

Management of severe liver trauma: an interactive experience

S Connor
CDHB

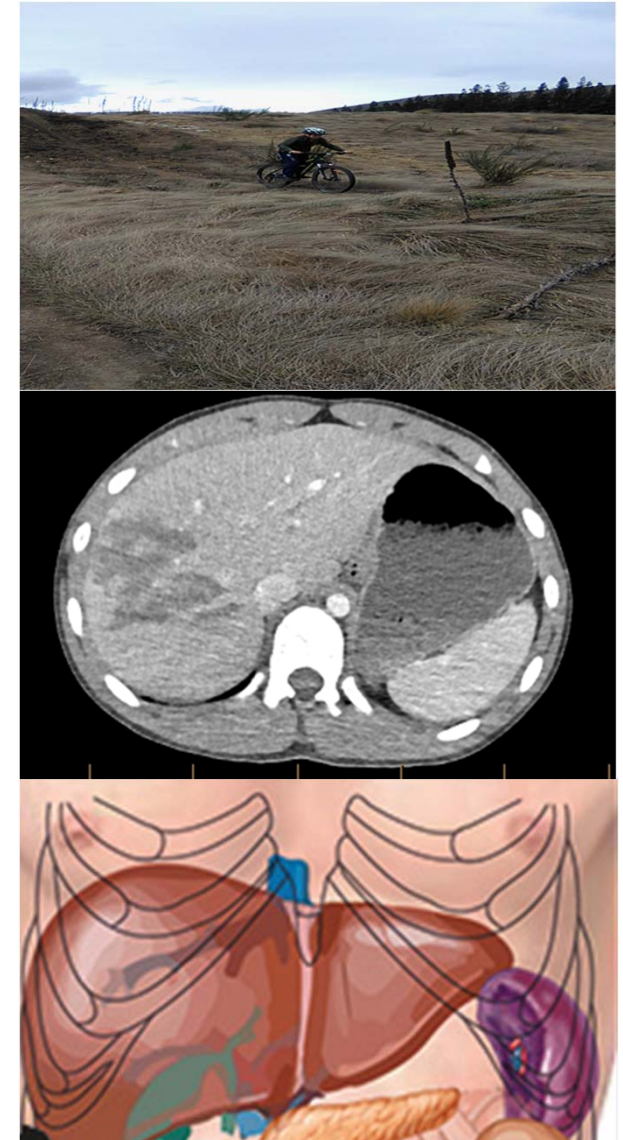
Acknowledge following people for their contributions
M Reeves, O Waddell, K Aldred (Med illustrations), J Koea

Note: we don't have the resources of Weta workshop so bear with me if I mis click couple times.

General points: the liver

- Commonly injured in trauma, surgical intervention rare.
- Penetrating vs Blunt ratio dependant on the society you live in.
- Is a grading system but is not clinically useful (Grade 1-6).
 - me showing a slide not likely to be remembered!
 - 80% are minor and be managed non operatively
- Remember the surface landmarks of liver
 - Level nipple anteriorly and just below point scapulae posteriorly
 - Thoracic wounds can injure

Pt consent given



Non operative management

- Indicated if:
 - Haemodynamic stability
 - Absence of peritoneal irritation and confidence that isolated injury
 - High quality CT scan and experienced radiologist
 - 24/7 availability of monitoring, repeat clinical assessment and intervention.
 - **Understand deterioration is falling Hb and increasing fluid requirement rather than sudden collapse- important that people can recognise deteriorating patient**
- Not if a gunshot unless
super experienced
centre

