PH abnormalities & ABG

MCQs

هاي المحاضرة جداً مهمة !!
و عليها كثير اسئلة سواء بالفاينال او الميني

- one is a cuase of anion gab metabolic acidosis?

Salicylate poisoning

Aspirin poisoning (Salicylates are a type of drug found in many over-the-counter and prescription medicines. Aspirin is the most common type of salicylate)

- All are causes of high anion gap metabolic acidosis except:

Renal tubular acidosis ✓

- Wide -high- anion gap except :

-Ethanol
-sepsis
-renal tubular acidosis

- An 84-year-old female nursing home resident is brought to the emergency department due to lethargy. Atthe nursing home, she was found to have a blood pressureof 85/60 mmHg, heart rate 101 beats/min, temperature 37.8°C. Laboratory data are obtained: sodium 137 meq/L, potassium 2.8 meq/L, HC03 - 8 meq/L, chloride 117 meq/L, BUN 17 mg/dL, creatinine 0.9 mg/dL. An arterial blood gas shows Pa02 80 mmHg, PC02 24 mmHg, pH 7.29. Her urine analysis is clear and has a pH of 4.5. What is the acid-base disorder?

a. Anion-gap metabolic acidosis
b. Non-anion gap metabolic acidosis
c. Non-anion-gap metabolic acidosis and respiratory alkalosis d. Respiratory acidosis
e. Respiratory alkalosis

B , anion gap = 137 - 125 = 12 , within normal range , non-anion gap
Low PH —> acidosis
Low PCO2 , low HCO3- —> metabolic acidosis
Then , B is true answer

- Apatient presents with a decreased level of consciousness and visual difficulties. Bloodwork reveals an anion gap of 22 and an osmolar gap of 24. Which of the following is most likely responsible?

a. Ethanol
b. Salicylates
c. Renal tubular acidosis type I
d. Methanol
e. Diabetic ketoacidosis

- **Which of the following is not associated with an anion gap metabolic acidosis?**

a. Diabetic ketoacidosis
b. Tissue hypoxia
c. Renal failure
d. Diuretics therapy
e. Isoniazid toxicity

- **Not normal anion gap acidosis :**

renal failure

- **Low co2 , Low Hco3 & ph= 7.1**

Metabolic acidosis

- **Metformin**

- lactic acidosis

- **All the following cause normal anion gap metabolic acidosis, except:**

a. Spironolactone
b. Diarrhea
c. Vomiting
d. Acetazolamide
e. Primary hyperparathyroidism

Acid-base balance — High concentrations of PTH inhibit proximal tubular bicarbonate reabsorption, which tends to cause a mild metabolic acidosis. However, this effect is usually counterbalanced by the alkali liberated as a result of increases in bone resorption and in tubular reabsorption of bicarbonate caused by hypercalcemia [85,86]. Thus, metabolic acidosis is unusual in PHPT unless serum PTH concentrations are very high or the patient has coexistent renal insufficiency.

Acetazolamid (Carbonic anhydrase inhibitos cause normal anion gap metabolic acidosis)

Spironolactone blocks actions of Aldosterone. Therefore, H is retained. "Other recognized side effects of spironolactone include diarrhea and hyperchloremic metabolic acidosis, especially in patients with a prior history of renal insufficiency.3 A few case reports have been published discussing type 4 renal tubular acidosis (RTA) developed by patients while taking spironolactone.4,5"

Answer: C (not sure... Because Wikipedia: A less frequent occurrence results from a vomiting of intestinal contents, including bile acids and HCO_3^-, which can cause metabolic acidosis.)

C is most probable answer bcz vomiting causes mainly alkalosis

- All of the following are associated with hypokalemia and alkalosis, except:

a. Bartter syndrome (???) [Yes Hypokaemia + alkalosis a disorder due to a defect in active chloride reabsorption in the loop of Henle; characterized by primary juxtaglomerular cell hyperplasia with secondary hyperaldosteronism, hypokalemic alkalosis, hypercalciuria,
elevated renin or angiotensin levels, normal or low blood pressure, and growth retardation; edema is absent. Autosomal recessive inheritance, caused by mutation in either the Na-K-2Cl cotransporter gene (SLC12A1) on chromosome 15q or the K(+) channel gene (KCNJ1) on 11q.
b. Furosemide Yes
c. Diabetes (If they are talking about DKA Hypokalemia and acidosis, so this should be the answer ?
d. Nasogastric tube suction Yes (loss through upper GI of K and Hydrogen)
e. Thiazides Yes

- All of the following electrolyte and acid-base disturbances may be seen in a patient with diabetic ketoacidosis upon presentation, except:

a. Hyponatremia
b. Normal anion gap metabolic acidosis
c. Hyperkalemia
d. Hyperphosphatemia
e. Increased urea

