





Take a decision: **Dialysis**

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What?



PATIENT BLOOD

Membrane

Solute

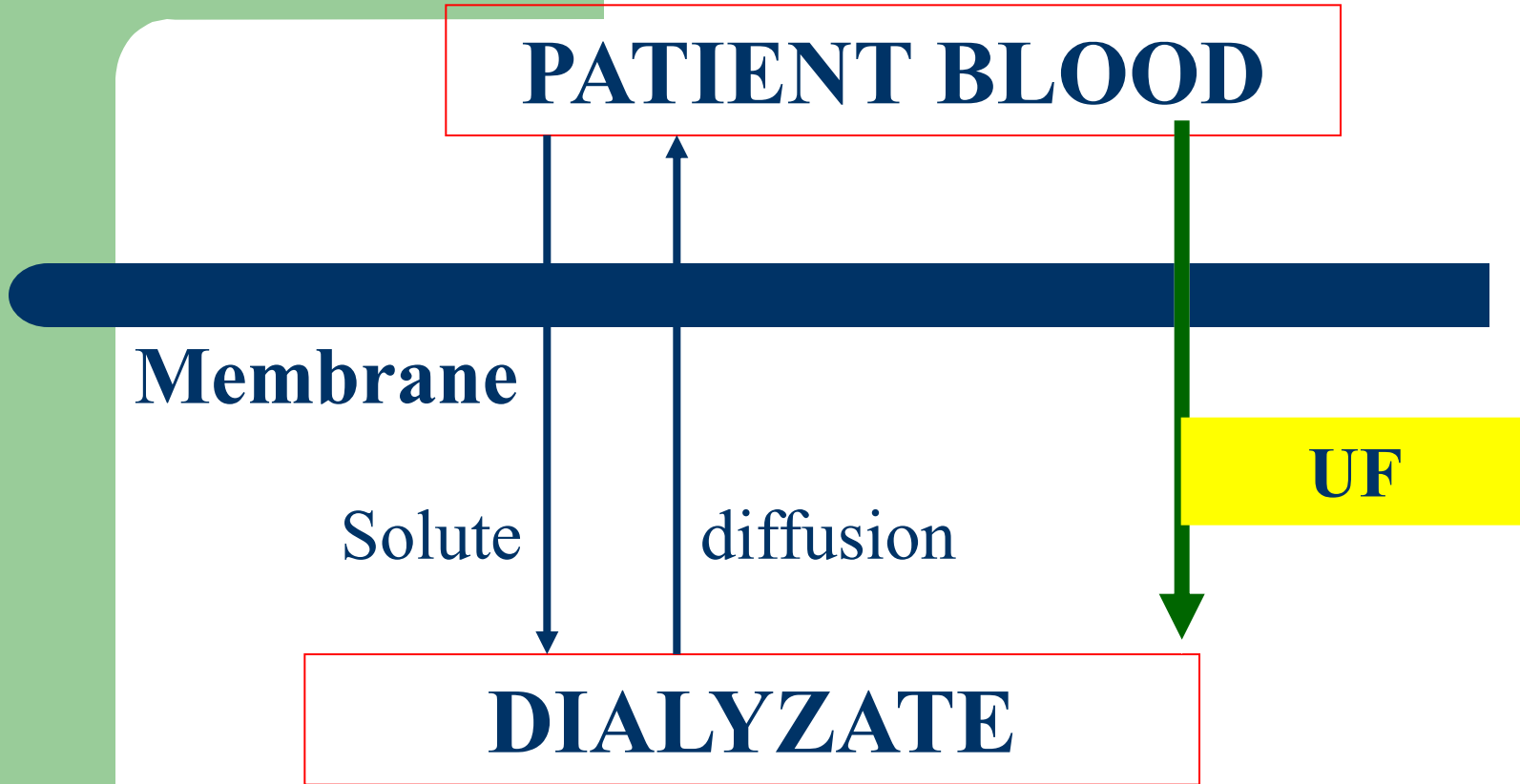
diffusion

UF

DIALYZATE

ULTRAFILTRATION

**Water removal along P
gradient**



ULTRAFILTRATION

Water removal along P gradient



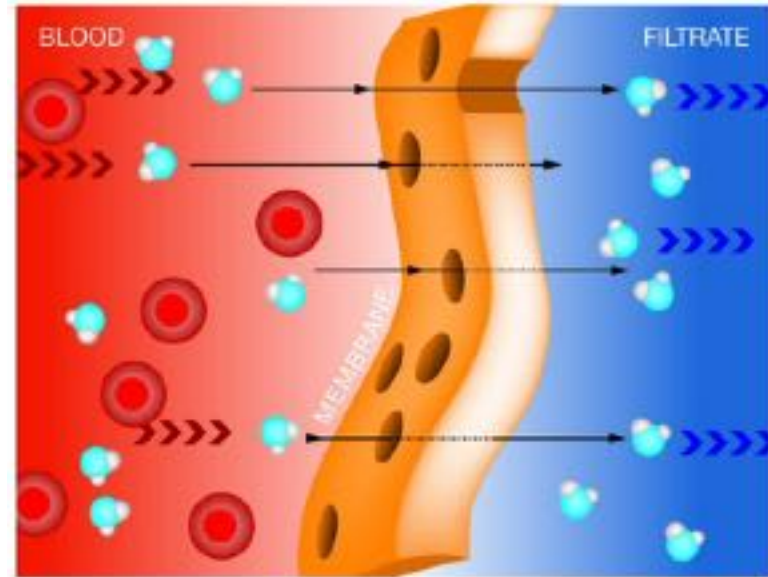
NOT JUST WATER

CONVECTION

Removal of solutes dissolved in Ultrafiltrate

-Dependent on uF rate

-Larger molecule advantage



When?

- **Remove solutes**
- **Remove water**

***Failure of conservative
management***

When?

Failure of conservative management

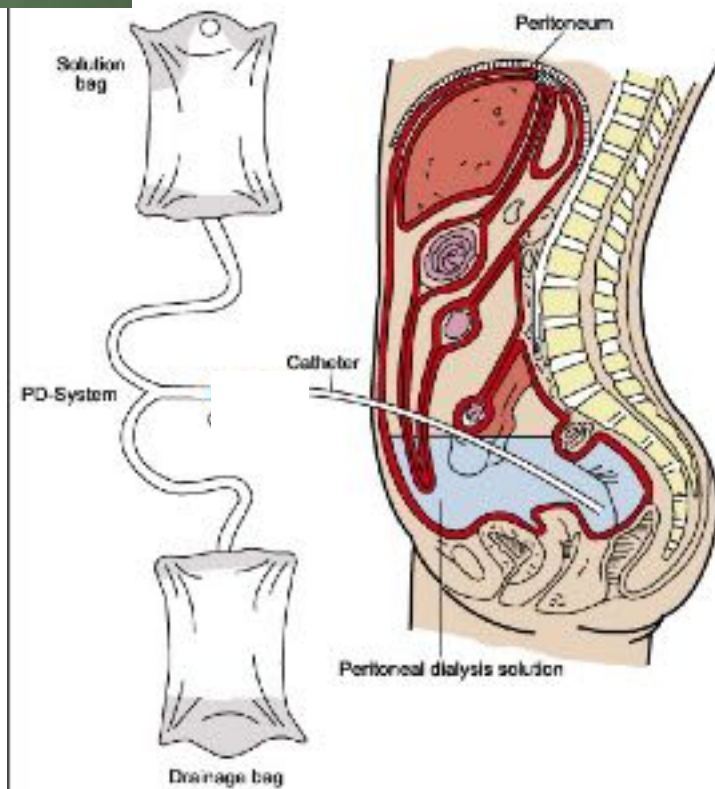
- **Tried and unsuccessful**
- **Will take too long**
- **Strongly expected to fail**
- **Another clear indication**

How?



PIRRT

Principle of Peritoneal Dialysis



The decision process

Plan it prior

Problem

Information


Options

Select

Execute

Evaluate

- **What's available?**
- **Patient (size & condition) limits?**
- **Technology & expertise limits?**
- **Transferability?**
- **Risk/ cost/ benefit**

- 
- **Dialysis is NOT the end of conservative management**
 - **Dialysis supports, not replaces, patient management**
 - **Do NOT treat dialysis as separate from patient management, even if provided by a different team/ facility/ location**



- **Dialysis or not?**



NO

- **12 months, anuria**
- **BP 60/20, HR 160, CRT 5sec**
- **pH 7.05 HCO₃ 4, pCO₂ 20**
- **Urea 90mg/dL, Creat 1.5mg/dL**



NO

- **6 yrs, 20 Kg**
- **Double J for obstructive anuria**
- **200mL urine in 2h**
- **pH 7.23, HCO₃ 10 mmol/L**
- **2 corrections yesterday, one immediate post-op**
- **Creatinine 5 mg/dL, Urea 110 mg/dL**