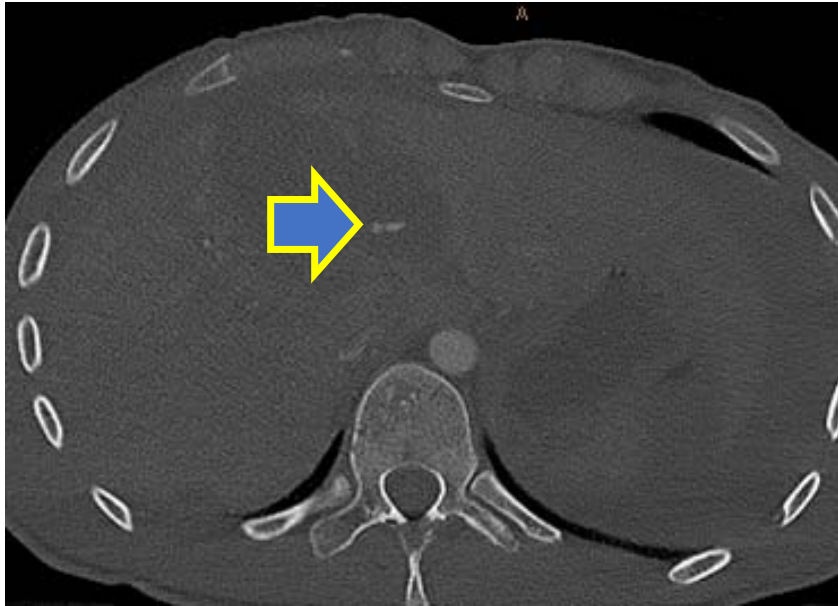
Dealing with complications

Infected collections or abscess

- Day 14 Post right hepatectomy for trauma
- Represented with increasing CRP, abdo pain, fevers....
- Repeat CT --→ large collection in RUQ
- PERC drain placed with good effect



Pseudoaneurysm



Initially stable then sign of deterioration

Also be on look out for arteriovenous fistulae.

Can cause late deaths from acute portal hypertension

I often do delayed USS prior to dx to be sure (rare but fatal)

Bile leak

- Present insidiously
- Increasing abdominal pain out of proportion to signs
- Ileus
- Low grade hyperbilirubinemia
- Once becomes septic , very quickly unwell
- Treatment ERCP and stenting
- Washout as required



Beware.....

- The occult hollow viscus injury
- VTE- should be on prophylaxis
- Delayed bleed- rare but potentially fatal
- Avoid contact sports 3/12- be sensible

Interactive session

- Mass shooting in New Plymouth
- Who is the Reg?
- Who is the team?
- [Patient 1](#)

Videos

- [FP](#)
- [P1](#)
- [P2](#)
- [M](#)
- [IFC](#)
- [SIFC](#)
- [TVE](#)
- [CC](#)

[PT1](#)
[RAD](#)
[PT2](#)
[PT3](#)

When is it futile?

- Based on 10000 patients, cross clamping thoracic aorta
- Penetrating trauma and signs of life on arrival
 - 21% survival and 11% neurologically intact
 - Vs no signs of life = 8.3% and 3.9% respectively
- Blunt trauma
 - 4.6% and 2.6% respectively
 - 0.7% and 0.12% respectively

Decision point



Blood gas values			
↓ pH	6.966		[7.350 - 7.450]
↑ pCO ₂	60.2	mmHg	[35.0 - 45.0]
↓ pO ₂	67.2	mmHg	[85.0 - 100]
Oximetry values			
ctHb	112	g/L	[- -]
↓ sO ₂	88.9	%	[97.0 - 100.0]
↓ FO ₂ Hb	86.3	%	[94.0 - 97.0]
FCOHb	1.4	%	[0.0 - 1.5]
FHHb	10.8	%	[0.0 - 15.0]
FMethHb	1.5	%	[0.0 - 1.5]
FHbF	0	%	[- -]
Electrolyte values			
cK ⁺	4.3	mmol/L	[3.5 - 5.2]
cNa ⁺	143	mmol/L	[135 - 145]
↓ cCa ²⁺	0.75	mmol/L	[1.13 - 1.26]
cCl ⁻	108	mmol/L	[95 - 110]
Metabolite values			
↑ cGlu	15.3	mmol/L	[3.5 - 7.7]
↑ cLac	11.2	mmol/L	[0.5 - 2.0]
Temperature-corrected values			
pH(T)	6.966		
pCO ₂ (T)	60.2	mmHg	
pO ₂ (T)	67.2	mmHg	
Oxygen status			
ctO ₂ c	13.6	Vol%	
p50 _c	32.59	mmHg	
Acid-base status			
cBase(B) _c	-18.0	mmol/L	

