The Shrewsbury and Telford Hospital NHS
NHS Trust

TACO isn't the privilege of the over 60's

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Background

- 17yr old concealed pregnancy
- Delivered non-viable foetus at home est 24/40, and admitted immediately afterwards.
- Delivered placenta in delivery suite.
- Low body weight (50Kg)
- Poor state of health *(later found to have urinary infection and possible chest infection)*

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Chronology

- O/A pale, tachycardic but B/P preserved (148/50)
- Given 1.5L crystalloid by Ambulance crew / handover obstetric team. No haemorrhage observed, but request for XM for 6 units RBC (Hb on VBG 25g/L)
- Oedematous ankles, protein in urine and lactate 12.97
- Lab called unit – Hb 25, MCV 71, plts 463, WCC 29
- Fluid resuscitation continues – further 400ml crystalloid *(creps, rhales to midzone on chest auscitation)*
- Despite this 3 units RBC Tx'd over 1.5hours
- Respiratory distress worsening and CXR taken

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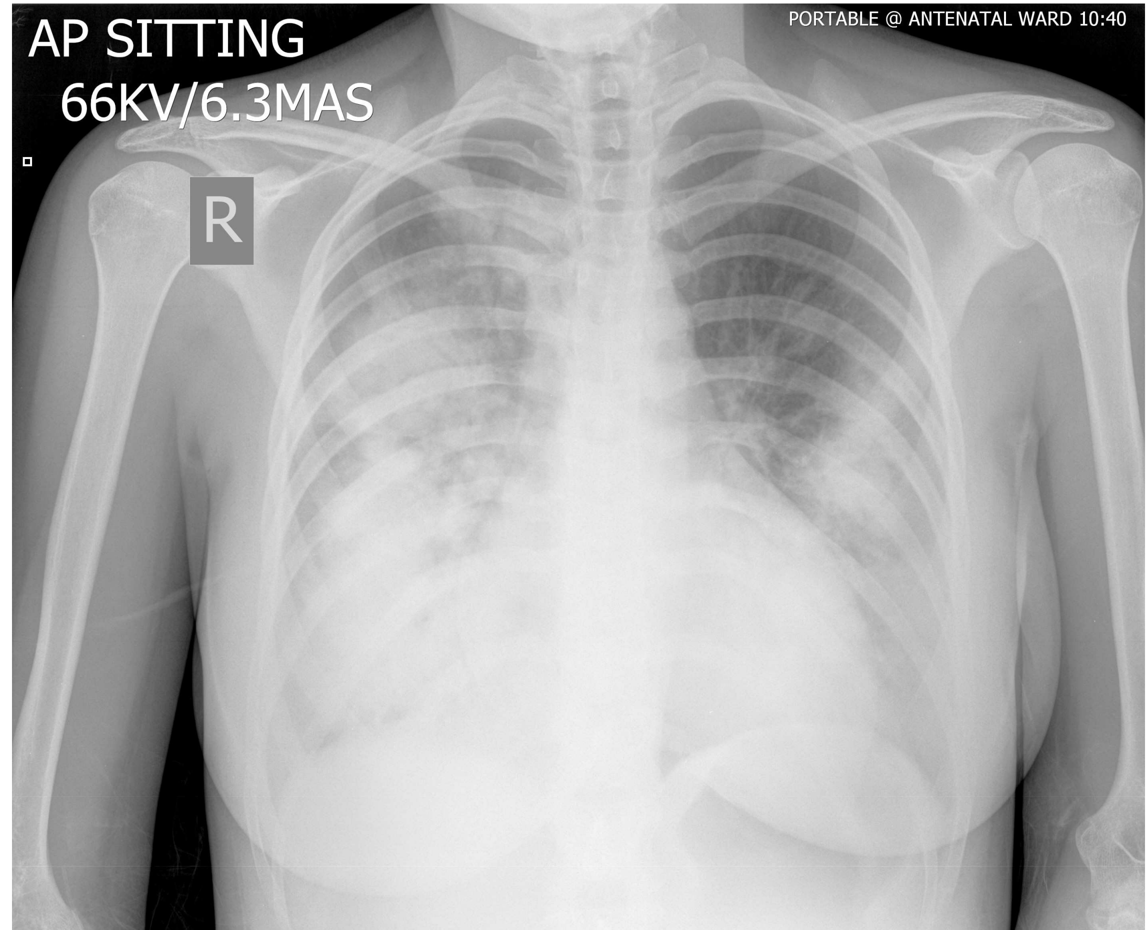
Fluid in = 1900ml, out = 243ml

