

The diagram illustrates the layers of the adrenal gland and the hormones produced by each layer. The layers are Medulla, Reticularis, Fasciculata, and Glomerulosa. The Medulla produces Testosterone (sex). The Reticularis produces DHEA, which is converted to ACTH, leading to Testosterone (sex). The Fasciculata produces Glucocorticoids, which are converted to ACTH, leading to Cortisol (sugar). The Glomerulosa produces mineralocorticoids, which are converted to RAAS, leading to Aldosterone (salt). A pink arrow at the bottom points from Testosterone to Aldosterone, indicating a common pathway.

Layer	Hormone	Function
Medulla	Testosterone	(sex)
Reticularis	DHEA	↓ ACTH
Fasciculata	Glucocorticoid	↓ ACTH
Glomerulosa	mineralocorticoid	↓ RAAS
	Cortisol	(sugar)
	Aldosterone	(salt)

- Na^+ & H_2O absorpⁿ
Intra- vasc. - fluid
maintain BP
- loss of K^+
- loss of H^+

Hypertension

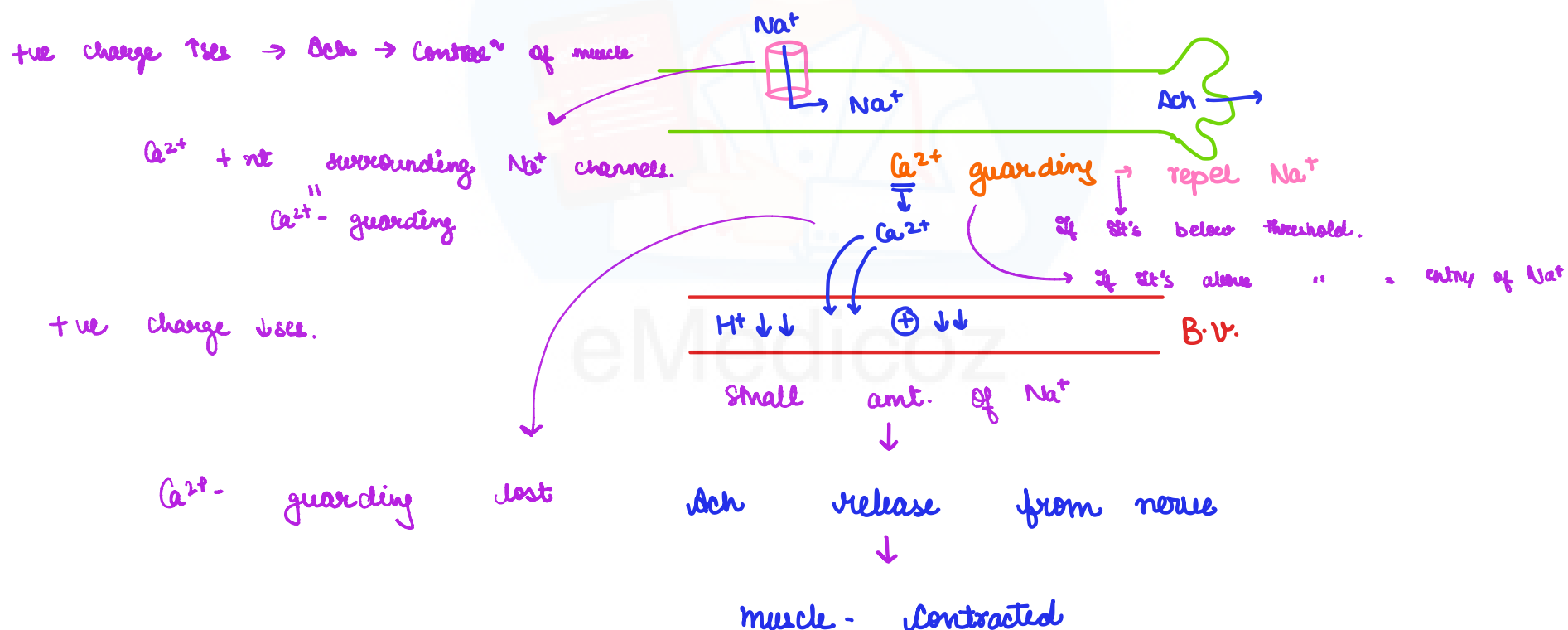
Hypotension

Hypokalaemia

Hyperkalaemia

- Cardiac arrhythmias
- Paralysis

$H^+ \downarrow$ = metabolic alkalosis metab. acidosis
 ↓
 cramps in muscle



Adrenal Insufficiency



Addison's disease

Cause - TB adrenalitis

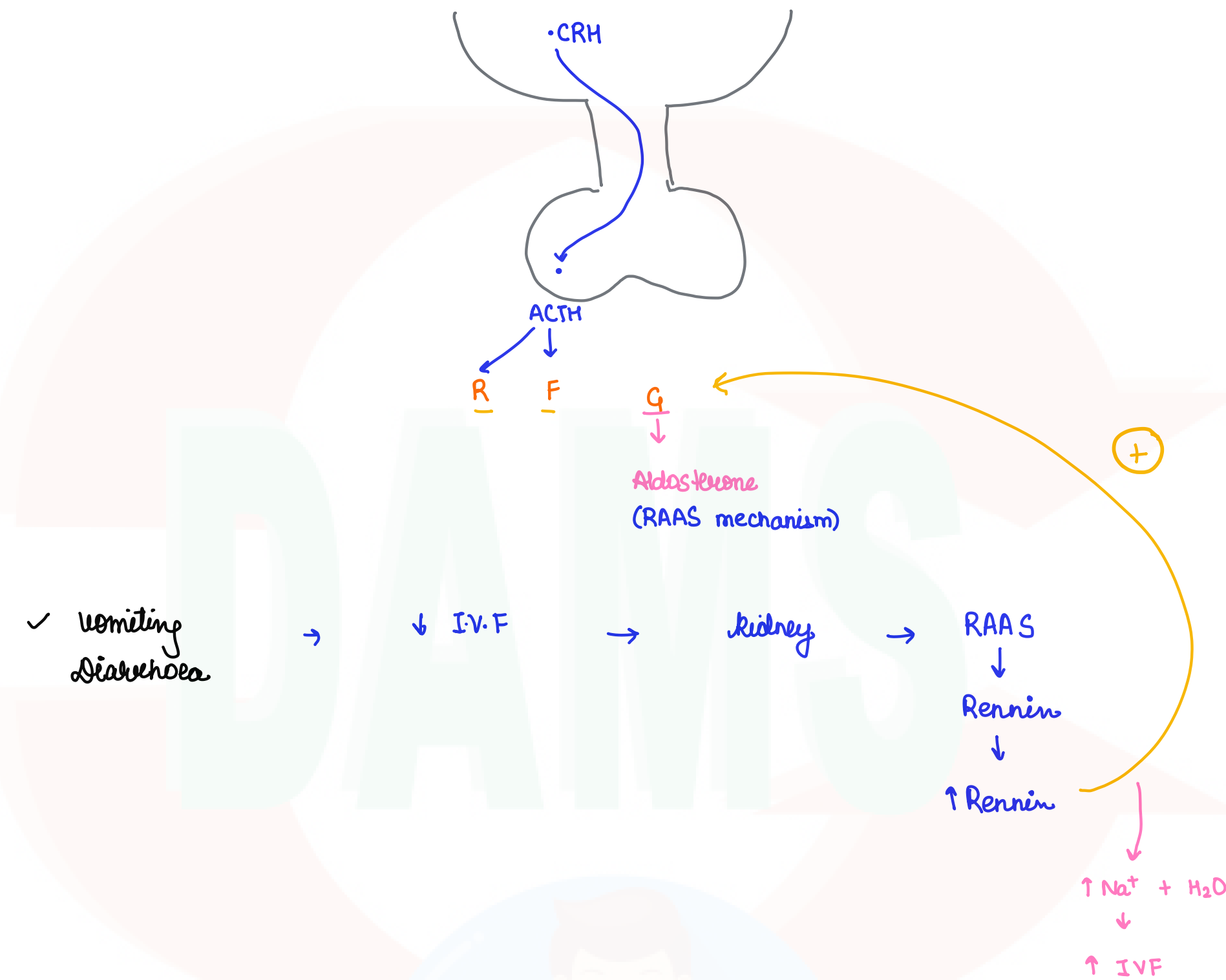
Auto-Immune adrenalitis

Causes - Pituitary defect (m/c)

Hypothalamic defect



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1° Adrenal Insuff.	2° Adrenal Insuff.
↓ Testosterone ↓ Cortisol ↓ aldosterone	↓ Testosterone ↓ Cortisol N Aldosterone
↑ ACTH ↑ Rennin	N ACTH N Rennin

C/F - hyper - pigmentation of skin.

