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18 Tweets • 2020-04-20 • See on 𝕏

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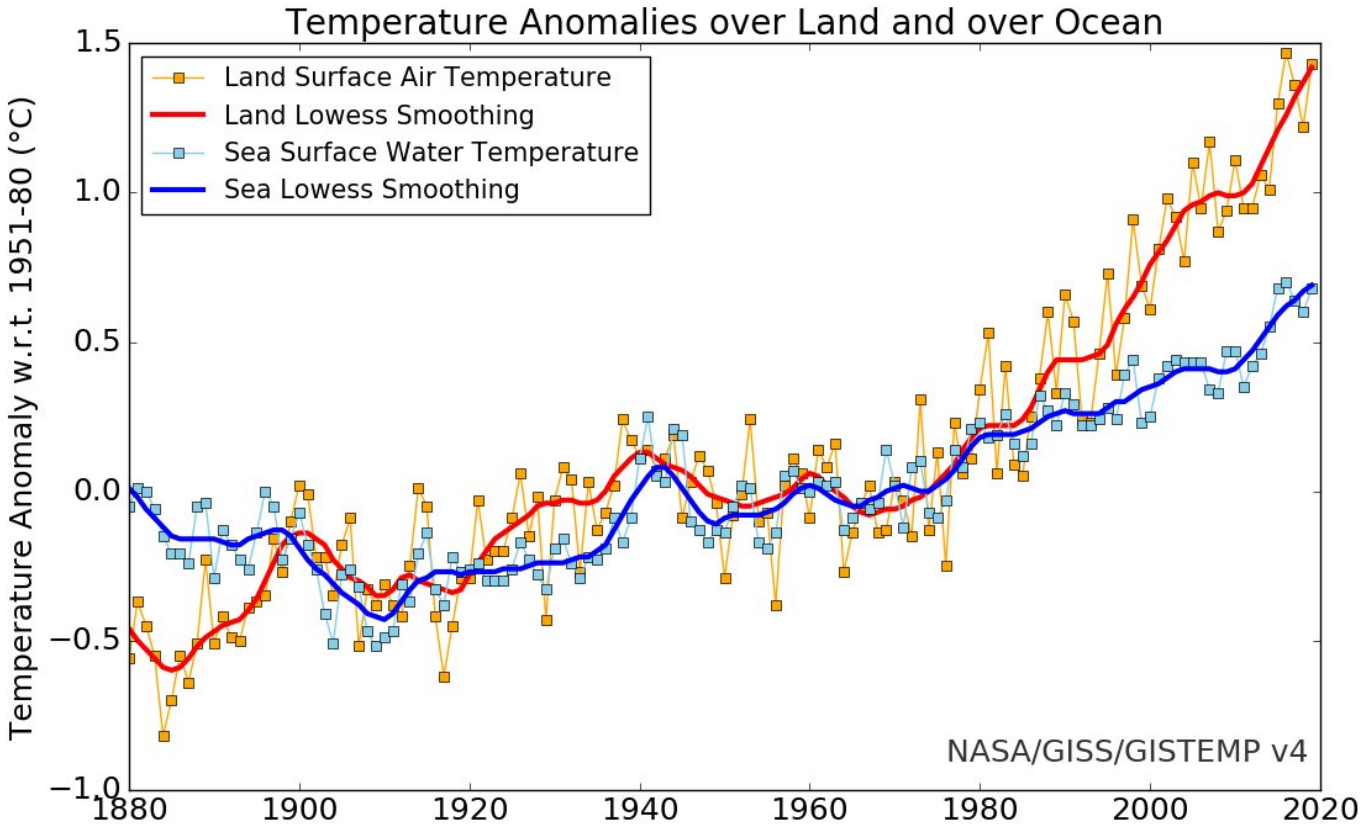
1. Could climate change affect my kidneys long term? YES it could!!!

