Answer to Medical Quiz-1

Answers

1. The facies is characterized by prominent forehead, broad nose with flattened bridge, thickened lips, enlarged tongue and prognathism.
2. Tapering of head and part of neck and shaft of all metacarpal bones, flexion deformity in distal interphalangeal joints, medial deviation of thumb, tapering of lower end of radius and ulna with deficient epiphysis along medial part of radius and lateral part of ulna.
3. Two-dimensional echocardiography left parasternal long-axis (C) and left parasternal short-axis (F) views show thickened and echogenic mitral and aortic valves with mitral valve area 0.8 cm2, indicating severe mitral stenosis. Also noted are trace pericardial effusion and coarse myocardium.
4. Mucopolysaccharidosis II, i.e., Hunter syndrome.
5. The toluidine blue spot urine test, also called the Berry spot test, is an old, rapid qualitative screening test for excess urinary glycosaminoglycans (GAGs) in suspected mucopolysaccharidosis (MPS). A small amount of urine is placed on filter paper, dried, and stained with toluidine blue, a metachromatic dye. Sulfated GAGs bind the dye and produce a purple/violet metachromatic spot against a blue background. A positive test therefore suggests increased urinary GAG excretion.

Discussion:

Mucopolysaccharidoses (MPS) are a group of rare, inherited lysosomal storage disorders caused by deficiencies of specific enzymes involved in the degradation of glycosaminoglycans (GAGs). Progressive accumulation of GAGs in tissues results in multisystem disease, commonly affecting the skeletal system, joints, respiratory tract, cardiovascular system, liver, spleen, hearing, and vision. Neurological involvement varies considerably among the different MPS subtypes. Diagnosis generally involves urinary GAG analysis, measurement of the relevant lysosomal enzyme activity, and molecular genetic testing. Treatment is multidisciplinary and may include enzyme replacement therapy (ERT), hematopoietic stem-cell transplantation in selected MPS I patients, and supportive management of organ complications.

Mucopolysaccharidosis type II (MPS II), or Hunter syndrome, is an X-linked MPS caused by pathogenic variants in the IDS gene, resulting in deficiency of iduronate-2-sulfatase (I2S). This leads particularly to accumulation of heparan sulfate and dermatan sulfate. Hunter syndrome predominantly affects males and has a broad clinical spectrum ranging from attenuated disease with relatively preserved cognition to severe neuronopathic disease with progressive cognitive decline. Characteristic manifestations include coarse facial features, dysostosis multiplex, short stature, hepatosplenomegaly, joint stiffness, hearing loss, airway obstruction, sleep-disordered breathing, and progressive cardiac disease, particularly valvular abnormalities.

Diagnosis of MPS II is established by demonstrating deficient I2S activity and confirming a pathogenic IDS variant. Enzyme replacement therapy with idursulfase can improve several somatic manifestations, including urinary GAG levels, hepatosplenomegaly, respiratory function, and walking capacity. However, conventional intravenous ERT has limited ability to cross the blood–brain barrier, so its effect on established central nervous system disease is limited. Early diagnosis and comprehensive multidisciplinary care are therefore essential.

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Answer to Medical Quiz-2

Answers:

1. There are bilateral hyperintensity on Diffusion-Weighted Imaging (DWI) and T2WI sequences within the deep gray matter in the basal ganglia and cerebral cortex,
2. Possible diagnosis is acute encephalitis with seizure clusters/status
3. Differential diagnoses:
   a) Metabolic encephalopathy
   b) Mitochondrial disorder
   c) Leigh disease
4. Electroencephalogram (EEG) reveals diffuse, generalized background slowing indicative of severe encephalopathy, interspersed with multifocal epileptiform spike-and-wave discharges.
5. The definitive medical management requires immediate, stepwise emergency resuscitation, seizure termination, and supportive intensive care.

Discussion:

Acute encephalitis presenting with seizure clusters or status epilepticus is a critical medical emergency characterized by rapid-onset brain parenchymal inflammation combined with prolonged or clustered seizure activity where consciousness is not regained between events, often classified as New-Onset Refractory Status Epilepticus (NORSE) or Febrile Infection-Related Epilepsy Syndrome (FIRES) when no immediate cause is identified.[1,2] Etiologically, it stems from infectious pathogens—such as HSV-1, VZV, enteroviruses, or arboviruses—or autoimmune/paraneoplastic mechanisms mediated by autoantibodies against neuronal surface or intracellular antigens like anti-NMDAR, LGI1, CASPR2, or GAD, all of which trigger microglial activation, massive cytokine release, blood-brain barrier disruption, and GABA/glutamate receptor dysregulation that drives sustained neuronal hyperexcitability and injury.[3] Management requires a rapid, parallel diagnostic and therapeutic strategy: evaluation involves high-resolution brain MRI (T2/FLAIR) to identify limbic or cortical hyperintensities, lumbar puncture for infectious PCR panels and autoantibody panels, continuous EEG to detect non-convulsive status epilepticus and guide titration, and systemic PET or CT imaging to screen for occult malignancies.[4] Treatment begins with emergency airway resuscitation and systemic stabilization, followed immediately by step-wise anti-seizure therapy using IV benzodiazepines (first-line), non-sedating antiseizure medications like levetiracetam or valproate (second-line), and continuous anesthetic infusions such as propofol, midazolam, or ketamine under EEG guidance to achieve burst suppression for refractory cases.[5] Concurrently, empiric IV acyclovir and broad-spectrum antibiotics must be initiated alongside early first-line immunotherapies—including high-dose IV methylprednisolone, IVIG, or plasma exchange within 72 hours—and second-line biologics like rituximab or tocilizumab for refractory autoimmune cases, as prompt neuro-intensive support and targeted immunotherapy directly correlate with improved survival rates and long-term functional recovery.[6,7]

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