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NURSING OFFICER

**EMPLOYEES' STATE INSURANCE
CORPORATION**

Volume – 1

**FUNDAMENTALS OF NURSING, NURSING
AND DRUG STORE MANAGEMENT**



FUNDAMENTAL OF NURSING

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FUNDAMENTAL OF NURSING

* Intro ⇒

⇒ Florence Nightingale / founder of modern nsg
Also known as "Lady with the lamp"

Born → 12 May 1820 in Florence Italy

Died → 13 Aug 1910 parklane London england
UK (united kindom)

"International Nurses Day → 12 May"

⇒ The 1st nsg school was Florence Nightingale
training school St. Thomas Hospital London.

* Nursing → Comes Latin word "Nourice" that
means: ⇒

* To Nourish

* To Cherish

* To support

* To Good Health

Ion \rightarrow Atom \rightarrow charges \rightarrow $\begin{matrix} + \\ \downarrow \\ \text{Cation} \end{matrix}$ $\begin{matrix} - \\ \downarrow \\ \text{Anion} \end{matrix}$

Blood pH \rightarrow 7.35 - 7.45

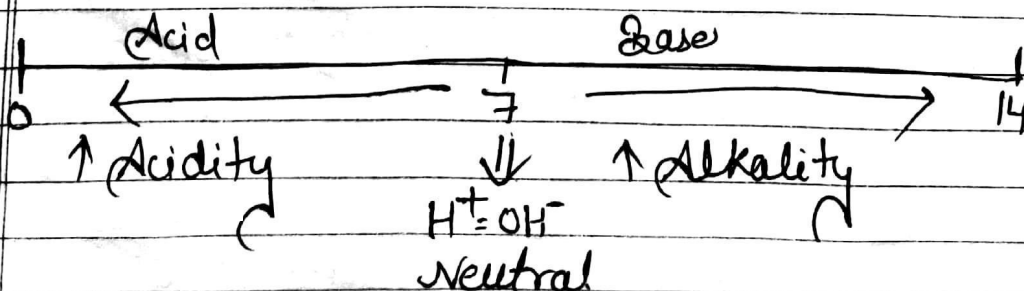
* Acid - Base Balance *

| Acid | Base |
|--------------------------------|--|
| ① They contain H^+ ion | ① They contain <u>Hydroxide ion</u> (OH^-) OR <u>Hydroxyl ion</u> (OH) |
| ② Denote H^+ (Hydrogen) | ② Denote OH^- |
| ③ OH^- acceptor | ③ H^+ acceptor |
| ④ pH \Rightarrow less than 7 | ④ pH \Rightarrow More than 7 |
| ⑤ Test \rightarrow Sour | ⑤ Test \rightarrow Bitter |
| ⑥ Eg \rightarrow HCl | ⑥ Eg \rightarrow NaOH |

* pH Scale

(Power of Hydrogen / Potential of Hydrogen)

* Invented By \Rightarrow Dr. Soren Sorenson (1909)



Homeostasis \Rightarrow Balance b/w in Internal or External Environment.
 \downarrow \downarrow
 Home Standing

