

Hypokalemia

Clinical scenario

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Presentation

- 26 days boy baby
- Respiratory distress
- Admitted, managed with HFNC, CPAP, then intubated
- Covid RTPCR positive
- Diagnosed to have pentalogy of Fallot (large ASD, large malaligned VSD, mild PS, RVH)

Management

- Ventilation
- Failed extubation attempts
- Started on diuretics – Frusemide infusion initially, switched to oral Frusemide
- Antibiotics, antifungals, steroids
- Shifted to our hospital after 20 days in PICU

Initial management

- Malnourished, peripheral edema
- Large left to right shunt
- Diuretics continued
- Cultures sent, antibiotics continued
- Nutritional support
- Lab values
 - TC 15480, DC N76!6
 - Hb 6.4, Platelets 2.65 l
 - Na 141, K 2.86, Cl 100, HCO₃ 23.3
 - Urea 19, creat 0.55
 - Ca 8.3
 - CRP 28.9
 - Procal 3.16

Challenges

- Hydration, avoiding overhydration/ ppting CCF
- Hypokalemia – muscle weakness, ileus
- Difficult venous access; (had bilateral femoral vein cut downs)
- Adequate nutrition with reduced fluid intake
- Catabolic state of sepsis, increased metabolic demand



Fluid and electrolyte management

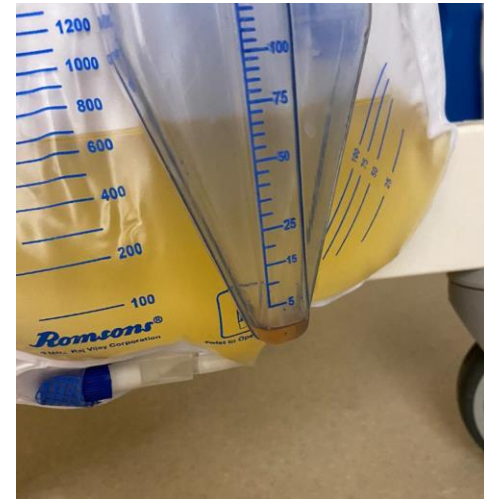
- Diuretics continued
- Maintenance 70-80% requirement
- K correction
 - Peripheral vein 40-60 mEq/l i.e 2-3 ml in 100 ml of IV fluid
 - Rate of infusion not to exceed 10 mEq/hr
 - Rates > 20 mEq/hr require cardiac monitoring

Potassium dose

- Maintenance 2-4 mEq/kg/day
- Max oral dose 1 mEq/kg (<5 yr) , 0.5 mEq/kg (>5 yr)
- Deficiency: 0.3 (max 0.4 mEq/kg/hr) for 4-6 hr IV, then 4 mEq/kg/day
- Hyperkalemia is more life threatening than hypokalemia

Hyperkalemia

- PRBC transfused
- Covid negative
- Failed extubation
- ABG – Hyperkalemia
- Se K 7, reduced to 4.5
- ? Transfusion reaction



Further course

- Urea, Creat elevation
- Spell like episodes
- CT Angio
- RV hypertrophy
- Propranolol added
- Sepsis
- Hyperkalemia

Additional woes

- Hypoglycemia
- Seizures
- Propranolol stopped
- Cause of hyperkalemia?
 - Feeds
 - Other sources
 - Decreased excretion
 - Surgery

Avoiding Hyperkalemia



- High alert drug
- Double check dose, dilution, route of administration
- Mix thoroughly
- Label clearly
- Higher conc. through CVL, syringe pump
- Do not flush

Label the IV solution bag.



INTRAVENOUS SOLUTION ADDITIVES	
Patient _____ Room _____	
Date _____ Time _____ By _____	
Time Started _____	
DRUGS ADDED	STRENGTH
EXP. DATE _____	
This label must be affixed to all infusion fluids containing additional medication	