Report = Differential diagnosis must include extensive bilateral chest infection, but also ARDS and pulmonary oedema



Bedside Echo & Chest USS
- Severe LV Impairment 35%
- Extensive Extravascular lung water

Referred to ITU

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Admitted to ITU

- started on CPAP, but not tolerated therefore intubated. Comment in notes re frothy secretions, but still no link to fluid or low MCV
- Started antibiotics *(tazocin & clarithromycin)–* (no +ve cultures noted)
- Low albumin noted, given 2Lit 4.5% HAS over next 2 days and 2x furosemide
- Hb 70g/L on ABG, given another unit of RBC
- Both days show a positive fluid balance

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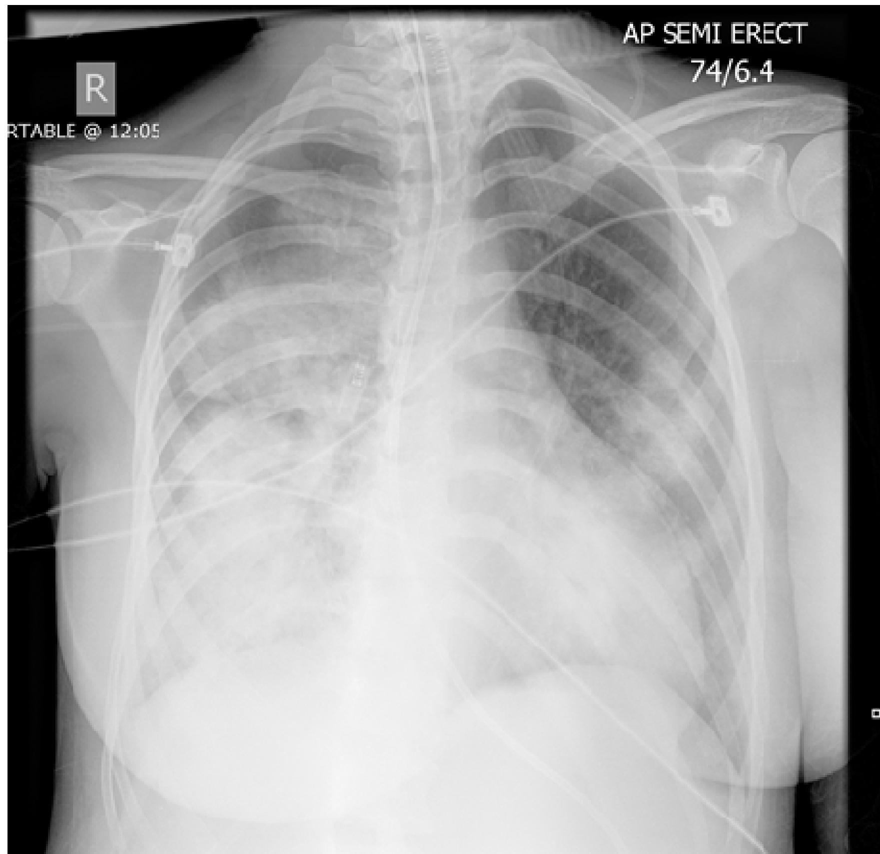
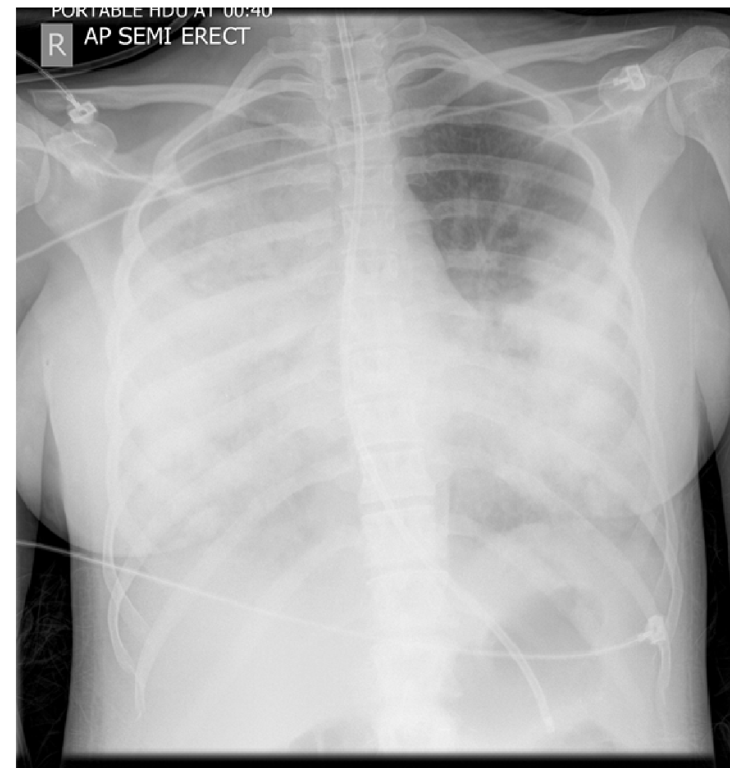
CXR day 2 & 4



