

Diuretics

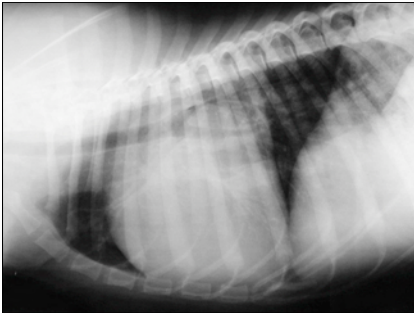


1

diuretics

- act on the kidney to increase urine flow
- most block reabsorption of ions from tubules
- water kept in tubules by osmotic pressure

2

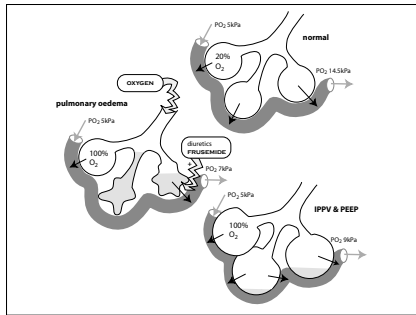


3

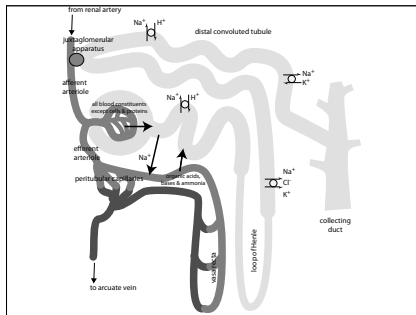
diuretics & CHF

- reduce pulmonary oedema
- reduce preload

4



5



6

groups of drugs

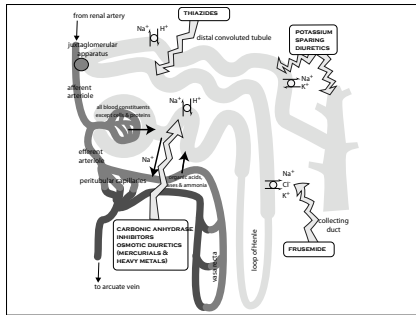
- loop diuretics
- thiazides
- osmotic diuretics
- potassium sparing diuretics
- carbonic anhydrase inhibitors
- (mercurials)

7

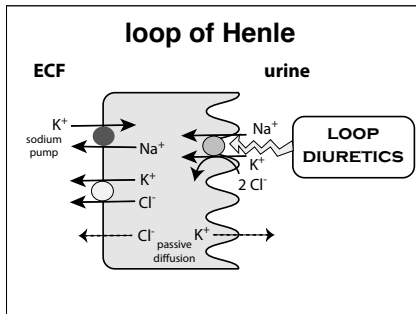
common drugs

- frusemide
- (hydrochlorthiazide)
- (mannitol)

8



9



10

frusemide

- **potent**
— up to 20% of filtered Na^+ excreted
- **cheap**
- **very widely used**

11

frusemide indications

- **reduce oedema**
- **reduce cardiac preload**
- **(acute renal failure)**

12

minor indications

- hyperkalaemia
- hypercalcaemia
- uraemia
- epistaxis
- hypertension

13

abuse

- speeding up / slowing racehorses

14

pharmacokinetics

- **iv**
 - onset minutes
 - peak 30 mins
 - duration 2 hours
- **po**
 - onset 30 - 60 mins
 - peak 2 hours
 - duration 4 - 6 hours

15

pharmacokinetics

- **metabolism**
 - negligible
- **elimination**
 - secreted into PCT by anion pump
 - passes out in urine
 - horses which eat their bedding may take it in again

16

side effects

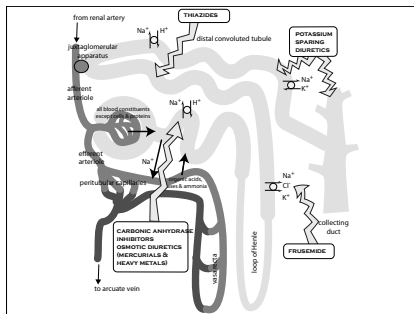
- **hypovolaemia**
 - reduced glomerular filtration
 - reduced excretion of other drugs
 - collapse
 - direct vasodilatation?
- **hypokalaemia**
- **metabolic alkalosis**
- **hypocalcaemia / hypomagnesaemia**