#NephMadness #GreenRegion #ClimateChangeAndCKD

In the last 50 years → 🌎 temperature increased about 0.8°C 😱

https://data.giss.nasa.gov/gistemp/



2. #ClimateChange

→ increase in extreme heat events #HeatWaves 🌞

→ consequences on human health 🤒

https://www.karger.com/Article/FullText/500344

3. Kidneys are not the exception:

High metabolic work + concentrated excretion of wastes make them susceptible to injury for #ClimateChange

In rural hot 🌡️ communities there has been an ↑ in CKD that is not associated with traditional risk factors

https://www.nejm.org/doi/full/10.1056/NEJMra1813869

4. Where has this phenomenon been reported?

5. CKD of unknown etiology (CKDu) has been recognized in regions of Central America, Mexico, Sri Lanka, India & Egypt by different names:

- Central America → Mesoamerican Nephropathy
- Sri Lanka → Sri Lankan Nephroathy
- India → Uddanam Nephropathy

https://www.nejm.org/doi/full/10.1056/NE

JMra1813869

Table 1. Demographic and Clinical Characteristics of Chronic Kidney Disease of Unknown Cause.*

Variable	Mesoamerican Nephropathy	Sri Lankan Nephropathy	Uddanam Nephropathy
Region	Pacific Coast, rural areas from Mexico to Panama	North Central Province	Central Indian states of Andhra Pradesh, Odisha, Chhattisgarh, Maharashtra
Demographic features	Age range, 20–50 yr Male:female ratio, ≥3:1	Age range, 40–50 yr Male:female ratio, 1.3:1	Age range, 30–60 yr More common in men
Affected population	Sugarcane workers, cotton workers, corn farmers, construction workers, port workers, miners, fishing industry workers, shrimp farm workers, brick workers	Rice farmers	Cashew, rice, and coconut farmers
Hypothesized causes			
Heat exposure	Low-altitude areas with hot tropical climate, physical exertion, recurrent dehydration	Low-altitude areas with hot tropical climate	Coast and inland up to 60–70 m above sea level with hot tropical climate
Other	Toxic causes: pesticides, heavy metals, NSAIDs, tobacco use Infections: leptospirosis, hantavirus infection Gene–environment interactions	Cadmium, pesticides (glyphosate), hard water, high fluoride content in drinking water, arsenic, glyphosate chelation with metals, low water intake, malaria	Silica in groundwater, excessive use of painkillers, low water intake
Clinical findings			
Acute phase	Fever, elevated serum creatinine level, muscle and joint pain, leukocytosis, leukocyturia, hematuria	Fever, fatigue, dysuria, joint pain, elevated serum creatinine level	Not described so far
Chronic phase	Insidious presentation (elevated serum creatinine level), low-grade or no proteinuria, hypokalemia, hyponatremia, hypomagnesemia, frequent hyperuricemia, reduced kidney size on ultrasound	Insidious presentation (elevated serum creatinine level), low-grade or no proteinuria, hypokalemia, hyponatremia, hypomagnesemia, frequent hyperuricemia, reduced kidney size on ultrasound	Insidious presentation (elevated serum creatinine level), low-grade or no hypertension, low-grade or no proteinuria, microscopic hematuria (rare), reduced kidney size on ultrasound

* NSAIDs denotes nonsteroidal antiinflammatory drugs.