* Formula of pH \Rightarrow

$$pH = \log \left(\frac{1}{H^+} \right) \quad pH = -\log H^+$$

DSSB
Q

$pH =$ Negative logarithm of Hydrogen ion

* ACID-BASE REGULATION \Rightarrow Maintain By Mechanism

① Chemical Regulation

② Physiological Regulation

③ K^+ Exchange

① Chemical Regulation \Rightarrow

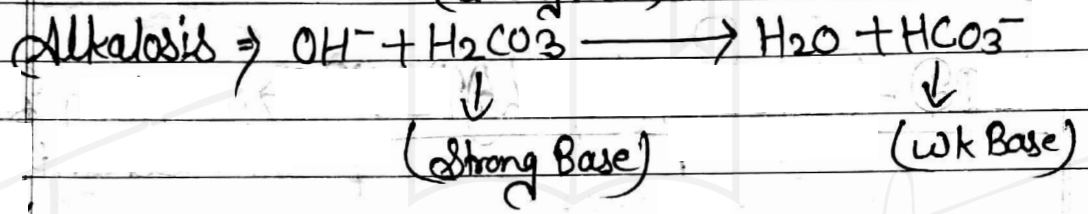
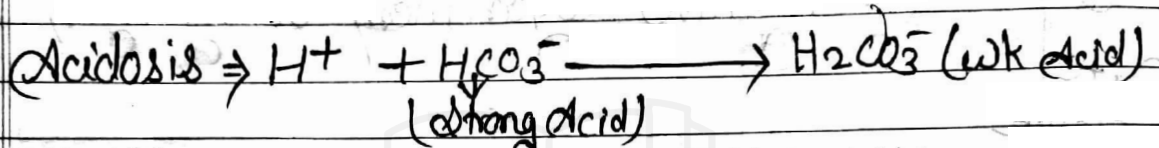
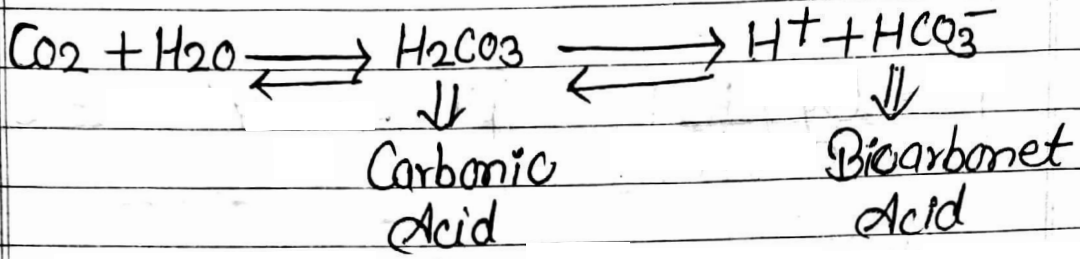
* Buffer \Rightarrow

A substance or group of substances which can absorb or donate Hydrogen ion (H^+) to correct acid-base imbalance.

Buffer system present in body \Rightarrow

- a) Bicarbonate + Carbonic acid
- b) Phosphate
- c) Plasma protein \rightarrow (Albumin)
- d) Hemoglobin

Q] Bicarbonet and Carbomic acid ⇒



⇒ Also known as primary Buffer

Q ⇒ Bicarbonate : Carbomic acid
20 : 1

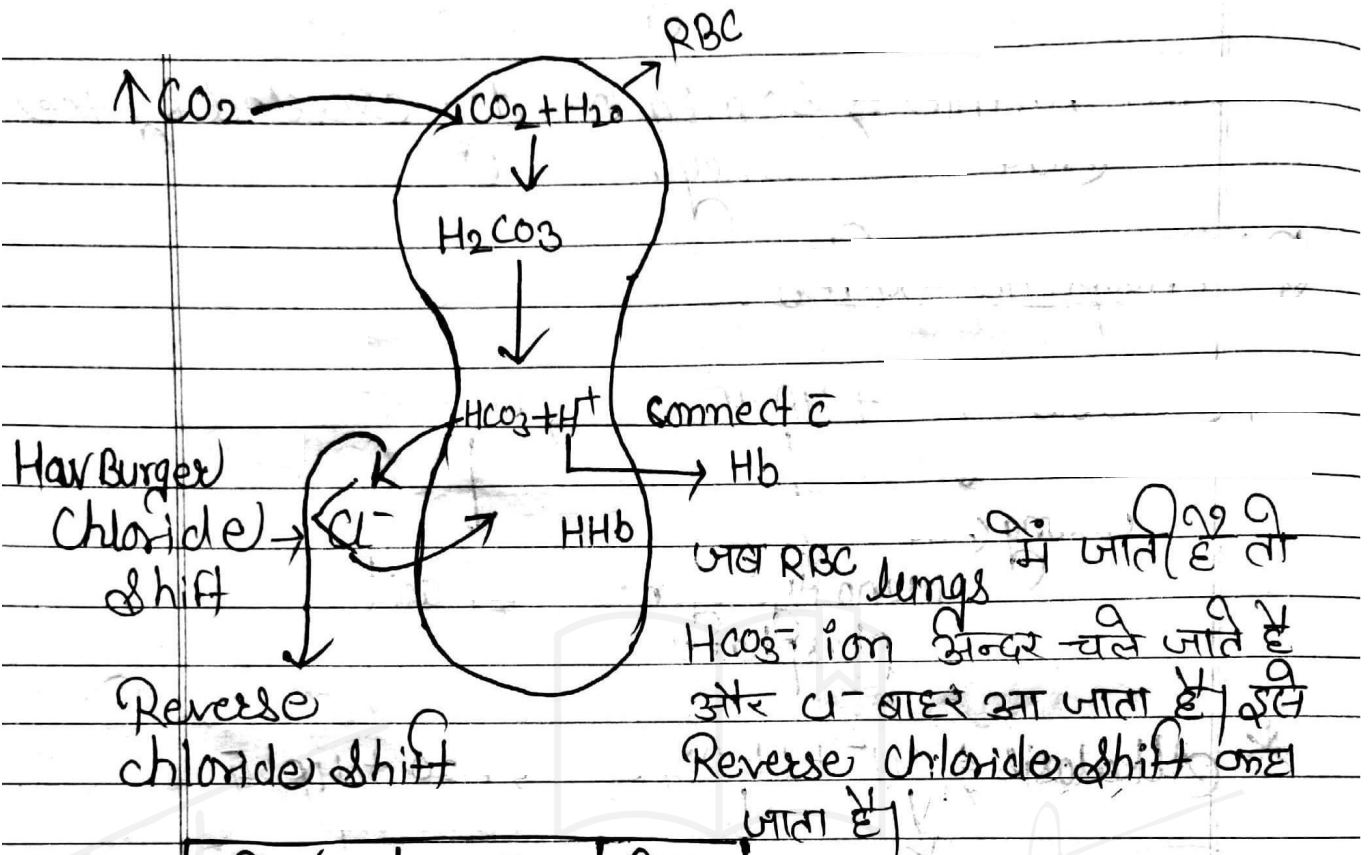
** Our Body maintain the pH 7.4 by 20 part Bicarbonate and 1 part Carbomic acid.

