Fanconi Syndrome Causes

Fanconi syndrome can be caused due to inherited disorders, along with acquired, or medication-induced factors. Hereditary causes include tyrosinemia, cystinosis, hereditary fructose intolerance, Wilson's disease, Dent's disease, glycogen storage diseases, galactosemia, and Lowe Syndrome. Acquired, or medication-induced causes include heavy metal exposure, multiple myeloma, and medications, such as tenofovir, expired tetracyclines, cisplatin, sodium valproate and gentamycin.

PLAY PICMONIC

Hereditary Causes

Cystinosis
Sister-noses
Cystinosis is the most common cause of Fanconi syndrome in children. It is an autosomal recessive disorder that causes an accumulation of the amino acid cystine within cells, forming crystals that build up and damage cells of the kidney.

Dent's Disease
Dented-floor
Dent’s disease is an X-linked disorder of the proximal tubules, and is a cause of Fanconi syndrome. Patients typically display hypercalciuria and nephrolithiasis.

Wilson's Disease
Wilson-ball
Wilson’s disease is an inherited disorder of copper metabolism, which can lead to tubular dysfunction, and Fanconi syndrome. More specifically, there is a disorder of bicarbonate handling by the proximal tubules leads to nephrocalcinosis, amongst other organ insults.

Oculocerebrorenal (Lowe) Syndrome
Low Ocular-brain-kidney
Lowe syndrome is an X-linked recessive disorder which causes congenital cataracts, hypotonia and areflexia, mental retardation, and renal dysfunction. It leads to renal tubular dysfunction, where bicarbonate, sodium, potassium, amino acids, organic acids, albumin, proteins, calcium, phosphate, and glucose are lost in the urine.

Galactosemia
Galactic-toast
Galactosemia is an autosomal recessive inherited disorder in which patients cannot properly metabolize galactose. Amongst cataracts, hepatic failure, and brain damage, patients can also develop renal failure, which can lead to Fanconi syndrome.

Hereditary Fructose Intolerance
Fruit-toast Intolerant-old-man with Hair-red
HFI, or hereditary fructose intolerance is an autosomal recessive disorder in which patients are deficient in aldolase B, and cannot properly metabolize fructose. Fructose ingestion may lead to renal failure, which may cause Fanconi syndrome in patients.

Glycogen Storage Diseases
Glider
Glycogen storage diseases, which are inherited disorders of glycogen metabolism can lead to Fanconi syndrome. More specifically, GSD type XI, or Fanconi-Bickel syndrome, leads to glycogen accumulation and a characteristic proximal tubule dysfunction.

Tyrosinemia

Tire

In tyrosinemia, patients cannot properly break down the amino acid tyrosine. This can lead to hepatic failure along with renal failure and tubular dysfunction, leading to Fanconi syndrome in patients.

Acquired and Medication Causes

Tenofovir

Tin-of-ears

Tenofovir is a NRTI used to treat HIV. This drug can lead to renal failure and can result in tubular dysfunction of the kidneys. Thus, patients taking tenofovir can develop Fanconi syndrome.

Heavy Metals

Heavy Metal-weights

Exposure to and intoxication from heavy metals like lead, iron, cadmium, copper and mercury can lead to renal dysfunction, causing Fanconi syndrome to present in those exposed.

Expired Tetracyclines

Broken Tetris-cycle

When tetracyclines expire, tetracycline changes to form epitetracycline and anhydrotetracycline. These two compounds damage the proximal tubule, causing Fanconi syndrome.

Cisplatin

C-SPAN reporter

Cisplatin is a chemotherapy agent used in various cancers. This drug is nephrotoxic, and its use, especially in those with existing kidney dysfunction, can lead to proximal tubule insult and Fanconi syndrome.

Gentamycin (Aminoglycosides)

Magenta-gentleman-mouse

Exposure to high dose or expired aminoglycoside antibiotics can lead to proximal renal tubule dysfunction, leading to Fanconi anemia.

Valproate Sodium

Vault-pro-rat with Salt-shaker

Patients taking valproate or valproic acid are susceptible to renal injury, which can lead to Fanconi anemia. It has been noted, however, that these cases resolved after stopping valproate administration.

Multiple Myeloma

M&M's

Due to abnormal deposits of light and/or heavy chain in the proximal tubules of the kidney, patients with multiple myeloma and MGUS (monoclonal gammopathy of undetermined significance) can develop Fanconi syndrome.