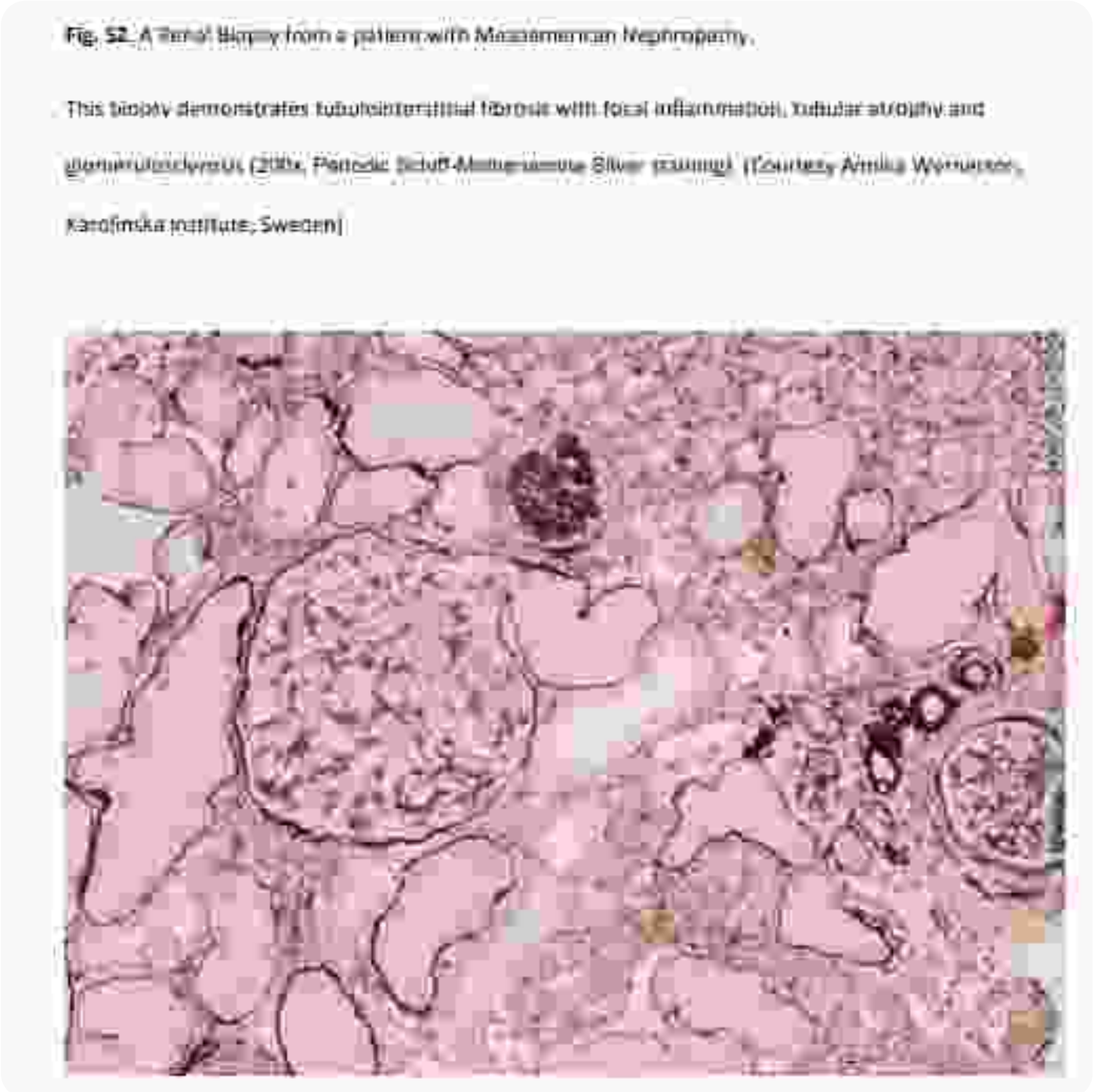
Johnson, R. J., Wesseling, C., & Newman, L. S. (2019). Chronic kidney disease of unknown cause in agricultural communities. *New England Journal of Medicine*, *380*(19), 1843-1852.

6. The term chronic interstitial nephritis in agricultural communities (CINAC), has been proposed to englobe them.

https://www.kireports.org/article/S2468-0249(17)30424-2/fulltext

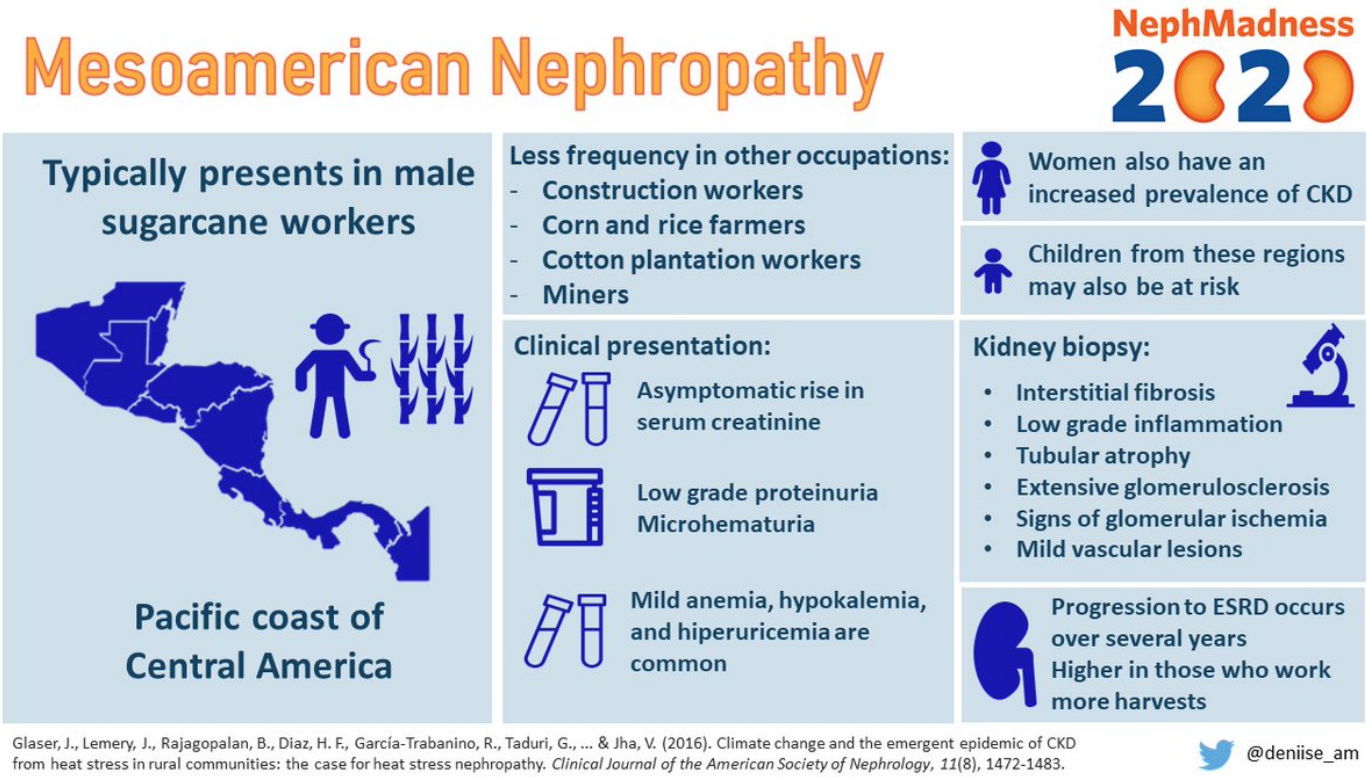
7. How do these patients develop CKD?

