Case conference

- Case ID: .
  - R1 鄭凱文
- Supervisor VS 林立偉
  - 2014/07/07

Patient Profile

- 77Y/o ♀
- 2014/xx/xx 10:01
- E4V5M6
- T/P/R=35.8/98/22; BP = 129/55mmHg
- SpO2 = 99%
- 檢傷主訴：病人主訴為尿滯留、雙腳腫
- Triage = Ⅲ

Present Illness

- C.C: 今早又尿不出來
- Both leg edema since this morning
- no obvious SOB;
- 有 cough; no fever;
- 最近有一直咳

Past History

- NKDA;
- Hx of Neurogenic bladder s/p Foley;
- DM (+); HTN (+);

Physical Examination

- Clear consciousness;
- supple neck;
- clear BS; RHBs;
- abd.: soft ; no tender point;
- ext.: freely movable

Impression

- AUR
- leg edema, r/o lung edema

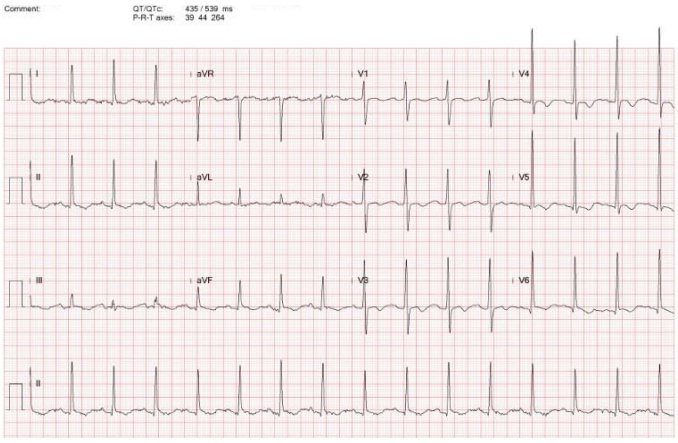
Initial order (day 1, 10:13)

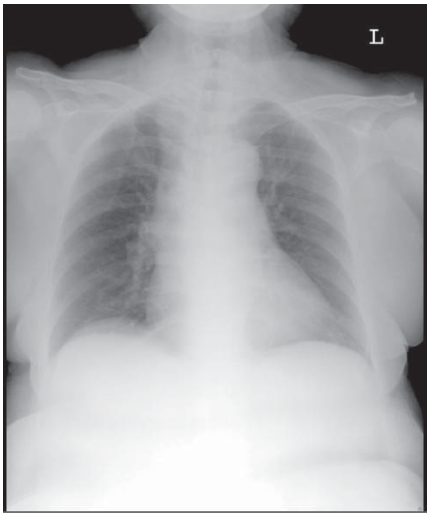
- On Foley
- F/S (107)
- VBG6
- Hb, WBC, D/C
- Crea
- CXR
- on lock

VBG6	
pH	7.38
pCO_2	30.6
pO_2	69
BE	-7
HCO_3^-	18.1
tCO_2	19
SO_2	93%
Na	132
K	2.2
Hct	32.0%
Hb	10.9

Day 1, 10:30

- EKG
- on monitor
- KCL 3amp po st
- KCL 20meq in N/S 100mL run 1hr st
- f/u VBG6 at 13:00





Lab data

Hb, WBC, D/C			生化	
Hb	11.2		Crea.	0.89
WBC	6.6		.eGFR	61.5
Differential count				
Seg.	73.0%			
Lymph.	15.0%			
Monocyte	11.0%			
Eosionophil	0.0%			
Basophil	0.0%			
Atypical lym.	1.0%			

Day 1, 14:29, Current problem

- Hypokalemia/AUR
  - S/p Foley
  - oral Kcl supply & f/u VBG6
- Leg edema, r/o CHF related
  - 排heart echo
  - be ware of hypokalemia
  - iv rasitol 1amp

→ if clinically stable, may consider discharge with oral Kcl & diuretics

- DC monitor
- Rasitol 1amp iv st
- Kcl 2amp po st
- f/u VBG6 at 21:00
- heart echo
- 排nephro床
- 待轉EC

Heart echo 報告

- EF 67%
- no regional wall motion abnormality;
- normal LV contractility and wall thickness;
- moderate MR; mild~moderate AR;

Day 1, 19:55 (K^+ 3.1)EC order

- 21:00 抽血加抽
- Cortisol, TSH, fT4, osmolarity
- urine BUN, Crea, K, Osmolarity
- (day 2, 00:45) f/u VBG6 at 05:00
- P-N
  - 排 nephro 床，總值郭 xx 不簽床
    （原因： f/u data; MBD & OPD f/u if no other problem ）

生化 (Urine)	D1, 21:38
BUN	
Crea.	46.4
.eGFR	
.TP.Cr	
K	20
Osmo. (urine)	398
Osmo. (blood)	278

VBG6	D1, 10:29	D1, 13:53	D1, 20:53	D2, 05:31
pH	7.38	7.397	7.452	7.403
pCO_2	30.6	28.9	25.6	31.4
pO_2	69	86	73	73
BE	-7	-7	-6	-5
HCO_3^-	18.1	17.7	17.8	19.6
tCO_2	19	19	19	21
SO_2	93%	97%	96%	95%
Na	132	135	137	139
K	2.2	3.1	3.1	3.1
Hct	32.0%	28%	31.00%	32%
Hb	10.9	9.5	10.5	10.9

報告說明　抽血時間：20:50

檢驗名稱	檢驗值	單位	符號	參考值範圍
#Cortisol	***	ug/dL		6.7-22.6
**AM Cortisol	12.4	ug/dL	*H	<10-58-403
**PM Cortisol	***			
**UR Cortisol	3.8254	uIU/mL		0.3500-4.9400
TSH	1.37	ng/dL		0.7-1.48
T4,Free				

