Learning from incidents with a focus on hierarchy in the ICU

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Local anaesthetic toxicity on a Critical Care unit

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LEAD PHARMACIST CRITICAL CARE AND THEATRES HHFT

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Quick overview of HHFT

- 3 hospitals
  - 2 district generals (BNH & RHCH)
  - 1 community hospital (Andover)
- Many key services now amalgamated to run on individual sites – cost saving
  - 2 A&E departments
  - Cardiology based at BNH
  - Stroke and rehab based at RHCH
  - Paeds services separated
  - Most surgery now split - urology at RHCH, peritoneal malignancy and major colorectal BNH
  - Outpatients and some elective colorectal carried out at RHCH
  - Trauma ortho at BNH, most elective ortho at RHCH
  - Emergency patients triaged and sent to respective site by ambulance crew
  - Patients presenting at A&E will be admitted worked up and transferred if needed

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The patient

- 69 year old male (D)
  - PMH - AF, HTN, T2 diabetes
- Attended RHCH for outpatient colonoscopy (08/11)– polyps identified and removed, no complications
- D attended A&E at RHCH 15/11 with abdo pain and vomiting – diagnosed with acute cholecystitis
- Increasingly unwell on 18/11 with AF and significantly raised inflammatory markers NEWS 6-8
  - Bisoprolol and digoxin given to control HR
- 19/11 AF continued patient transferred to ICU with significant hypotension and renal failure. During central line insertion D suffered a cardiac arrest and was intubated. 6 mins downtime before ROSC
- Back to theatre for suspected perforation of gallbladder but only found inflammation and fluid around gallbladder.
- Over the next 6 days D had antibiotics and vasopressors, improved and was declared wardable on 28/11.

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The patient

- 28.11.22
- patient wardable from ICU
- 1658hrs VF arrest – one shock ROSC, amiodarone
- 1953hrs ST depression V3/4, discussed with cardio should have angiogram but not needed overnight/ for transfer to BNH on 29.11.
- 2200hrs – 2 x episodes of VF, shocked, immediate ROSC, patient remains self ventilating and awake afterwards.

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The patient

- 29.11.22
- 0500hrs self reverting VT for 30 secs.
- 0545hrs VF – one shock, ROSC, remains SV and communicating.
- 0612hrs d/w ICU consultant and then cardio consultant suggests transfer to BNHH with esmolol or lidocaine inf. Plan: wait and stabilise first – not urgent. Loading dose of lidocaine IV administered.
- 0800hrs approx d/w day ICU consultant d/w cardio, plan to take to cath lab in PM, start lignocaine infusion
- 1030hrs infusion prescribed