The mechanism is unclear, but some biopsies shows → chronic tubulointerstitial disease → Heat Stress Nephropathy



8. Let's talk more about #MesoamericanNephropathy, where was this entity first reported?

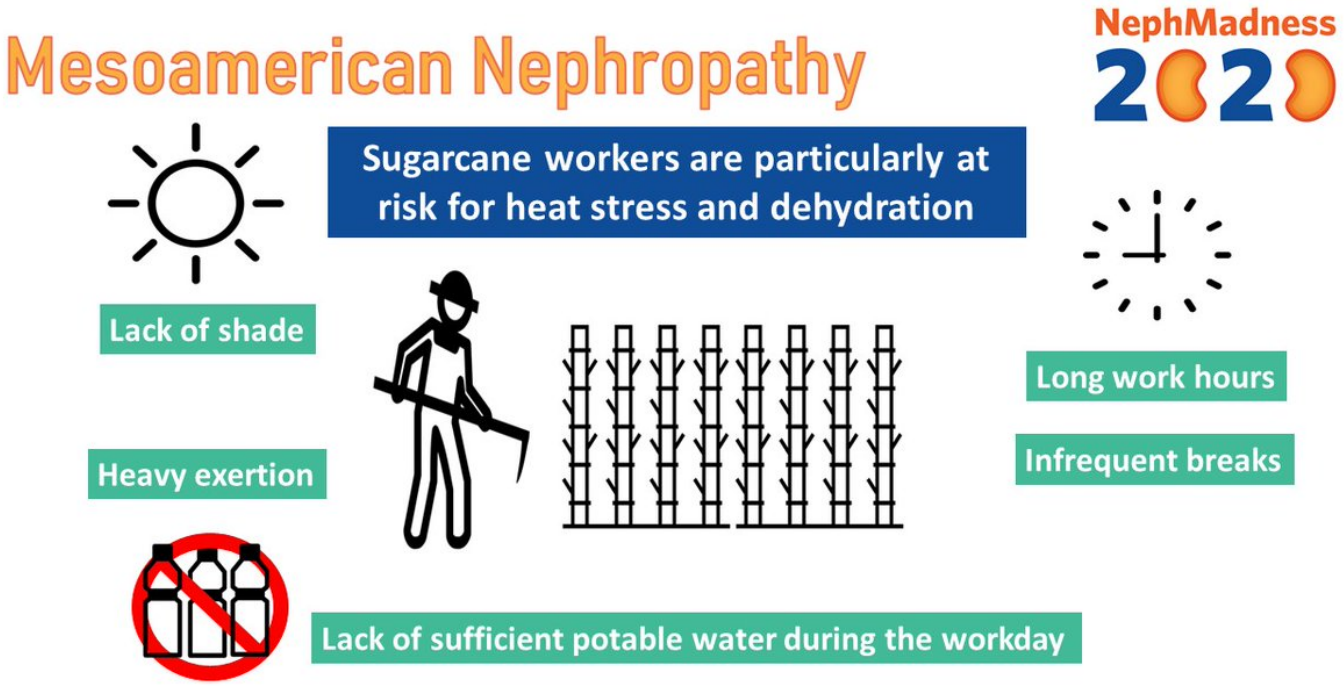
9. First reported in El Salvador in 2002, #MesoamericanNephropathy is an example of a disease that is accelerated by global warming 🌎🌡️