- **18 months, anuria**
- **HB 5g/dL, Retics 10%, PLT 40**
- **Urea 180mg/dL, Creatinine 6mg/dL, K 8mmol/L**

Volume, K





- **6 yrs, ESKD-HD**
- **Missed 2 sessions (VA failure)**
- **RD, orthopnea, O₂ sat 74%, BP 180/120, Chest crepitations**
- **Creatinine 8mg/dL**

Volume





- **14 yrs**
- **Methyl alcohol intake 1h ago**
- **Conscious, creatinine 0.8mg/dL**
- **HCO₃ 20, Anion gap 12**

Dialyzable toxin





NO

- **6 Months, diarrhea & vomiting**
- **Severe dehydration**
- **Na 180mmol/L, K 2.2mmol/L, Urea 60mg/dL, creatinine 0.8mg/dL**



- 6 days
- Encephalopathy
- Ammonia 400
- pH 7.37, HCO_3^- 20

Metabolic

IV



- **10y**
- **Surgery for ruptured appendix**
- **Peritonitis, sepsis**
- **Anuria, oedema, BP 100/50 on inotropes with CVP 16**
- **Creatinine 4, pH 7.1, HCO₃ 6, K 7**

Sepsis-AKI

V



- **6y**
- **Fatigue, bony pains, exertional dyspnea, growth failure**
- **Blood transfusion last month**
- **Lethargic & repeated vomiting**
- **Creatinine 14mg/dL, urea 300mg/dL, HCO₃ 10mmol/L, K 5mmol/L**

Uremic

VI

Dialysis: Indications

- Volume/ fluid management
- Uremia (syndrome NOT Urea)
- Lab: K, acidosis, ..

Settings

- AKI
- CKD + acute
- ESKD
known or not
- Non-renal

Dialysis: Non-renal indications

SOLUTE REMOVAL

- **Severe electrolyte disturbances**
- **Acute metabolic crisis (IEMs)**
- **Intoxication (dialysable agents)**

Serious electrolyte disturbances

Most can be initially managed conservatively

- **Potassium**
- **Sodium**
- **Calcium (,PTH & vit D)**
- **Magnesium**
- **Phosphorous**
- **Tumor lysis (P, K, uric a)**

In-born errors

- **Ammonia**
- **Organic acids and Ketoacids**

PLASMA TV: Dialyzable Toxins

P	Phenobarbital
L	Lithium
A	Acidosis
S	Salicylates
M	Metformin
A	Ethanol, methanol, ethylene glycol
T	Theophylline
V	Valproate



Digoxin is

NOT DIALYZABLE

Dialysis: Non-renal indications

SOLUTE REMOVAL

- Severe electrolyte disturbances
- Acute metabolic crisis (IEMs)
- Intoxication (dialysable agents)

FLUID REMOVAL

Highly refractory HF, pulmonary oedema, oedema

Dialysis: Non-renal indications

SOLUTE REMOVAL

- Severe electrolyte disturbances
- Acute metabolic crisis (IEMs)
- Intoxication (dialysable agents)

FLUID REMOVAL

DIALYSIS-LIKE THERAPIES

DIALYSIS-LIKE THERAPIES

- **Cytokines in sepsis, cytokine storm (HV-HF, Oxiris)**
- **Liver cell failure (albumin dialysis, adsorption, PE)**
- **Antibodies in immune disorders (PE, adsorption)**
- **Refractory hypo/ hyper thermia (PD)**
- **Severe dyslipidemias (apheresis)**

Dialysis

Part of patient support when you need to

- **Remove solutes**
- **Remove water**

Failure of conservative management

- **Consider options**
- **Plan it prior**

Q1. The principal absolute laboratory indication for dialysis is

A	sodium
B	potassium
C	urea
D	creatinine

Q2. Dialysis is UNlikely to be beneficial in cases of

A	organophosphorous poisoning with altered consciousness
B	ornithine transcarbamylase deficiency with coma
C	AKI with oliguria and fluid overload
D	tumor lysis syndrome with refractory hyperuricemia & hyperphosphatemia

Q3. The initial management of a child with hypotension, delayed capillary refill, anuria, bicarbonate 10 & K 5 is

A	immediate dialysis for AKI with acidosis
B	trial of diuretic to reverse anuria
C	normal saline bolus IV for volume expansion
D	sodium bicarbonate to correct acidosis