$$\frac{\text{HCO}_3^-}{20} : \frac{\text{H}_2\text{CO}_3}{1}$$

$$24 \text{ mEq/L} = 1.2 \text{ mEq/L}$$

* Q* Carbomic acid is controlled By lungs through excretion of Carbon-di-oxide

* Q* Bicarbonet is controlled By ~~kidney~~ kidney excretion through kidney.



| | Ion | ICF | ECF |
|--------|-------------------------------|-----------------|-----|
| Cation | K ⁺ | Na ⁺ | |
| Anion | PO ₄ ³⁻ | Cl ⁻ | |

② Physiological Mechanism →

(A) Respiratory Mechanism ⇒ By Lungs.

Acidosis ⇒ Rate/depth → ↑se → Hyperventilation

Alkalosis ⇒ Rate/depth → ↓se → Hypoventilation

90% Acid in Body

② Renal Mechanism \Rightarrow By kidney.

Acidosis \rightarrow

H^+ ion secreted into tubules and combined with Buffer and excreted in the form of urine.

Alkalosis \rightarrow

The bicarbonate secreted into tubules and combine with electrolyte (Na) and excreted in the form of urine.

③ K^+ Exchange

K play a exchange role to maintain acid-base balance

Acidosis \Rightarrow Hyperkalemia (More than 5 mEq/L) because H^+ ion inside and K^+ outside exchange



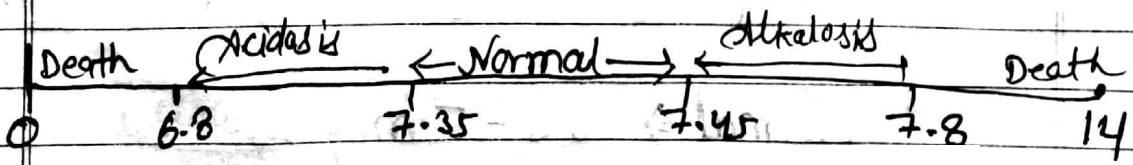
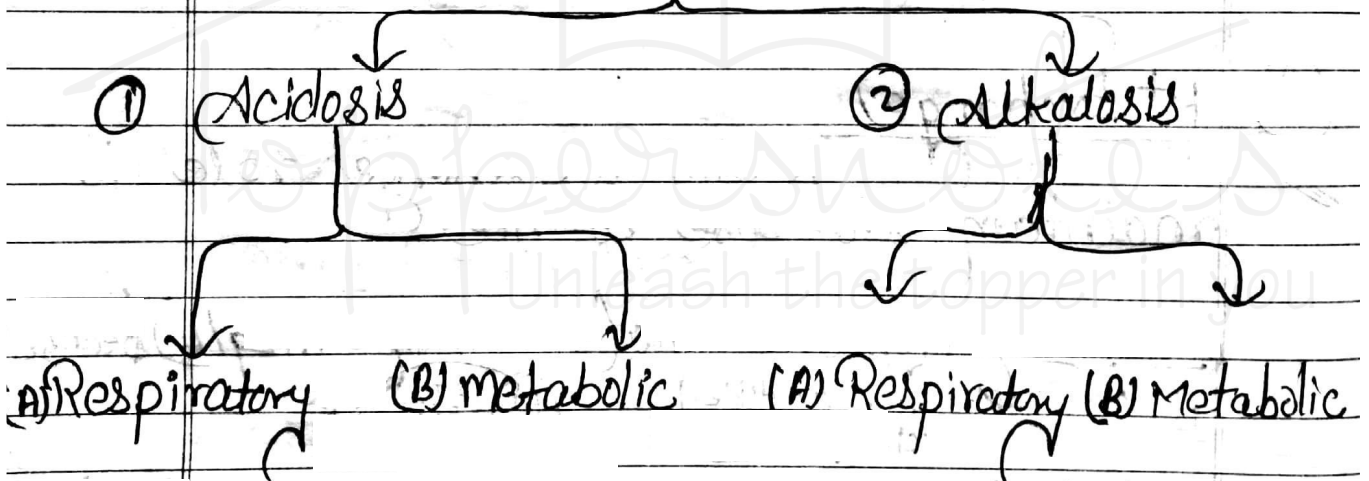
Alkalosis \Rightarrow Hypokalemia (Less than 3.5 mEq/L)