10. Which of the following has been linked with #MesoamericanNephropathy?

11. The etiology is not entirely clear:

- Was thought to be caused by a toxin (agrochemicals, heavy metals, from infectious agents)
- But has been linked with recurrent dehydration and heat stress
- Sugarcane workers are particularly at risk.



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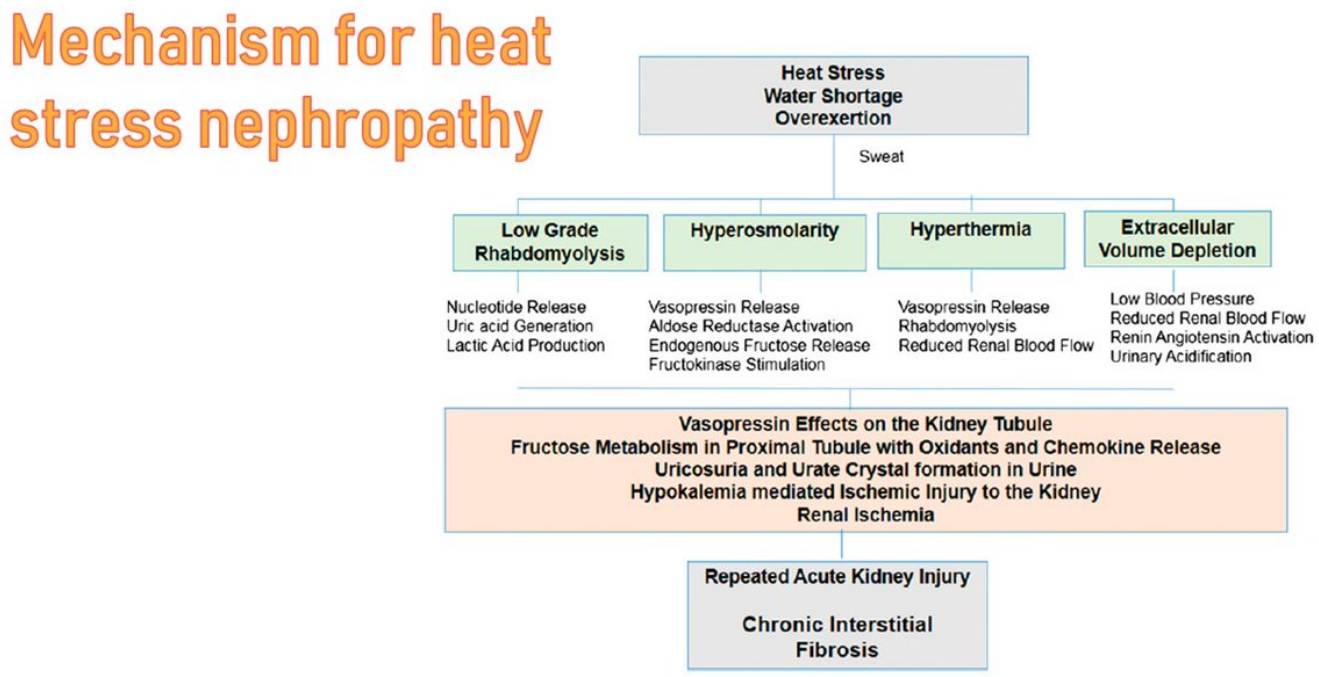
12. In Sri Lanka, others factors have been implicated:
- Environmental pollution (heavy metals & agrochemicals)
- Excess fluoride in water
- Sodium/calcium imbalance in water
- Genetic factors