Adding KCl to fluids



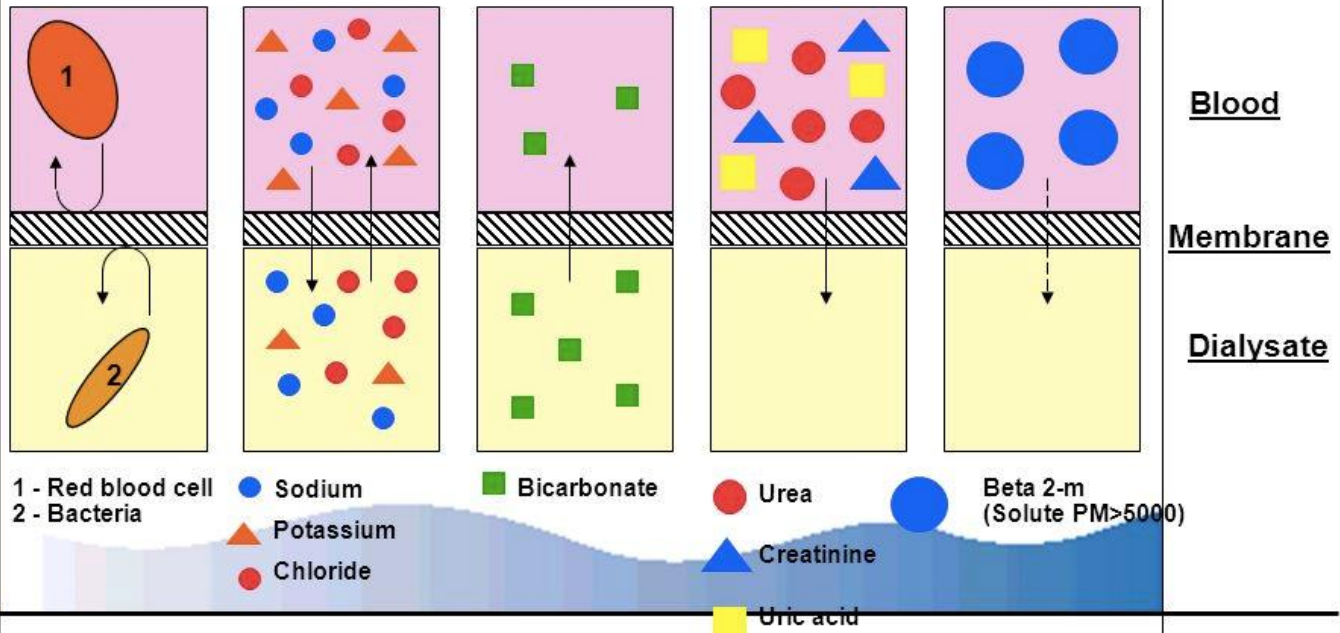
Post op course

- Diuretic infusion to achieve negative fluid balance
- Persistent low values
- Peritoneal dialysis
- Multiple corrections through CVL
- Add KCl to PD fluid

Peritoneal Dialysis

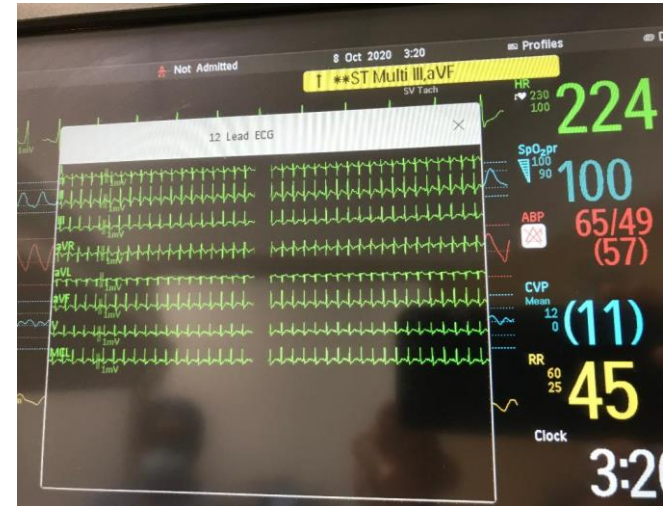
Diffusion

- Transfer by diffusion is the passive transfer of solutes across the membrane, without the passage of solvent (water).



Arrhythmias

- Heart block initially
- Junctional ectopic tachycardia – Correct Se.K
- Bigeminy



Further course

- Hypokalemia persisted
- Failed extubation (bronchomalacia, collapsed lung)
- Lasix infusion
- Potassium corrections
- Magnesium replacement
- Enalapril, oral Lasix