Answer: B (DKA causes high anion gap metabolic acidosis)

- 49 year old female is evaluated in ER after being found lying in the street in a semiconscious state , she is known to have hypertension and a history of seizures. Lab : BUN 79 mg/dl , Cr 8.7 mg/dl , Na 138 meq/l , K 4.2 meq/l , Cl 60 meq/l , HO3 54 meq/l . ABG PH 7.43 , PCO2 85 mmHg. Which of the following Acid Base disorder is most compatible with these lab findings

a) Metabolic Acidosis and Metabolic Alkalosis
b) Metabolic Acidosis and Respiratory Acidosis
c) Metabolic Acidosis and Metabolic Alkalosis and Respiratory Acidosis
d) Metabolic Alkalosis and Respiratory Acidosis
e) Metabolic Acidosis

- ABG respiratory alkalosis?

Asthma

- **Which one of the following arterial blood gas sets on room air is compatable with completely compensated metabolic acidosis?**

	A	B	C	D	E
PH	7.44	7.38	7.60	7.36	7.56
PaC02 mmHg	26	25	25	95	40
Bicarb. mEq	18	15	24	49	34
B. Excess	-4.0	-10	+4	+15	+11

The pH must be normal. Therefore, exclude "E" and "C". The correction will be respiratory in the form of "washed-out" CO2 need to be low. Therefore, exclude D. Bicarbonate will be low. The remaining options are A & B.

- **35 year old man presented to ER after an episode of Grand mal seizure and by exam he was afebrile , Bp 130/95 and confused .**

Labs showed : Cr 1.0 mg/dl , BUN 12mg/dl , Na 140 meq/L , K 4.8 meq /L , Cl 100 meq/L , HCO3 12 meq/L . ABG : PH 7.25 , PCO2 28 mmHg , HCO3 12 meq/L .
Which of the following is the most appropriate initial treatment for the Metabolic Acidosis :
a. Observation and repeat ABG in 2 hours ?
b. NaHCO3 2 ampoules (100 meq) by Iv push ?
c. 1 L of 5 % dextrose in H2O & HCO3 3 ampoules (150 meq) infused over 3 hours
d. Hemodialysis Fomepizole

- **The following statements about potassium balance is true except?**

a- 85% of the daily potassium intake is excreted in urine
b- Intracellular potassium ion concentrations are about 150 mmol/l
c- Cellular uptake of potassium is enhanced by adrenaline and insulin
d- Alkalosis predispose to hyperkalemia
e- The normal dietary potassium is about 100 mmol/day

- Complications of chronic renal failure include all of the following except?

a. Normocytic or microcytic anemia
b. Peripheral neuropathy
c. Bone pain
d. Uremic pericarditis
e. Metabolic alkalosis and hypokalemia

- medical student while taking the internal medicine exam suffered from tachypnea and anxiety, in the emergency laboratory investigation Ph=7.52, co2=22 , HCO3=24, which of the following is correct ?

A. Acute Metabolic alkalosis
B. Chronic Respiratory alkalosis
C. chronic Metabolic alkalosis
D. Acute Respiratory alkalosis

- PH 7.51..PaCO2 : 24...caculated bicarb 24 , ABG :

respiratory alkalosis

- adrenal insufficiy wrong >

metabolic alkalosis

- A 20-year-old male presented to you with generalized weakness. Labs showed:

a. Dlarrhea
b. Spironolactone
c. Recovery from DKA
d. Thiazide diurectic
e. Amiloride

Ans: D (Thiazide diuretic cause metabolic alkalosis)

- Type II respiratory failure is likely to be present in a patient with the following ABGs:

a. Hypoxia, Hypercapnia, low pH

- **Which of the following ABG parameters are CORRECT in chronic type II respiratory failure?**

a. PH 7.25, paC02 52.5 mmHg, pa02 56 mmHg, HC03 30 mmol/L.
b. PH 7.10, paC02 52.5 mmHg, pa02 62 mmHg, HC03 24 mmol/L.
c. PH 7.30, paC02 30 mmHg, pa02 63.7 mmHg, HC03 15 mmol/L.
d. PH 7.36, paC02 30 mmHg, pa02 50 mmHg, HC03 22 mmol/L.
e. PH 7.54, paC02 22.5 mmHg, pa02 90 mmHg, HC03 24 mmol/L.