Surgical approach to hepatic bleeding

- Push- . MOBILISE the liver bring liver together anatomically, if stops proceed to..
- Pack- bleeding stops- likely porto-venous bleeding
- Pringle- bleeding stops –arterial injury
- Isolate- likely retrohepatic veins or cava- will need total vascular isolation and control.

Bleeding vs sepsis

Relook should be performed at **36-48 hours** once physiologically better and have appropriate personnel and equipment

Operative management



Hepatic Mobilization

Packing (how not to....)

Hepatic Packing

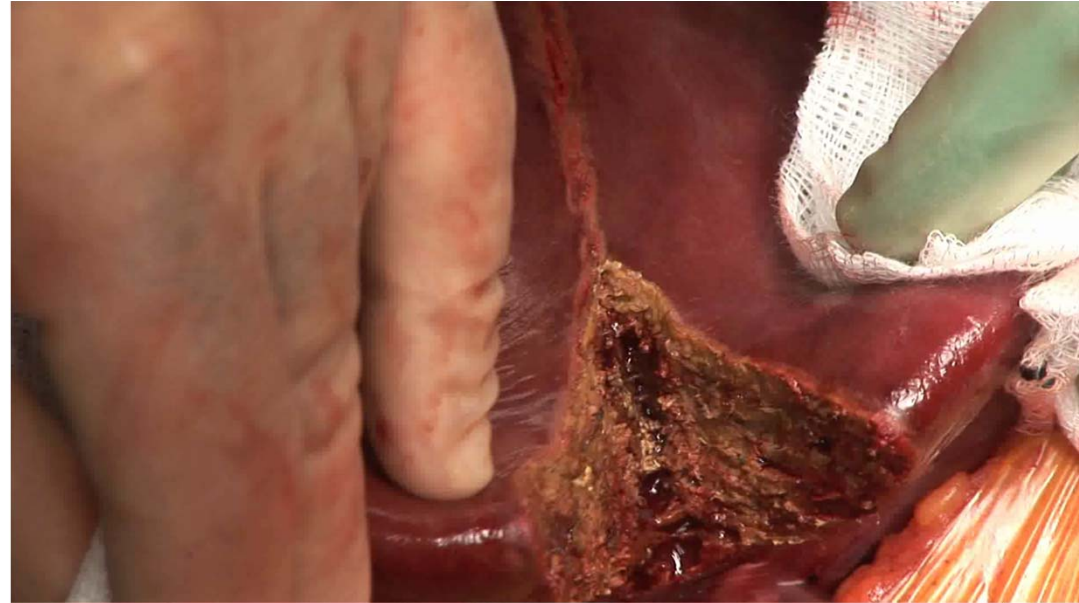
A dark, almost black, rectangular area representing a surgical site. A light gray, rounded rectangular label with the text "Inflow Control" is positioned in the lower-left quadrant.

