Lysosomal Storage Disorders Diagnostic Algorithm, Part 1

Clinical Information:
- Developmental delay/Cognitive impairment
- Coarse features/Organomegaly
- Dysostosis multiplex
- Neurodegeneration/Behavioral changes
- Lipidosis
- Hearing defects/loss

LSDS / Lysosomal Storage Disorders Screen, Random, Urine
Testing includes:
- Mucopolysaccharides (MPS)
- Dermatan sulfate (DS)
- Heparan sulfate (HS)
- Keratan sulfate (KS)
- Chondroitin 6-sulfate (CS)
- Oligosaccharides (OLIGO)
- Ceramide trihexosides (CT) – Normal for all disorders on this algorithm
- Sulfatides (S) – Normal for all disorders on this algorithm

Clinical information:
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Order: IDUAW / Alpha-L-Iduronidase, Leukocytes

Order 1 of the following:
- BGA / Beta-Galactosidase, Leukocytes
- BGABS / Beta-Galactosidase, Blood Spot
- BGAW / Beta-Galactosidase, Blood

Order: FUCW / Alpha-Fucosidase, Leukocytes

Does not rule out MPS III A, C, D
MPS IIIB confirmed

Order: G6SW / N-Acetylgalactosamine 6-Sulfatase, Leukocytes

Consider 1 of the following:
- Beta-glucuronidase enzyme analysis
- GUSB sequencing

Consider: SFPAN / Mucopolysaccharidosis III, Multi-Gene Panel, Varies
Consider: MP3BZ / Mucopolysaccharidosis IIIB, Full Gene Analysis, Varies

If deficient, MPS I confirmed
Consider: MPS1Z / Hurler Syndrome, Full Gene Analysis, Varies

If deficient, MPS IVA confirmed
Consider: MPS6Z / Mucopolysaccharidosis VI, Full Gene Analysis, Varies
Consider: GALNS sequencing

If deficient, α-fucosidosis confirmed
Consider: FUCA1 sequencing

MPS I (Hurler syndrome) or MPS II (Hunter syndrome)
MPS I
MPS II

Order: EDUAW / Alpha-L-Iduronidase, Leukocytes

Order 1 of the following:
- GS2W / Iduronate-2-Sulfatase, Whole Blood
- GSBIIS / Iduronate-2-Sulfatase, Blood Spot

If deficient, MPS I confirmed
Consider: MPS1Z / Hurler Syndrome, Full Gene Analysis, Varies

If deficient, MPS II confirmed
Consider: MPS2Z / Hunter Syndrome, Full Gene Analysis, Varies

If deficient, MPS IVA confirmed
Consider: GALNS sequencing

MPS IVA

Order: G6SW / N-Acetylgalactosamine 6-Sulfatase, Leukocytes

Consider: MPS6Z / Mucopolysaccharidosis VI, Full Gene Analysis, Varies

If deficient, MPS IVA confirmed
Consider: GALNS sequencing

MPS VI

Order 1 of the following:
- BGA / Beta-Galactosidase, Leukocytes
- BGABS / Beta-Galactosidase, Blood Spot
- BGAW / Beta-Galactosidase, Blood

If deficient, α-fucosidosis confirmed
Consider: FUCA1 sequencing

MPS VI

Order 1 of the following:
- BGA / Beta-Galactosidase, Leukocytes
- BGABS / Beta-Galactosidase, Blood Spot
- BGAW / Beta-Galactosidase, Blood

If deficient, perform GLB1 sequencing to distinguish between the disorders

MPS VII

Order: ANAS / Alpha-N-Acetylglucosaminidase, Serum

NORMAL
DEFFICIENT
Does not rule out MPS III A, C, D
MPS IIIB confirmed

Consider: SFPAW / Mucopolysaccharidosis III, Multi-Gene Panel, Varies
Consider: MP3BZ / Mucopolysaccharidosis IIIB, Full Gene Analysis, Varies

OLIGO – MPS IVB profile
OLIGO – GM1 gangliosidosis profile
OLIGO – α-fucosidosis profile
OLIGO – galactosialidosis profile

MPS IVB (Morquio syndrome type B)
GM1 gangliosidosis
α-Fucosidosis
Galactosialidosis

Order 1 of the following:
- BGA / Beta-Galactosidase, Leukocytes
- BGABS / Beta-Galactosidase, Blood Spot
- BGAW / Beta-Galactosidase, Blood

If deficient, perform GLB1 sequencing to distinguish between the disorders

Order: FUCW / Alpha-Fucosidase, Leukocytes

Consider: CTSA sequencing

STOP TESTING COMPLETE