Abnormal - color - Pale - skin
" Pallor Taut Anemia "

C.S.

Pt. c/o - weakness, Pallor.
Hb - 13 gm/dl

{ Abductor - color - Pale - skin }

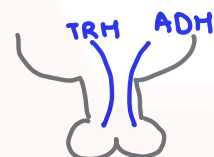
Ans: Cause of Pallor - 2 out anemia → 2° Adrenal Insuff.

∴ C/F →

↓ Cortisol

→

Weight loss
Hypoglycemia
low BP
↑ TSH
Hyponatremia



↑ TSH ADH ↑

↓
reabsorpⁿ of H₂O

↓
dilutional hyponatremia

↓ Androgen Insuff.

→

loss of libido
loss of axillary hair & pubic hair

↓ Mineralocorticoid

→

low BP
salt craving
Hypo - Na⁺ - emia
Hyper - K⁺ - emia

∴ Management →

PROTOCOL

Clinical symptoms +

↓

If after 30 To 60 mins Inj. of COSYNTROPIN (CRH) i.m/i.v
Cortisol (<500 nmol/L) means adrenal failure (1°/2°)

$\uparrow$ - ACTH
 $\uparrow$ - Renin
 $\downarrow$ - Aldosterone

1° Adrenal Insuff.

ACTH $\rightarrow$ $\downarrow$
 Renin $\rightarrow$ n
 Aldosterone $\rightarrow$ n

2° Adrenal Insuff.

Rx -

1° Adrenal Insuff.

Glucocorticoid
 +
 mineralocorticoid
 (Fludrocortisone)

2° Adrenal Insuff.

Glucocorticoid

Acute Adrenal Insufficiency $\rightarrow$

- more freq. seen in 1° Adrenal Insuff.

C/F $\rightarrow$

1.) Postural hypotension may progress to hypovolemic shock.

Infection symp. $\rightarrow$

2.) Acute vomiting, abdominal pain, tenderness, nausea, fever

3.) decreased responsiveness progressing to stupor and coma.

4.) Triggered by illness, surgical or other stress.

Rx $\rightarrow$

Rehydration $\rightarrow$ Saline Infusion 1 ltr. 1 hr.

Glucocorticoids → Inj. Hydrocortisone 100mg (i.v. stat)
↓ #1b
100mg-200mg over 24 hours Cont. Infusion

Mineralocorticoids →

Initiate	once	daily	when	he
hydrocortisone	close	↓ sed	To	< 50 mg
as	high	close	hydrocort	stimulate
mineralocorticoid .				

