crystal induced arthritis

3 types of crystals can induce "crystal induced arthritis"

1- mono-sodium urate causing gout
2- calcium pyrophosphate causes pseudogout
3- hydroxy-appetite crystals

GOUT and PSEUDOGOUT

- **common site** is first metatarsophalangeal joint , this joint is involved in **50%** of gout patient in their first presentation , and in **90%** of patient during their whole disease course . so if patient have arthritis for 10 years for example and there were no involvement of MTP joint , don't consider gout as much as other possible DDx .
- gout in big toe called **podagra**
- **DDx** of arthritis in this joint : septic arthritis , cellulitis , and most typically OA
- usually doesn't come to female in their reproductive ages ✕ , usually post menopause poly-articular .
- it could come in the knee , ankle , shoulder or else where , usually takes large joins in acute attacks not small joints (hand joints for ex.)
- gout is a **very painful** arthritis , more painful than others , patient with gouty pain will not tolerate the sheet of the bed . the attack lasts for one week to maximum three **weeks** , usually gout subside with treatment and rarely before one week .
- **short onset**, develops during hours not days , usually pain develops at night (Saturday evening in الغرب because of alcohol intake at this time. In Arabs they will be at cardiology ward because of usage of ***diuretics*** that have a side effect of hyperuricemia) .
- It could be **acute or chronic** arthritis , its cause by precipitation of urate in joints and soft tissues .
- **Palindromic rheumatism** : arthritis have very short duration (hours)

- Sometimes when a lady 24 YO came to the ER with acute knee arthritis , its hard to differentiate whether its **septic arthritis OR gout** , both have pain , hotness , tenderness , swelling , limitation of movement and fever , different points are :
  1- Being a female and young is far away from gout .
  2- Night time of pain and development time of pain (in gout is hours but in septic is days).
  3- Ask about precipitating factors of gout like recent trauma , related medications like diuretics , alcohol consumption .
  4- Recurrent or not (if yes it's with gout , if not this can go with both).
  5- Presence of tophi (gout)
  6- First MTP involvement (gout)
  7- Renal involvement (gout)
  8- In examination : extension of inflammation in acute gouty attack is more than the joint area , it spread above and below the joint . this spread must be acute (within hours) to be characteristic to gout . because septic arthritis if not treated probably it could spread too but over weeks .
- **It has 4 phases :**

1- Asymptomatic:

discovered accidentally by blood testing for other reasons .

This face ends with the first attack .

The patient may stay asymptomatic for life , may have first attack and never have second one ,, and may have recurrent attacks (chronic gout).

management at this case is doing nothing 😊 except in 2 cases :

- uric acid level exceeds 10mg in female and 15mg in male ,, because it can precipitate in kidney causing urate nephropathy or kidney stones. (normal urate in blood is up to 7mg) .

Why we don't treat asymptomatic patient with mild elevation in uric acid ? because the risk of treatment side-effects is exceeding the risk of mildly high urate .

- OR if the patient have renal impairment or stones or tophi .

2- Acute first gout :

monoarticular , first MTP joint , usually in the lower limbs , large joints , preferred by previously damaged joints (if a joint is partially damaged by previous OA for example) , usually last for days up to 4 weeks .

- **What precipitate acute gouty arthritis** ? alcohol , stressful condition (trauma , surgeries) , HTN , diuretics (the most common drug known to precipitate gout) , heparin , cyclosporine .

Half of the patients will have 2nd attack within 1 year and Frequency of attacks increases with time .

3- Inter-critical gout : period of between first attack and second attack .

Usually we don't treat patients after first attack bacause most probably they will not have second one , except in renally impaired patients or patient with renal stones or if patient have critical job like pilots 😊

4- Tophitious gout (chronic gout) :

appear after one year from the first attack , involve joints and soft tissues like tendons , ear , subcutaneous tissue .. and it **must be** differentiated from rheumatoid nodules .