17

side effects

- **hypovolaemia**
- **hypokalaemia**
 - digoxin!!!
- **metabolic alkalosis**
- **hypocalcaemia / hypomagnesaemia**
- **tolerance**

18



19

side effects

- **hypovolaemia**
- **hypokalaemia**
- **metabolic alkalosis**
- **hypocalcaemia / hypomagnesaemia**
- **tolerance**

20

interactions

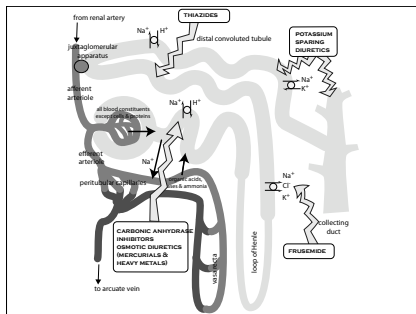
- **increased PCT toxicity**
 - aminoglycosides
 - out of date tetracyclines
 - some obsolete cephalosporins
- **potentiates digoxin**
- **ACE inhibitors?**

21

common drugs

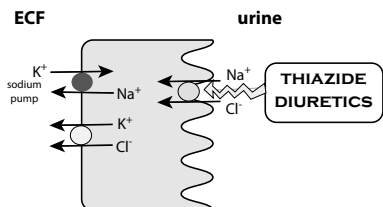
- **furosemide**
- **(hydrochlorthiazide)**
- **(mannitol)**

22



23

early DCT



24

thiazides

- **many drugs available**
 - hydrochlorothiazide
 - bendrofluazide, etc
- **moderately potent**
- **cheap**

25

thiazide side effects

- **hypokalaemia**
 - digoxin!!
- **metabolic alkalosis**
- **increased plasma uric acid**
- **hyperglycaemia**

26

kinetics

- **always given po**
- **onset 1 - 2 hours**
- **peak effect 4 - 6 h**
- **duration 8 - 12 h**

27

indications

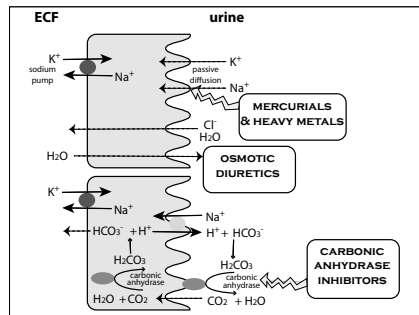
- **mild / moderate heart failure**
- **(diabetes insipidus)**

28

osmotic diuretics

- mannitol
- glycerol
- glucose

29



30

mannitol

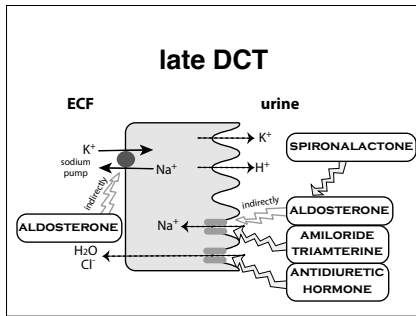
- **indications**
 - glaucoma
 - cerebral oedema
 - acute renal failure
- **contraindications**
 - heart disease
- **caution**
 - **must** be given iv

31

K^+ sparing diuretics

- amiloride
- triamterene
- spironolactone

32



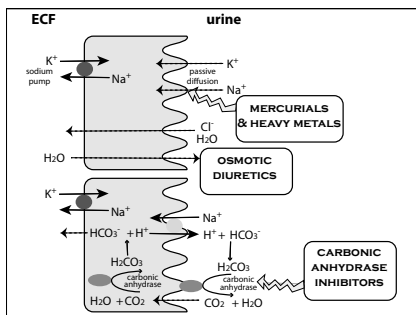
33

- K^+ sparing diuretics**
- weak diuretics
 - expensive
 - caution with ACE inhibitors
 - rarely used in animals

34

- CA inhibitors**
- acetazolamide
 - (dorzolamide - eye drops only)

35



36

CA inhibitors

- **weak diuretics**
- **rarely used as diuretics**
 - used for glaucoma
- **cause mild metabolic acidosis**

37

diuretics

- frusemide most important
- main indication - oedema
- very potent - beware overdose
- hypokalaemia potentiates digoxin
- do not use in horses about to race
- mannitol - beware accidental perivascular injection

38