Normal \Rightarrow $3.5 - 5 \text{ mEq/L}$
Serum K^+ Level

* In acid-base imbalance monitor K level closely

In alkalosis H^+ ion ↓ & OH^- ion ↑ for correction alkalosis H^+ ions comes cell to outside of cell & K^+ go into the cell

* ACID-BASE IMBALANCE



(1) Acidosis

(A) Respiratory Acidosis

It is rise in H^+ ion due to alveolar Hypoventilation

Causes ⇒ Respiratory System Disorder

Eg ⇒ Asthma

COPD, Emphysema

Bronchiectasis, pulmonary edema,

pulmonary Embolism

Pneumonia.

(2) Brain Trauma

(3) CNS Depression Eg ⇒ Sedative

Cause ⇒ RBC ⇒ R ⇒ Respiratory System disorder

B ⇒ Brain Tumor

C ⇒ CNS Depression

Narcotics

Anesthesia.

(sleeping state)

CI/M ⇒

* Hypoventilation / Hypoxia

* Drowsiness, Dizziness, Disorientation
Headache, Coma

* Hypotension

* Dysrhythmia, warm flush skin

* Seizure.

Mgt ⇒

⇒ O₂ therapy

⇒ Semifowler's position

⇒ Suctioning

⇒ Hydration (→ Improve)

- ⇒ Antibiotic if Respiratory Infection
- ⇒ Encourage deep Breathing & Coughing.
- ⇒ ET intubation & Mechanical ventilation if respiratory distress present.

(B) Respiratory Alkalosis ⇒ ↓ use in H^+ ion due to alveolar Hyperventilation

* Causes ⇒ HOPF

H ⇒ Hypoxia

H ⇒ Hysteria

O ⇒ Overventilation by mechanical ventilator

P ⇒ pain

F ⇒ fever due to ↑ metabolic Rate

1°F = ↑10% OF Metabolism

* CIM ⇒

~~Comp~~ ⇒ Hyperventilation

⇒ Lethargy, Light Headache, Confusion

⇒ Nausea, vomiting, Epigastric pain

⇒ Tachycardia, dysrhythmias

~~Comp~~ ⇒ Tetany, Numbness, Tingling in Exterminities

⇒ seizures

Tetany → Due to deficiency of calcium

* Mg⁺ ⇒

- ⇒ Encourage appropriate breathing pattern
- ⇒ Voluntary hold of Breath

⇒ Use of Rebreather mask or CO₂ Breath By paper bag

⇒ Appropriate care of the pt. on mechanical ventilator.

⇒ Injection Calcium Gluconate → Pt tetony

(C) Metabolic Acidosis ⇒

* Definition ⇒ Rise in H⁺ ion due to abnormal metabolic process.