Chronic type II respiratory failure is characterized by long-term retention of carbon dioxide (CO_2) with compensatory metabolic alkalosis. Therefore, the correct option should have a high $paCO_2$ (partial pressure of carbon dioxide) and an elevated bicarbonate (HCO_3) level.
Among the options provided:
a. PH 7.25, $paCO_2$ 52.5 mmHg, paO_2 56 mmHg, HCO_3 30 mmol/L: pH is low, $paCO_2$ is high, and HCO_3 is high. This matches the criteria for chronic type II respiratory failure.
b. PH 7.10, $paCO_2$ 52.5 mmHg, paO_2 62 mmHg, HCO_3 24 mmol/L: pH is low, $paCO_2$ is high, but HCO_3 is normal.
c. PH 7.30, $paCO_2$ 30 mmHg, paO_2 63.7 mmHg, HCO_3 15 mmol/L: pH is normal, $paCO_2$ is low, and HCO_3 is low. This doesn't match the criteria for chronic type II respiratory failure.
d. PH 7.36, $paCO_2$ 30 mmHg, paO_2 50 mmHg, HCO_3 22 mmol/L: pH is normal, $paCO_2$ is low, and HCO_3 is normal.
e. PH 7.54, $paCO_2$ 22.5 mmHg, paO_2 90 mmHg, HCO_3 24 mmol/L: pH is high, $paCO_2$ is low, and HCO_3 is normal.

So, the correct option is:a. PH 7.25, $paCO_2$ 52.5 mmHg, paO_2 56 mmHg, HCO_3 30 mmol/L.

- **25 year old female was admitted to hospital with referred to OPD due to incidental finding of the following labs & ABG :**

PH 7.32 , HCO_3 15
Cr 1.0 mg/dl , urea 35 meq/l , Na 135 meq /L , Cl 110 meq/l All the following may cause the above except :
a) Acetazolamide treatment
b) Fanconi syndrome
c) Treatment with Thiazide
d) Primary hyper parathyroid
e) Diarrhea

- **DKA all except..**

No change in anion gap

Mini-OSCE

Classification of RF

Type 1

- Hypoxemic RF **
- PaO2 < 60 mmHg with normal or ↓ PaCO2
- Associated with acute diseases of the lung
- Pulmonary edema (Cardiogenic, noncardiogenic (ARDS), pneumonia, pulmonary hemorrhage, and collapse

Type 2

- Hypercapnic RF
- PaCO2 > 50 mmHg
- Hypoxemia is common
- Drug overdose, neuromuscular disease, chest wall deformity, COPD, and Bronchial asthma

HYPOXAEMIC TYPE I	VENTILATORY TYPE II
ABG CHANGES: • PaO_2 ↓ *(< 60 mmHg / 8.0 kPa)* • $PaCO_2$ normal or ↓ *(<50 mmHg /6.7 kPa)* • $PA\text{-}aO_2$ ↑	**ABG CHANGES:** • PaO_2 ↓ *(< 60 mmHg / 8.0 kPa)* • $PaCO_2$ ↑ *(> 50 mmHg /6.7 kPa)* • $PA\text{-}aO_2$ normal • pH↓ *(Acidosis)*

Q5 - A 66 year old male smoker with exertional dyspnea and dry cough. What finding is expected in this patients' ABG's?

a. Low bicarbonates

b. Respiratory acidosis

c. Type 1 respiratory failure

d. Metabolic acidosis

e. Type II respiratory failure

Q17 : ABG question , the date given with two different units for each parameter , **Note that** we use the Unit mmHg for (PCO2 & PO2) and meq/L for (HCO3-) in the interpretation we used to !

The answer was :
(**partialy compensated respiratory acidosis**)

So : PH and PCo2 HCO3-

Station 12

Q : calculate anion gap

- **ABG :**
  - **Na : 150**
  - **K : 5 ✕🤔**
  - **Cl : 110**
  - **Hco3 :25**

150 − 135 = 15

150+5-110 -25 = 20

$$AG = Na^{+} - (Cl^{-} + HCO_3^{-})$$

AG: Anion gap, **Na^{+}:** Sodium, **Cl^{-}:** Chloride, **HCO_3^{-}:** Bicarbonate

Station 20

ABG Case :

-Dx :

Partialy compansated respiratory acidosis with hypoxemia

-Mension one cause ?

case 6 :what is your interpretation of this ABG

high anion gap metabolic acidosis with respiratory compensation

one of these can cause this disturba

lactic acidosis was the answer

- ABG Case
- Ph: 7.29
- Co2: 22
- hco3: 10
- Cl: 100
- Na: 145
- + other labs , normal values was given

RS SECTIONS

Q1 :Patient with this ABG Results :

The ABGs interpretation ?

-Partial compensated respiratory acidosis

*One of the following can’t cause this case ?