Day 2, 11:42, P-N

- S: forehead pain as usual;
- O:
  - clear consciousness
  - coarsed BS;
  - abd.: soft; no tenderness;
  - bil. Feet edema 1+
  - pupil (3+, 3+);
  - neck supple;
- A:
  - Hypokalemia, cause?
  - Metabolic acidosis, cause?
  - Acute bronchitis
  - DM, HTN
  - neurogenic bladder
- P:
  - Tinten 1# po st
  - DC Hyzaar (∵有 diuretics)
  - ketone, lactate, Cl

生化 (blood)	
ketone	0.1
Cl	108
lactate	8.8

Day 2, 20:14

- Na-Cl-NaHCO3
  = 139-108-19.6 = 11.4 → non-AG acidosis
  - Urine Na, K, Cl, Crea
  - urine gas
  - U/R, UC
  - B/C *II
  - Tinten 1# po st

Urine Gas	
pH	7.31
pCO_2	20.5
pO_2	141.4
Hct	31
BE	-12.8
HCO_3^-	10.4
SO_2	99%

生化 (Urine)	D2, 21:19
Crea.	38.9
.eGFR	
.TP.Cr	
Na	49
K	8
Cl	55

Urine routine	**********			-
.Color	Yellow			Yellow-
.Clarity	Negative			Negative-
.Sp.gr.	1.006			1.003-1.035
.pH	6.5			5-8
.OB	<0.03(+/-)	mg/dl		Negative-Trace
.protein	30-70(+)	mg/dl	H	Negative-Trace
.glucose	Negative	mg/dl		Negative-Trace
.Ketone	Negative	mg/dl		Negative-Trace
.Bilirubin	Negative	mg/dl		Negative-
.Urobilinogen	<1.5	mg/dl		<1.5-
.Nitrite	Negative			Negative-
.WBC(esterase)	Negative	Leu/ul		Negative-Trace
Sediment	**********			-
.RBC	3-5	/HPF	H	0-2
.WBC	3-5	/HPF		0-5
.Epithelial cell	0-1	/HPF		0-5
.Cast	Not Found	/LPF		Not Found-
..cast-amount	-			Negative-
.Crystal	Not Found	/HPF		Not Found-
..Cry-amount	-			Negative-
.Bacteria	+/-			Negative-
.Others	Not Found			Not Found-

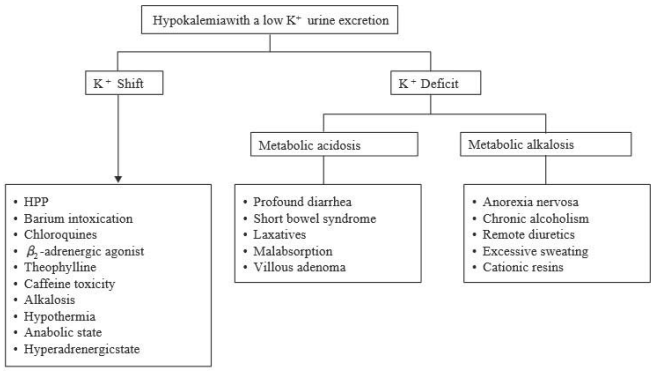
Day 3

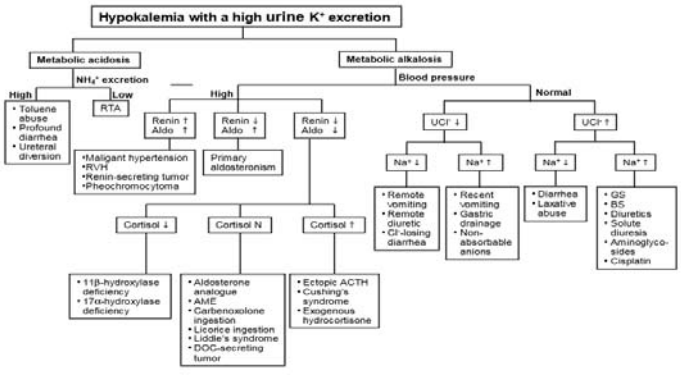
- 04:00
  - PCT (negative)
  - Curam 1.2g ivd q8h+st (hold 09:00 dose)
  - VBG6 (cm)
  - CRP (cm)
- 05:26
  - KCL 1amp po st
  - Radi-K 2# po tid *2days
- 13:22 admission

Discussion
simple and rapid approach to hypokalemia

Lin SH, Chiu JS, Hsu CW, Chau T. A simple and rapid approach to hypokalemic paralysis. Am J Emerg Med. 2003;21(6):487-91.

- ABG
- Uk/UCr ratio (>0.17mEq/mg)
- TTKG = (U/P[K])/(U/P[Osm]) （ >3 & Osm: U>P ）
- Urine osmolar gap$_{(>100)}$ = 2 [NH_4^+]





Treatment

1. Medical emergency	Cardiac arrhythmia, respiratory insufficiency
2. Avoid risks of K^+ shift into cells	Do not give glucose, insulin and $NaHCO_3$
3. Magnitude of K^+ deficit	Large vs. small does of K^+
4. Route of K^+ administration	Central, peripheral or oral
5. K^+ preparations	KCl vs. $KHCO_3$ (K^+ citrate) vs. K^+ phosphate
6. Adjuncts to therapy	K^+-sparing agents, ACEI, AIIA
7. Associated settings	HPP, chronic hyponatremia, hypomagnesemia, volume depletion, severe metabolic acidosis, low muscle mass