* Causes ⇒ DR.HIMES

D ⇒ Diabetes Mellitus / Ketoacidosis (DKA)

R ⇒ Renal Insufficiency / Acute kidney / Kidney Injury / Chronic (Kidney disease)

H ⇒ High fat diet
 → (oxidation → formed Ketone Body)
 ↳ (Impaired function of kidney + formation of uric acid)

I ⇒ Insufficient metabolism of CHO (Because Break CHO with ^{out} O₂ → formed Lactic acid + 2 ATP)

M ⇒ Malnutrition / Starvation

^{fat oxidation} E ⇒ Excessive Ingestion of Aspirin (Acetyl Salicylic Acid)

^{Imp} S ⇒ Fever Diarrhoea (Because Altimity alkaline juice excrete)

* C/M ⇒ Hyperventilation } Regular but ↑ rate and depth of Respiration
 Imp ⇒ Kussmaul's Respiration

⇒ Drowsiness, Confusion, Headache, Coma

⇒ Hypotension, warm flushed skin, Dysrhythmia
 (vasodilation)

⇒ Nausea, vomiting, Abdominal pain, Diarrhoea

* Mgt ⇒ Correct underlined Cause

(D) Metabolic Alkalosis ⇒

Def:

↓ use H⁺ ion due to abnormal metabolic process.

* Causes: → (MEDS) (Because ↑ amount of citrate and convert citrate → Bicarbonate)

M ⇒ Massive Blood transfusion

E^{Imp} ⇒ Excessive vomiting / GI suctioning / Antacid
 (outside acid) → (inside Base) → alkalois

D ⇒ Diuretics

H ⇒ Hyperaldosteronism

(due to excessive aldosterone and excrete excessive H⁺ ion out of Body)

I \Rightarrow Retention / Infusion of Excess CO_2 bicarbonate

C/M \Rightarrow

Imp \Rightarrow Hypoventilation

\Rightarrow Drowsiness, Nervousness, Confusion

\Rightarrow Tachycardia, Dysrhythmia

\Rightarrow Anorexia, Nausea, vomiting

Imp \Rightarrow Tetany, Tremors, muscle cramp, tingling
in Extremities. \downarrow Involuntary
(jerky movement)

\Rightarrow seizure

Mgt

\checkmark Correct / treat underlying causes.

* Acidosis and Alkalosis is diagnosed / checked
By the ABG Analysis \Rightarrow

A \rightarrow Arterial

B \rightarrow Blood

G \rightarrow Gas

* ABG Analysis ⇒

⇒ Sample from Arterial Blood

⇒ Sample collect by the → Radial Artery /
Brachial Artery /
Femoral Artery /
~~Radial Artery~~

Normal value ⇒

primary parameters ⇒ * pH → 7.35 - 7.45
* P_{CO_2} → 35 - 45 mmHg
 P_{O_2} → 80 - 100 mmHg
* HCO_3^- - 22 - 27 mEq/L

→ $Hb \rightarrow O_2$

secondary parameter ⇒ $SO_2 = 95 - 100\%$
Base Excess = -2 to +2 mmol/L

① Pulse oxymeter checked by → SO_2

⇒ Sample collect by the radial artery
Allen's test is done.

Before

* Allen's test ⇒

The test is performed to determine collateral circulation in hand & adequacy of ulnar artery

procedure ⇒ apply pressure over radial and

Ulnar artery

- ⇒ Ask pt to open and close the hand
- ⇒ Release pressure from ulnar artery

** If pinkness fail to reappear in 6-7 sec., sample should not be drawn from radial artery (Allen's negative) (collect)

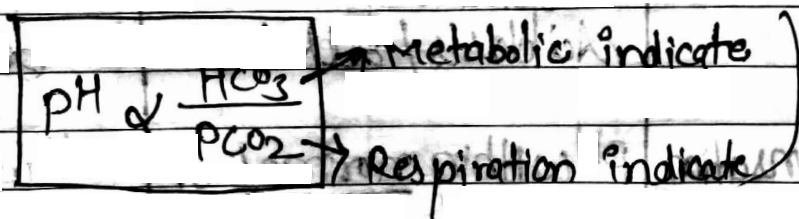
- ⇒ Drawn sample if Allen's test positive.
- ⇒ Use heparinized syringe to draw the sample.
(sample → 5-7 ml)

Respiratory Acidosis → $\text{pH} \downarrow$, $\text{pCO}_2 \uparrow$

Respiratory Alkalosis → $\text{pH} \uparrow$, $\text{pCO}_2 \downarrow$

Metabolic Acidosis → $\text{pH} \downarrow$, $\text{HCO}_3 \downarrow$

Metabolic Alkalosis → $\text{pH} \uparrow$, $\text{HCO}_3 \uparrow$



7.31

Eg ⇒ ABG
①

$\text{pH} \rightarrow 7.49$

$\text{pCO}_2 \rightarrow 30$

$\text{HCO}_3 \rightarrow 25$

Ans → Respiratory Alkalosis.