Chronic Adrenal Insuff. →

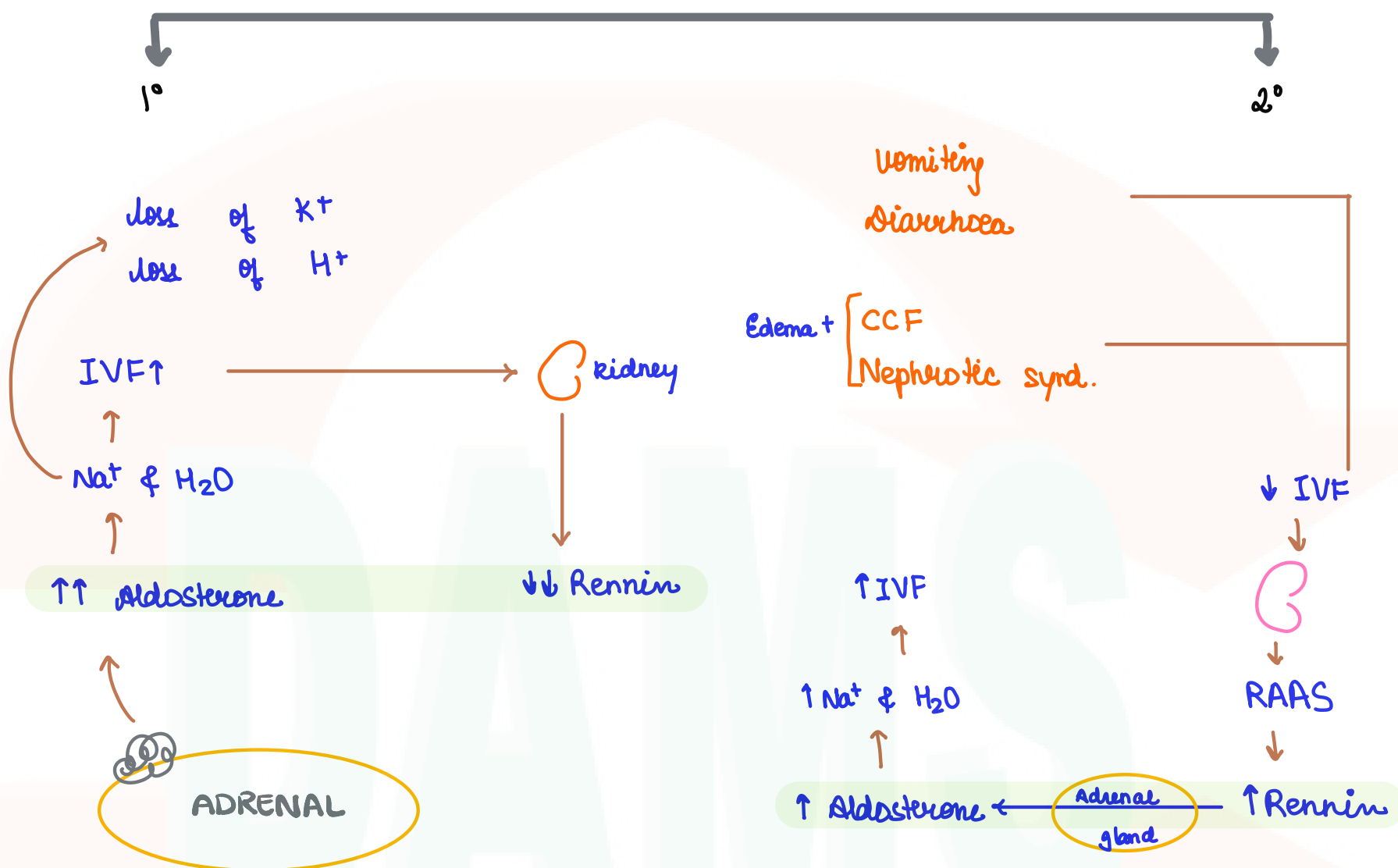
 $R_x \Rightarrow$

Oral Hydrocortisone 15-25 mg B.D or Tds
(long acting not preferred bc2. they result in glucocorticoid exposure)

Mineralocorticoid replacement → Hydrocortisone 100-150 mcg.

Adrenal androgen replacement → DHEA 25-50 mg OD.

HYPER ALDOSTERONISM



- Edema → not in 1° Hyperaldosteronism.

Aldosterone escape therapy →

- ↑ Aldosterone → ↑ Na⁺ & H₂O → ↑ IVF

↑ workload on heart

prevents Edema formation

loss of Na⁺ & H₂O

natriuretic peptide

ANP → Atrial
BNP → Brain

ventricles of heart

1° - HYPER - ALDOSTERONISM

Causes →

- m/c → B/d micro nodular hyperplasia
- Adrenal adenoma (CONN'S SYNDROME)

C/F →

HTⁿ
Hypo Kalaemia
↓ H⁺
no edema

Investigations -

Screening Test -

ratio of $\frac{\text{Plasma Aldosterone}}{\text{Plasma Renin activity}}$ (PA) (PRA)

$\frac{PA}{PRA} > 30$ with PA > 20 ng/dl.

Confirmatory test →

- 1) Saline - Infusion - test
- 2) Oral - sodium - loading - test
- 3) Hydrocortisone suppression test

CT- Abdomen



Drugs :

1.) mineralocorticoid - R- antagonist

- Spironolactone
- Eplerenone

2.) Na^+ - channel - blockers
- Amiloride



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