the corner of mouth.

On clinical examination, child had walking difficulty but normal IQ and except slow motor activity, no abnormality in voluntary movements, no history of seizure.

On skeletal examination, child showed short bones, mild scoliosis, mild protruding thorax and odontoid hypoplasia. Skeletal deformity was then confirmed on X-ray. Systemic examination ruled out any neurological deficits. From the above findings child was provisionally diagnosed to be a case of Mucopolysacchridosis.

After obtaining consent from mother Saliva, urine and blood samples were sent to metabolic screening lab of biochemistry department for special tests relating MPS.

## Result From Laboratory Investigation:

1. Toluidine blue (Berry) spot test[4] was performed on patient's urine sample along with normal urine as negative control and solution of Heparan sulphate as positive control. No metachromasia was seen on filter paper spotted with patient's urine sample.
2. Acid albumin precipitation test[7] performed on serum demonstrated precipitate indicating presence of increased level of GAG.
3. Spectrophotometric assay on urine sample by 1,9 dimethyl methylene blue reagent and heparan sulphate as standard indicated increased level of glycosaminoglycan.
4. Urine samples when subjected to electrophoresis on cellulose acetate paper followed by Alcian blue staining revealed presence of Chondroitan sulphate and dermatan sulphate bands.[8]

## Results

From the above clinical investigations and results from metabolic biochemistry lab a case of Mucopolysaccharidosis was confirmed. As this being a genetic disorder and considering economic status of patient's family; except dental treatment no other treatment was offered. Mother was educated about the disorder and instructed how to take care for child.

## Discussion:

Glycosaminoglycan are hetero-polysaccharide, having long unbranched sulphated molecules. Hyaluronic acid, dermatan sulphate, chondroitan sulphate, heparin, heparan sulphate and keratan sulphate are physiologically important GAGs. Usually they contain N-acetyl galactosamine (GalNAc) or N-acetyl glucosamine (GlcNAc) with a hexuronic acid (except in keratan sulphate)[9,10,] they are in association with protein forming important proteoglycans. GAGs are negatively charged molecules having exceptional water imbibing capacity. This imparts high viscosity to the solution and making them ideal lubricant of joints and mucous layer over cells/tissues.

Lysosomal enzymes are glycosidase and sulphatase type Hydrolase class of enzymes which degrades GAGs to their constituent monosaccharide derivatives. Due to mutations in the genes encoding this specific lysosomal enzyme, degradation of specific GAG is affected, resulting in abnormal accumulation. Clinical features of disease vary based on extent of deficiency of a specific enzyme and amount of GAG accumulation in tissue.

Simple screening teston urine sample, based on dye binding property of GAG, can speak about disease. It can be confirmed by electrophoresis, enzyme assay. In addition to chondroitan sulphate four different GAG patterns have been observed when urine is used for electrophoresis. The patterns are[1] Only Heparan sulphate band[2] Only Dermatan sulphate band[3] Both heparan and dermatan sulphate band in equal proportion and[4] many fold increase in both types. Though other advanced methods like tissue biopsy, amniotic analysis, HPLC, TM MS, CT MRI, leucocyte enzyme assay are available[6,11,12] but due to palliative measures and lack of definite cost effective treatment they are in less practised. Also limited life span of the patient causes limitations.

All MPS are chronic, progressive disorders displaying variety of clinical manifestations, from delayed growth mile-stones to skeletal abnormality to cognitive impairment. MPS being a metabolic disorder, suspected cases may be screened for urinary GAG excretion followed by differentiation

of GAG by urine electrophoresis or TLC. Further analysis of enzyme deficit from leukocyte and genetic counselling is advised. Clinical observations should be confirmed by biochemical test results and radiography.

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