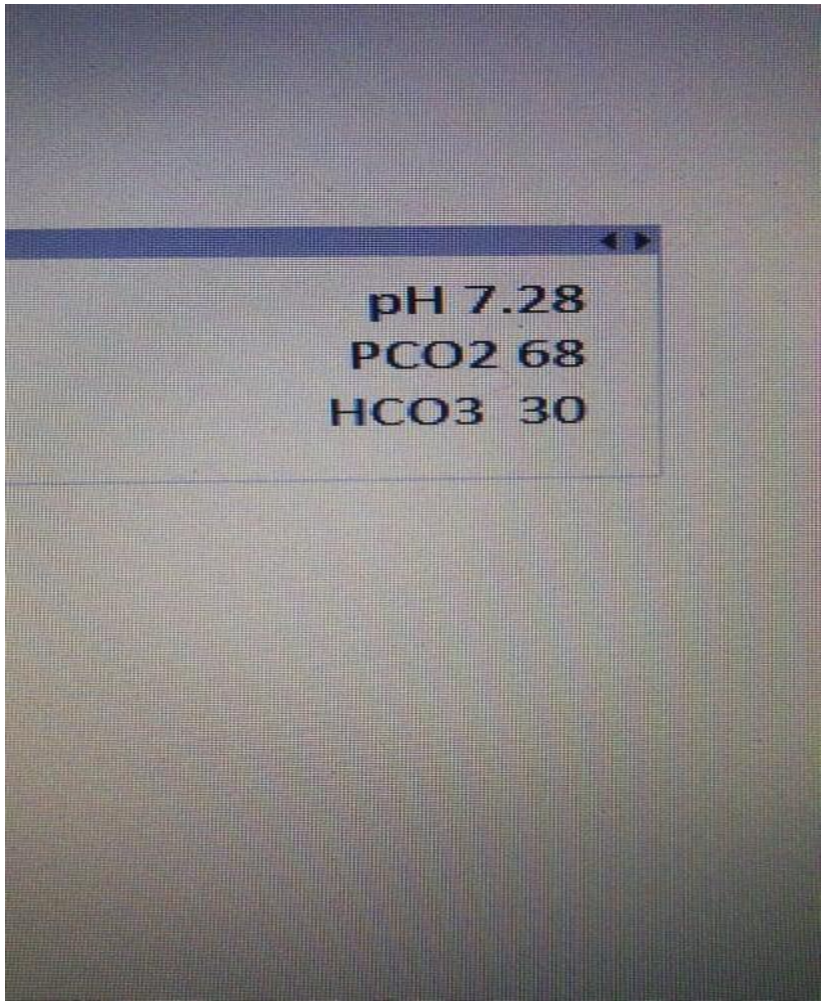
A . COPD

B. Pulmonary edema

C. guillain barre syndrome

D. Respiratoy muscle paralysis

E. Pulmonary Infarction



Q12) This is result of ABGs test, which one of the following is true :

PH	Low
PCO2	High
HCO3	High
O2 saturation	92%

سؤال الأمتحان كان معطي أرقام وكان موجود الـ **normal range** بالجدول

a) Partial compensated respiratory acidosis without hypoxemia

b) Partial compensated respiratory acidosis with hypoxemia

Q13)
Smoking patient for long time
ABGs result : Respiratory acidosis (from Table)

What is presentation of patient in PFTs is wronge?

a) FEV1/FVC ≥ 70%
b) FVC1 changes less than 12%
c) FEV1/FVC ≤ 70%
d) Irreversible condition

نص السؤال غير دقيق ولكن معطيات السؤال ونتائج الـ ABGs كانت
تدل على إنه مريض COPD و irreversible changes

ABGs: pH= 7.2

pCO2 = 22 mmHg

HCO3 = 28 mEq/L

SpO2 = 99.8%

Q21: ABGs interpretation:

- Metabolic acidosis with hyperoxemia.

Q22: Next step to determine the cause:

- Calculating anion gap

Heavy smoker patient presented with SOB

1) what is ABG finding you see (paritly compensated respiratory acidosis)
2) give me 3 causes for this condition (COPD, hypoventilation due drugs , PE)
3) give 3 line of treatment (steroid / SABA and LABA / ibratrobium)

- pH 7.34
- PO2 90
- PCO2 35
- Bicarb 18
- Na 136, Cl 100

Station 5

Medical student female came to ER

ANALYTE	Value
PH	7.50
PCO2	20mm Hg`
HCO3	24meq/L normal
SaO2	%88
PO2	70mm Hg`

Q1 : the oxygenation and acid base status ?

Respiratory Alkalosis with hypoxemia

Q2 : 2 causes for her condition ?

Panic attack ,

Q8) a 24 year old patient complaining of high fever and dry cough for 9 days , 2 days ago he developed dyspnea and hypoxia . a CXR was done for him and gave the following appearance .

what is your diagnosis ?

a) Covid19 pneumonia

b) Aspiration pneumonia

c) Lobar Pneumonia

What is presentation of patient?

a) Low PH, High PCO2, High HCO3, 88% O2

b) High PH, Low PCO2, Low HCO3, 88% O2

c) High PH, Low PCO2, Low HCO3, 92% O2

((السؤال كان معطي أرقام بدل من عبارات
(Low/High))

The image from Google !!