Worsening CXR over next few days.

- Day 3 - Renal review noted that pt 2lit +ve
- Day 4 – first day considered overload – IVI stopped



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Finally contacted the Tx team day 6!

- Previous night- Hb still low, therefore another unit RBC (5th unit) given during the night
- Respiratory symptoms worsened.
- Haematologist opinion sought on grounds that may be TRALI due to the single unit Tx'd previous night!
- Advice – no more RBC!
  - Request FBC, B_{12} Folate, ferritin, parvovirus
  - Cardiology *review (pregnancy related cardiomyopathy, Furosemide 40mg, Spironolactone 25mg, Perindopril 2mg all added)*

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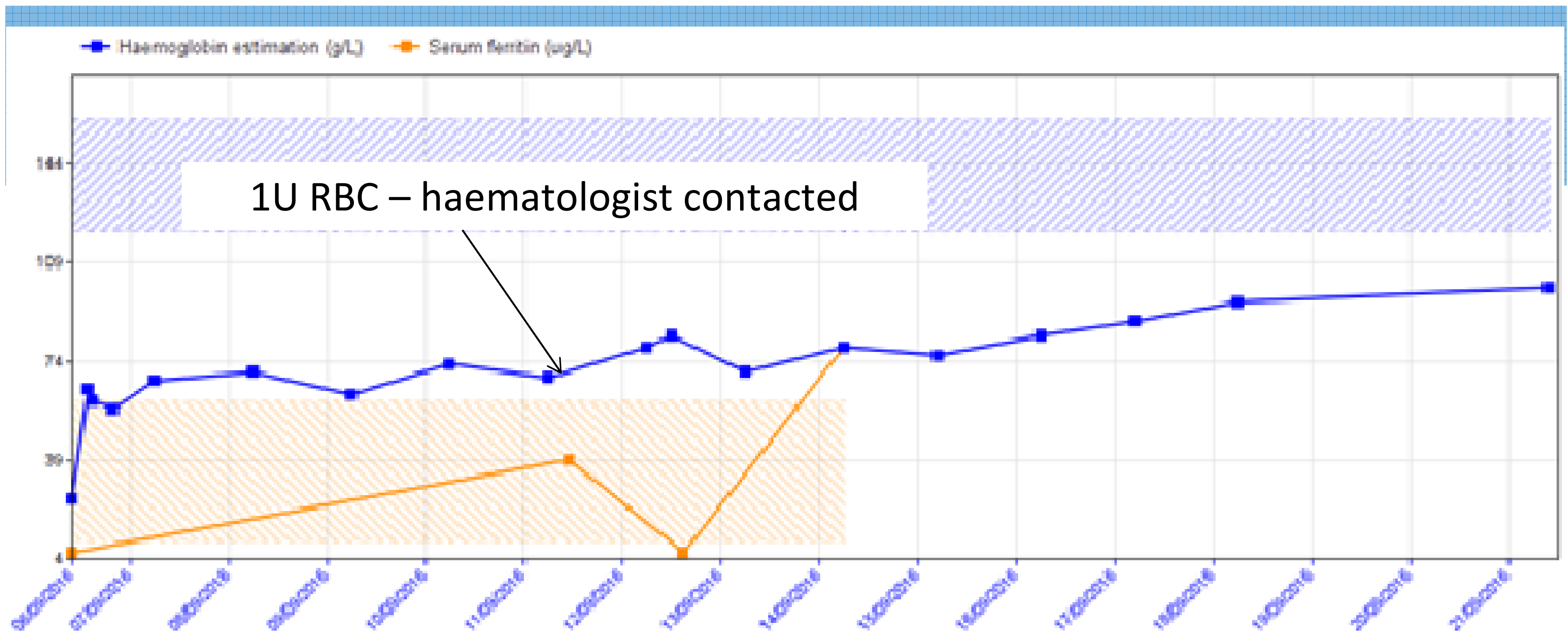

FBC o/a = WCC 29.7, Hb 25, Plts 463, Neut 27, MCV 71.8

Ferritin results
Day 5; Post 3 unit RBC Ferritin 39mcg/L
Day 6; Ferritin B12 and Folate added to historical sample, pre-transfusion. Ferritin 6mcg/L, B12 499ng/L, Folate 2.6mcg/L.

IV Iron has now been given

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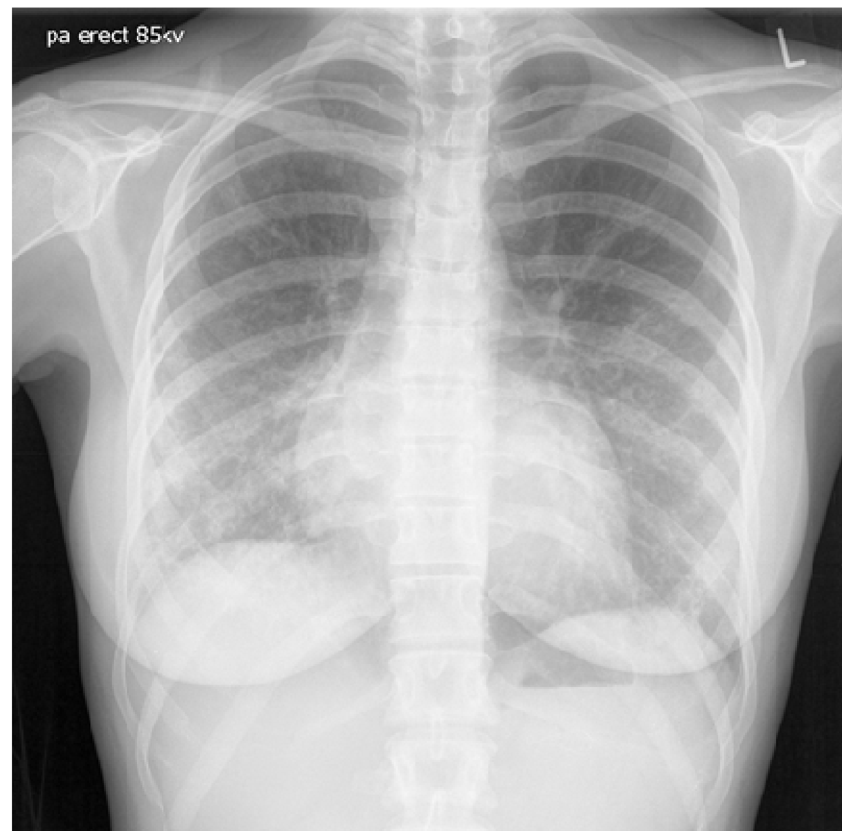
Summary