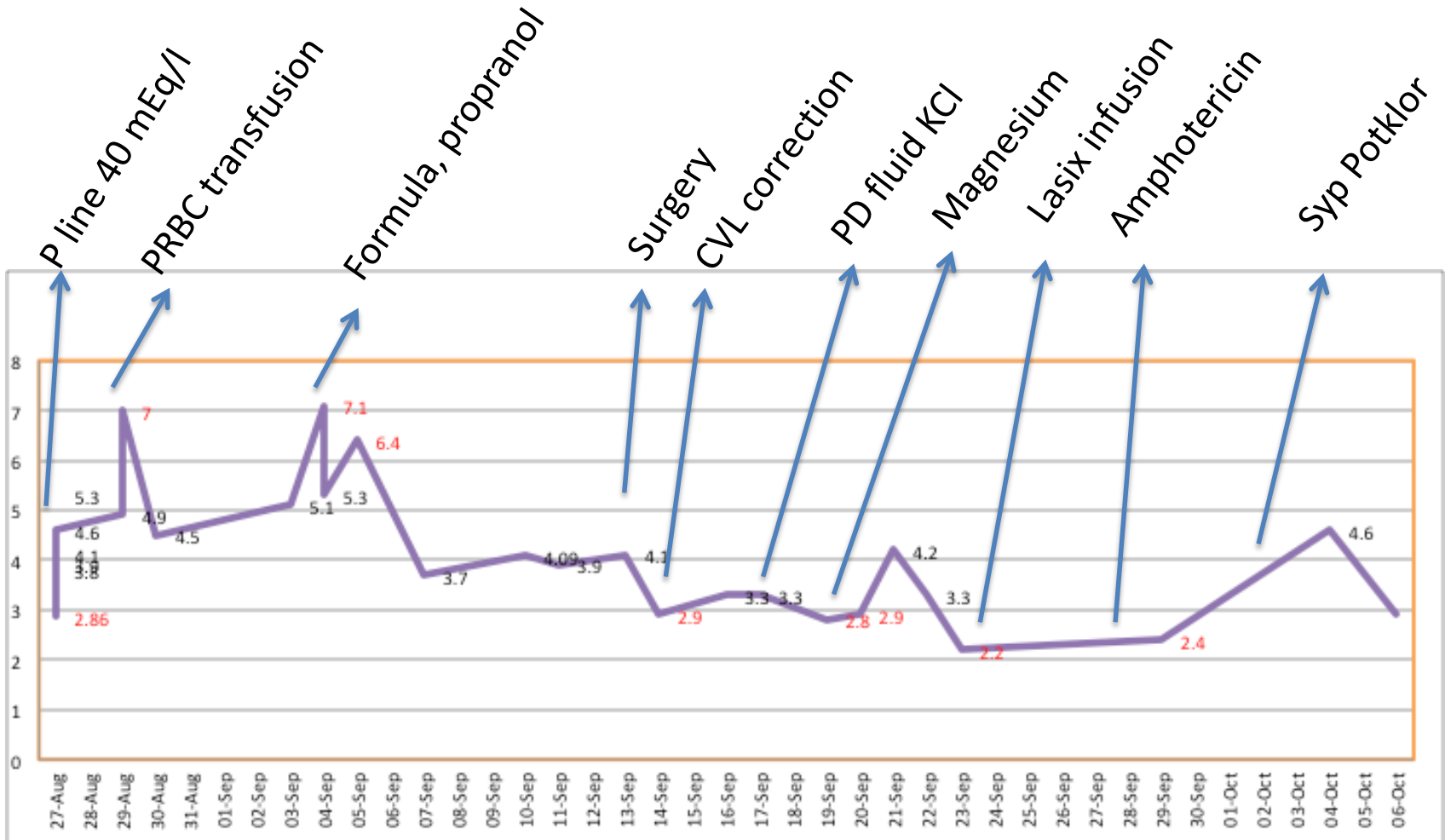
Hypokalemia persistence

- Check Serum Magnesium
- Hypomagnesemia aggravates hypokalemia
- Hypokalemia becomes refractory to correction
- Impairment of Na-K ATPase, K wasting
- Mg administration decreases K excretion and increases Serum K levels

Hypokalemia persistence

- Patient was started on antifungals (Amphotericin B) for severe thrombocytopenia and suspected sepsis
- Ampho B binds to CD cells, pores form, leaks potassium
- Magnesium depletion concomitant

Trend of Potassium



Drug interactions

- Salbutamol
- Beta blockers
- Soda bicarbonate
- Dextrose, insulin
- Amphotericin B

Key message

- Check and double check K dose, route, dilution and rate of administration
- Closed loop communication
- Review drugs and their side effects repeatedly
- Algorithm based approach

THANK YOU