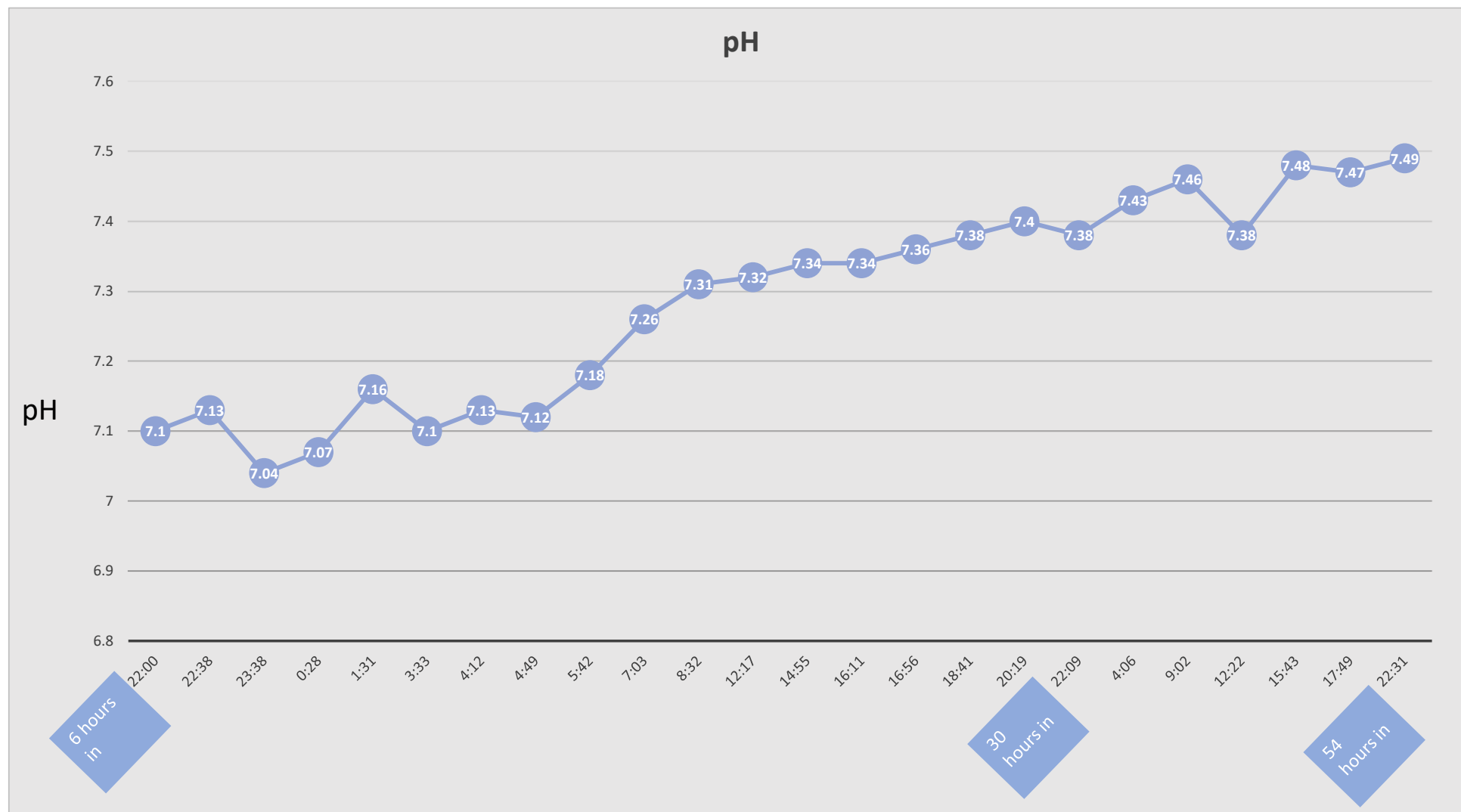
Inflow Control

A surgical photograph showing a liver with a large, dark, rounded retractor system in place. A gloved hand is visible on the right, and a surgical instrument is on the left. A light gray, rounded rectangular label with the text "Selective Inflow Control" is overlaid in the lower-right quadrant.