- In hindsight the patient was iron deficient on admission with a probable compensated anaemia.
- No bleeding was observed after admission to hospital. There was no estimate at volume of blood lost.
- The patient is low wt (50kg) and was given significant volume of fluid and blood on arrival. But she was in respiratory distress with respiratory crepitations even before any blood was given.
- She had a positive balance for days 1-3, but diursed well after Furosemide 20mg on day 4.

Summary continued

Day 14



- She was given more volume on day 6, pushing her into a positive balance again, which coincided with a return of the respiratory compromise on day 7 (haem review).
- Thereafter she began sustained diuresis and treatment for congestive cardiac failure.

Consideration -pre-eclampsia on admission (oedema + proteinuria), but this could equally have been fluid overload from resuscitation and proteinuria due to infection.

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Second Case Study

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Underlying complaint(s) and diagnosis

- Preterm baby born 30+2*, 18/7 old on day of event*
- IUGR *(Intrauterine Growth Restriction),*
- choledocal cyst,
- hyponatraemia, hypomagnesiamia, hypophosphataemia,
- profound bradycardias, anaemia, nutrition concerns.

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Day of incident

- 09:30, baby pale pink, SVIA, chest clear, minimal recessions, intake via tube fed intermittently.
- Hb on a lab sample was 63g/L. A Tx requested (his first, therefore sample from his mum).
- Weight 1.05g & NNU used calc of 20ml/kg
  - 21mls over 3.5hrs
- Pre Tx observations – 14:20 temp 37°c, HR 144, RR 27, BP 79/60, Sao2 96% in air,

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Tx was commenced at 1515.

- Vital signs at 15:30- unchanged except RR 37 (increased slightly), temp 37°c, HR 141, BP 75/58, Sao2 100% in air
- 16:25, nursing staff became concerned - increased work of breathing, desaturating into the 80's.
- 16:32- vBlood gas pH 7.242, pCO2 7.05, BE -5.1, gluc 7.8, lactate 2.72.
- 16:35 – reviewed by ANNP,- airway maintained with PEEP 5cms and 30% o2, sao2 were high 80's. He was pale, nasal flaring, head bobbing, chest recessions both subcostal and intercostal and grunting.

Triage (1hr & 25min from start time)

- 16:40 Consultant Neonatologist review.
- The blood transfusion was stopped, 7.8mls of the planned 21mls had been given and respiratory support was started to maintain airway.
- His chest was clear L=R.
- 16:45- vital signs temp 36.5^{o}c, HR 155, RR 50, BP 71/62, sao2 89 in 30% o2 with PEEP.
- CXR ordered