13. Dehydration and recurrent volume depletion are correlated with repeated AKI episodes, but may also cause CKD via other mechanisms:

https://cjasn.asnjournals.org/content/11/8/1472.long



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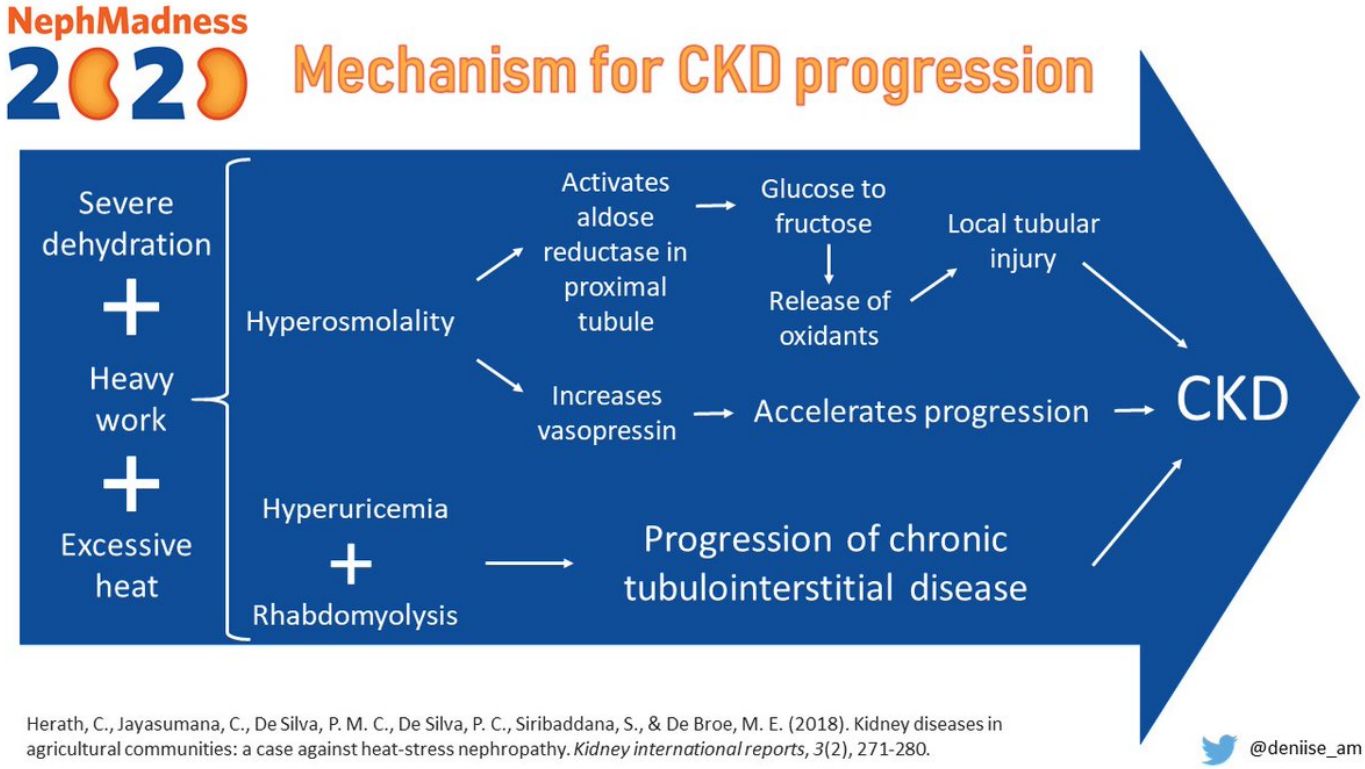
14. Dehydration & hyperthermia → hyperosmolarity + vasopressin + hyperuricemia + rhabdomyolysis = CKD progression



15. But beside dehydration → drinking fructose-containing sugary beverages 🧃, could exacerbate kidney injury via:
- Local tubular injury
- Inflammation
- Oxidative stress
- Stimulates vasopressin

16. Experimental studies in 🐭 have shown that rehydration with soft drinks could enhance kidney damage.

https://bmcnephrol.biomedcentral.com/articles/10.1186/s12882-018-0963-9

17. Take home points📝
- Climate change affects kidney health long term
- In hot regions there has been an increase in CKDu
- Biopsies show chronic tubulointerstitial disease
- CKD occurs by multiple mechanisms (dehydration and heat stress are principal risk factors)

18. Don't forget to submit your bracket!

#NephMadness #GreenRegion
#ClimateChangeAndCKD

https://ajkdblog.org/2020/03/11/welcome-to-nephmadness-2020/

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