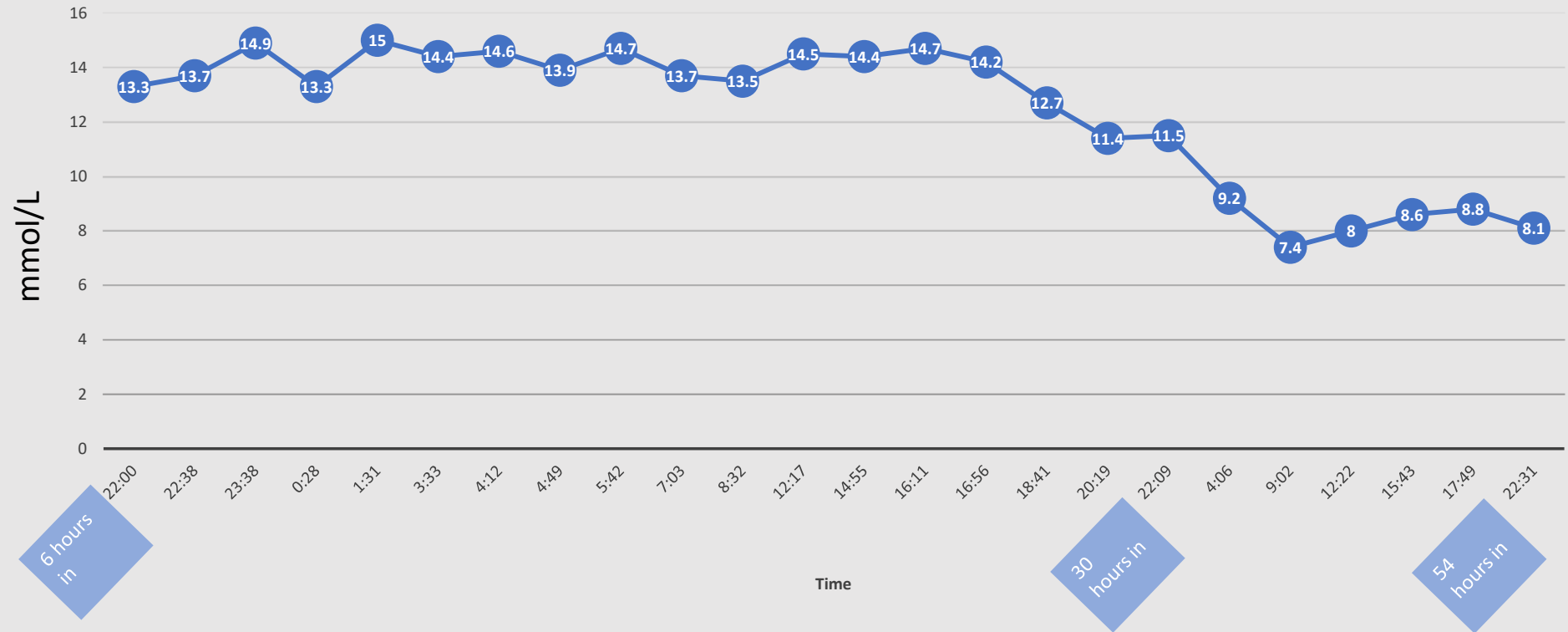
Selective Inflow Control

Total Vascular Isolation





Blood Lactate

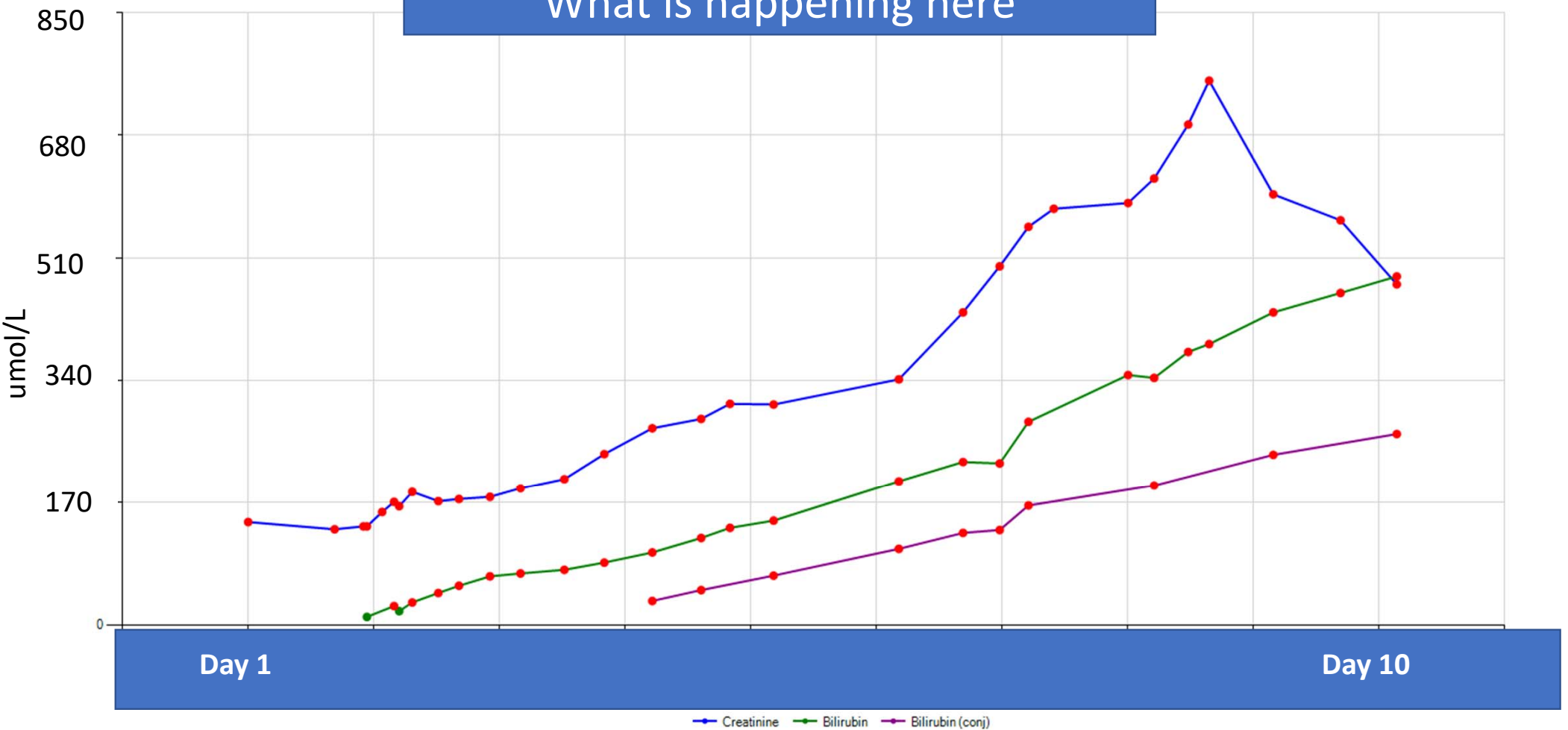


POD 5 CT

- **IMPRESSION:**

- 1. Findings concerning for retained surgical packing material posteroinferior aspect right hemithorax/pleural reflection. Finding discussed with ICU and later cardiothoracic registrars.
- 2. Small right pleural effusion, possibly related to the above. No imaging features to indicate infection although this is not excluded.
- 3. Moderate volume of simple free fluid about right hepatectomy site. Again, no imaging features to indicate infection although this is not excluded. Also unable to determine on imaging whether this represents a bile leak or not.
- 4. Left lobe of liver demonstrate expected enhancement.
- 5. Although CT is less sensitive for soft tissue collections, no CT evidence of collection associated with either right chest / scapula wound or T12 bullet fragment.

First 10 days?
What is happening here



Key Post op problems to look out for

- Thrombotic events
 - Why?
- Small for size syndrome/ liver dysfunction
 - How might it present
 - What is this?
 - How can you treat?
- Sepsis
 - How to minimise
 - In particular what is different for this patient (why high risk?)