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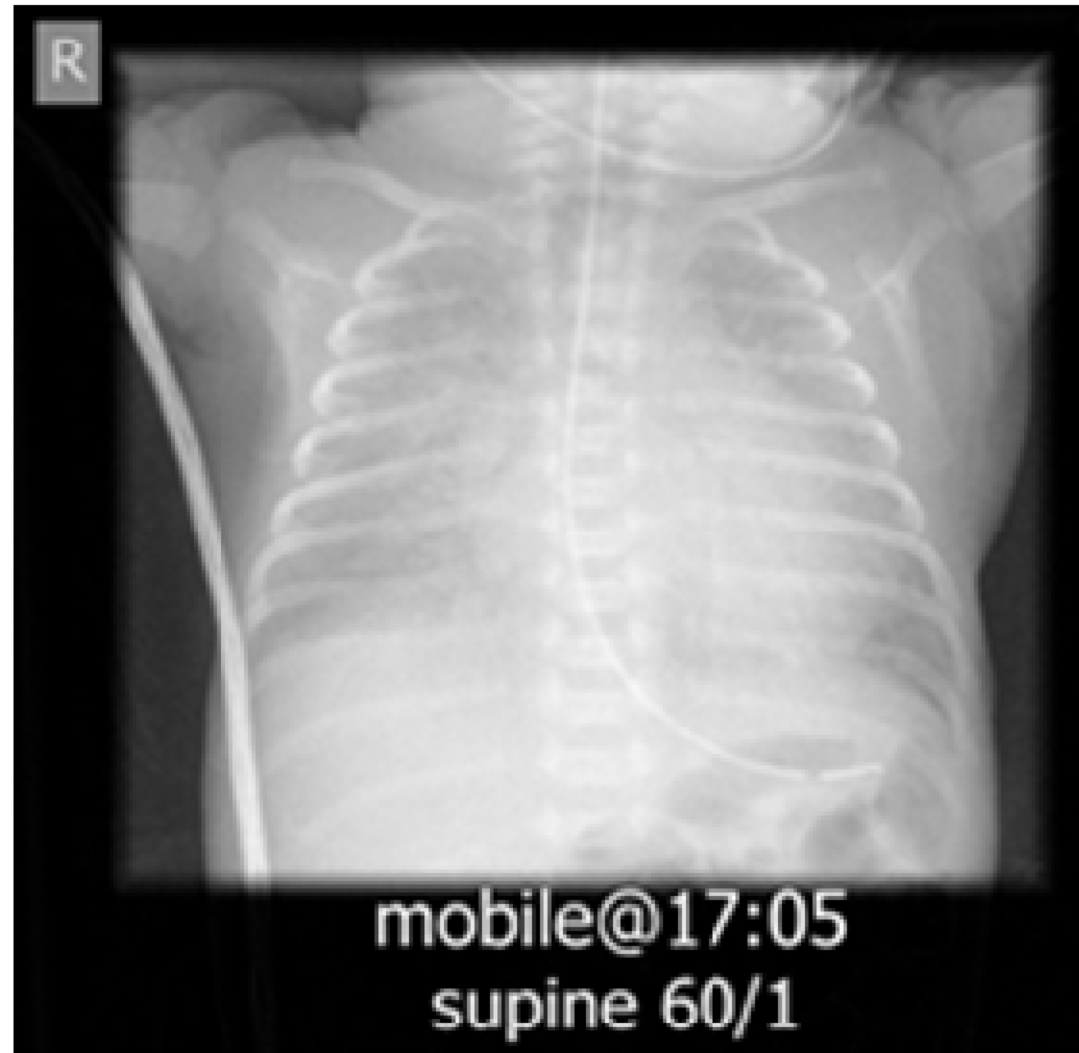
Previous CXR taken prior to this event was NAD with clear lung fields

- **CXR report -** There is extensive air space change bilaterally predominately centrally, this could be due to pulmonary oedema or infection
- furosemide 1mg/kg- this was given at 17:15
- 17:41 his work of breathing was improving along with blood gases
- 19:30 lactate had fallen to within normal limits