Gouty tophi is immediately over the olecranon area الكوع (pursitis) , just like rheumatic fever nodules.

Gouty ones are soft full with fluid that can be aspirated by needle .

On X ray It causes erosions that are **punched out with over-hanging edges** , while erosions in rheumatoid are marginal erosions without punching out .

It causes chronic urate nephropathy with renal impairment , it deposit in medullary interstitial , and **less commonly** acute urate nephropathy except in patient with tumor lysis .

*Disease causing acute urate nephropathy : acute lysis syndrome (patient with tumor undergoing chemotherapy) , in oncology wards patient are on hydration and allopurinol even before chemotherapy to avoid nephropathy .

Hyper-uricemia Is either because under-execration (90% so more common) or over-production .

Uric acid path in kidney : 1- filtered 2-reabsorbed 3-secreted

Overproduction in liechnehan syndrome (defenses and mental sub abnormality) , affect female more than male .

Diagnosis :

1- clinically (as mentioned above)
2- lab (urate serum level , synovial fluid)

For all mono-arthritis , the best diagnostic tool is **joint aspiration** (in gout fluid is turbid with high cellularity , and urate crystals (intracellular needle shaped crystals) , WBC count is more than 2000-20000 cell , (its normally less than 200 cell) and it can sometime cause a count of 100000 , here cell count will not help to distinguish between septic and gout). And we do culture and glucose level of synovial fluid .

Low glucose mean septic (bacterial infection) .

Culture is negative in gout . but in septic , the probability to have positive culture is 95% , except in patients who had antibiotics before test , or un-usual organism that is difficult to grow .

Polarized like microscopy صوره > crystals appear shiny in black background (negative birefringent) .

When urate crystals is **with the axis** صوره > its yellow In color , **against the axis** it turns blue ,,, opposite in pseudo-gout (which have rhomboid shaped crystals) .

There is also red light microscope (red background) صوره.

Both septic and gout have elevated blood WBC count , but more in septic .

❖ [Pseudogout]

Pseudo gout and CPPD **aren't the same term !** , pseudo-gout is one presentation of CPPD .

patient with CPPD maybe Asymptomatic OR have pseudo-rheumatoid OR pseudo-OA OR pseudo-neuropathic ,, most common in CPPD are pseudo-gout and pseudo-OA .

CPPD usually in **elderly**, more in female , and usually affect large joint like knee, wrist , symphysis pupis and shoulders .

(On X-ray) Appear like calcification on cartilage of joint > called ***chondrocalcinosis*** ,this is very typical & cheap to diagnose CPPD ,most patients here **asymptomatic !**

Shape of crystals is short rods (like bacilli organisms) , the color is blue when parallel to axis , and yellow when perpendicular (or opposite to axis) .

Management :

Manage risk factors (drugs , alcohol , …) , give fluid , reducing weight , diet modifications (just to reduce *not stop* uric acid containing food and protein containing food)

NSAID in acute attacks unless the patient have renal impairment , instead we use colchicine (never combine NSAID with colchicine , both together lead to sever GI upset like ulceration and gastritis) OR better to give intra-articular steroids .

Allopurinol , never given in acute attack because it may precipitate more attacks , usually in acute attacks we give NSAID or colchicine then we wait for 1 month then give allopurinol if indicated .

- Indications for allopurinol :

1- Recurrent attacks
2- Renal impairment
3- If the patient have Tophitious gout

Side effects of allopurinol : hyper-sensitivity syndrome , in 1 for every 1000 patients , so its alternative is febuxostat (xanthine synthase inhibitor) .

We can use probenecid that increase uric acid secretion in urine . its contraindicated in patients with renal stones because it increases the risk of stones .

If you cut protein containing food completely , liver will compensate it and things may get worse .

😊اللهم اني استودعتك ما قرأت وما حفظت فرده لي وقت حاجتي له يا كريم

Done by : Ena’am domi