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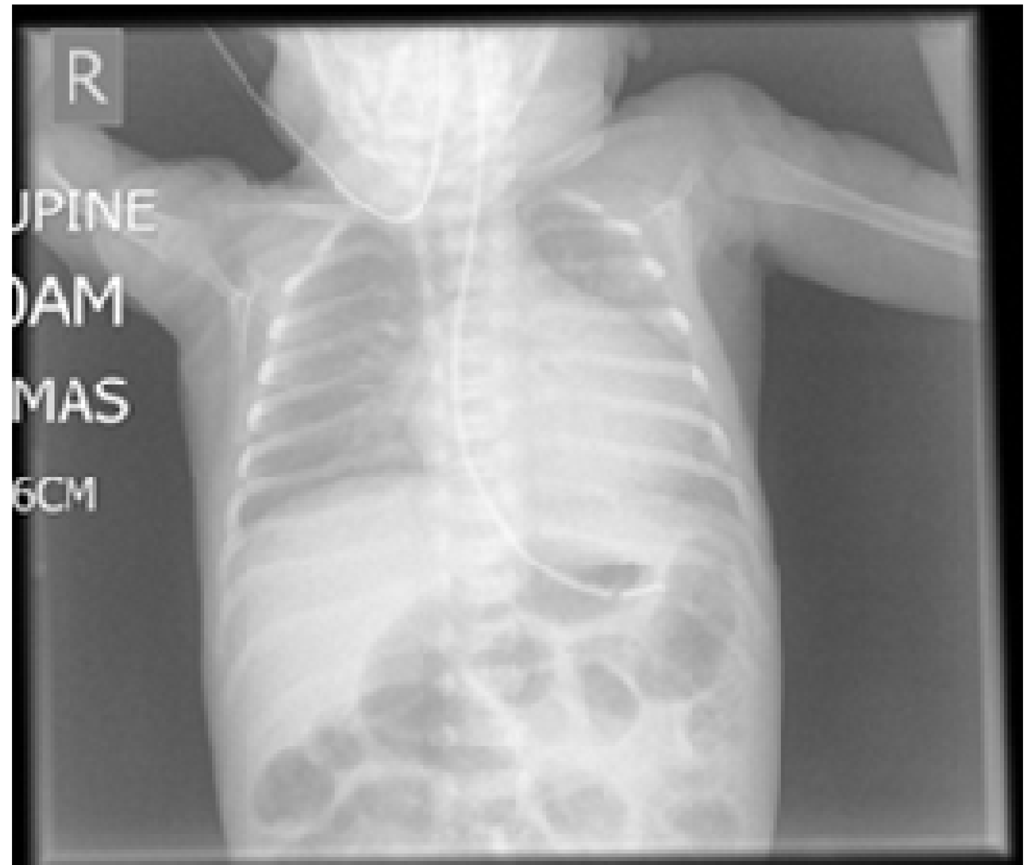
16 hours after time of possible transfusion related event

- **CXR report -** The lung fields now show only a fine alveolar change and the considerable airspace appearances on yesterday's films have virtually all resolved.
- Baby remained on support until the following day and returned to self ventilation on air making a full recovery



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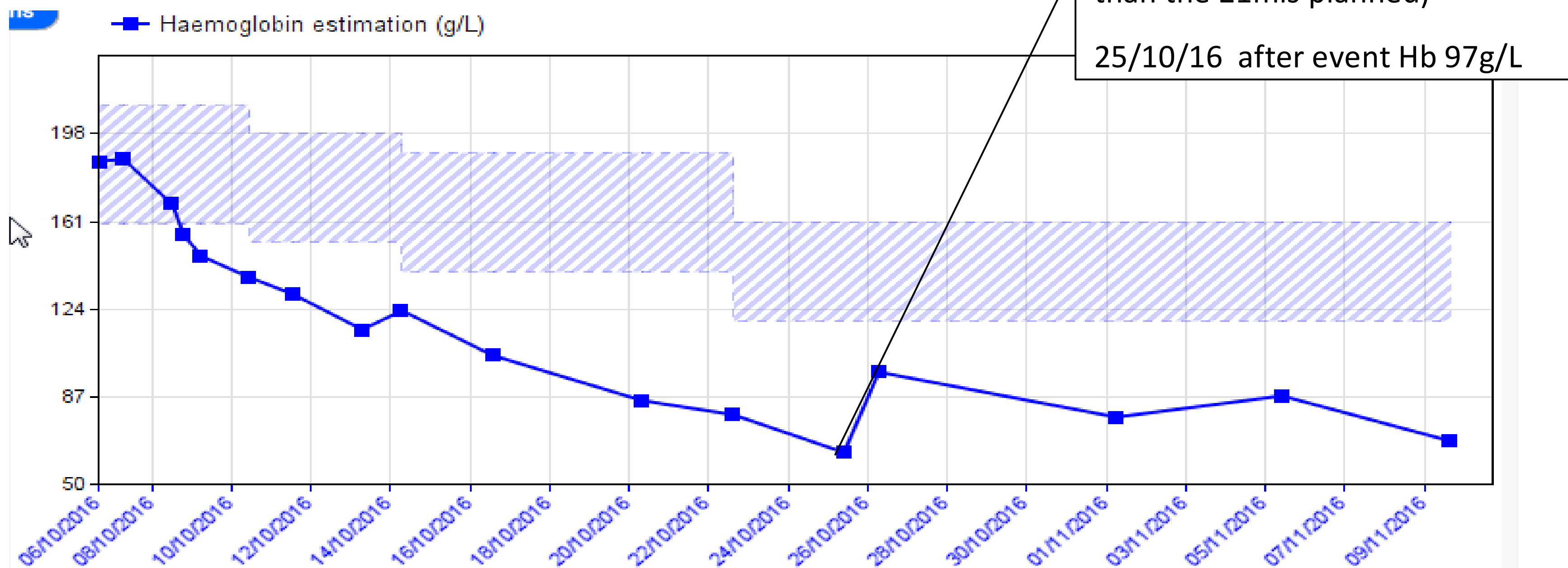
Summary

- Fluid Balance in the 24 hours preceding the event: 192mls in (milk EBM) and 5 wet nappies out, therefore not an issue
- Transfusion was appropriate

25/10/16 Hb 63g/L. Transfusion of the 7.8mls of red cells (rather than the 21mls planned)

25/10/16 after event Hb 97g/L



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Change of Practice

- NNU have now changed to the new BCSH guideline for neonates of 15mls/kg and is given over approx 3.5hrs

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TRALI vs TACO

Both cases were reported to the Tx team as ?TRALI

TRALI

- Transfusion Related Acute Lung Injury
  - Typically during / within 2º Tx (< 6º from Tx)
  - Sudden hypoxaemia. Often requiring ETT
  - Associated bilateral Pulmonary Infiltrates
- No Specific Rx other than Resp support
  - 90% improve within 96º. Remaining 10% fatal
- Plasma rich components more likely
  - FFP >> Plts >> PRBC

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TACO

- Transfusion Associated Circulatory Overload
  - Added to SHOT 2008. But still under-reported

- Acute Respiratory distress during / within 12º Tx AND ≥2 of;
  - Pulmonary Oedema clinically or on CXR
  - Tachypnoea, hypertension, inc JVP, Pedal Oedema
  - Positive fluid balance +/- response to diuresis
  - Elevated BNP inc. Post-BNP:Pre-BNP > 1.5

- Consider Weight / Body size & Transfused vol.
  - Not always old / frail. Consider children / underweight

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BCSH TRALI vs TACO

	TRALI	TACO
Patient characteristics	More frequently reported in haematology and surgical patients	May occur at any age, but characteristically age > 70
Type of component	Usually plasma or platelets	Any
Speed of onset	During or within 6 hours of transfusion, usually within 2 hours.	Defined as occurring within 6 hours of transfusion
Oxygen saturation	Reduced	Reduced
Blood pressure	Often reduced	Often raised
JVP	Normal	Raised
Temperature	Often raised	Usually unchanged
CXR findings	Often suggestive of pulmonary oedema with normal heart size: may be a "whiteout"	Cardiomegaly, signs of pulmonary oedema
Echo findings	Normal	Abnormal
Pulmonary wedge pressure	Low	Raised
Full blood count	May be fall in neutrophils and monocytes followed by neutrophil leucocytosis	No specific changes
Response to fluid load	Improves	Worsens
Response to diuretics	Worsens	Improves