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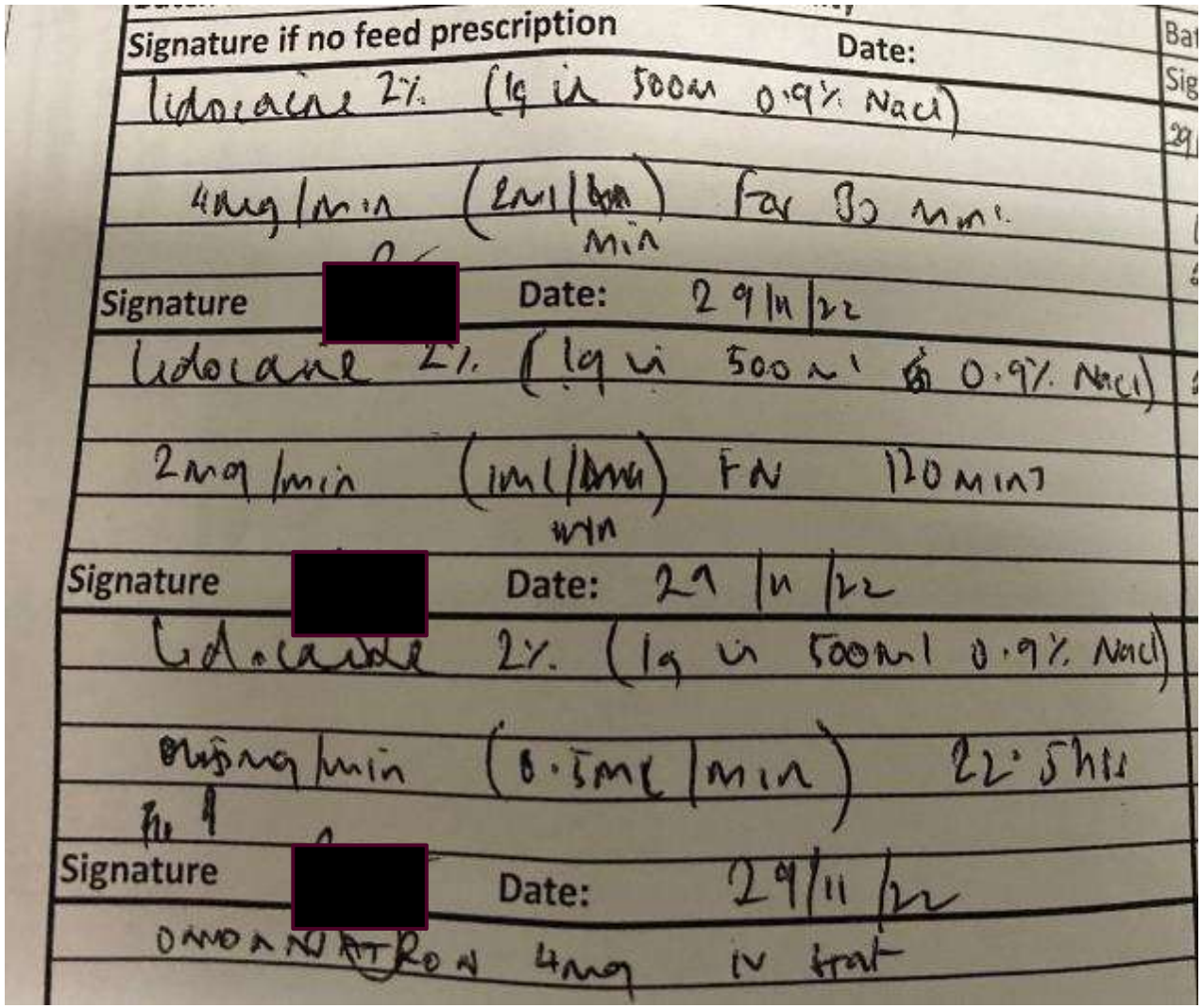
The patient

- 1030hrs infusion checked by Dr and nurse together. Nurse reports being confused by prescription as doctor had told her to run the bag over 30 mins yet prescription states 500ml bag should be given FOR 30 mins (and then reduced). Doctor confirms bag to run over 30 mins then need to get another bag. He instructed another nurse to make up the other '2 infusion bags' Checking procedure did not include pump rate / volume to be infused. Infusion started. 500ml bag set to run over 30 mins.
- 1045hrs - Patient suddenly unresponsive for 10mins. Nauseous and was given IV ondansetron (nurse notes)
- 1050hrs – Pharmacist came to patient bedside and noted infusion running too quickly. He checked the protocol to discover bag running at 1000ml/hr. Went to get ICU consultant. Approx 100ml left in bag. Patient given 800mg lidocaine in 20 mins
- "Haemodynamically stable, but groaning and unable to properly communicate. Looked like a partial non convulsive seizure."
- "Recent ABG had been normal, including glucose. I notice a lidocaine infusion that has just been started around 15mins prior running v quickly. I stopped this infusion and requested the protocol was checked"
- Patient had 42 further episodes of VF/VT and shocked 16 times between 11am and 14:15.



Signature if no feed prescription Date:

Lidocaine 2% (1g in 500ml 0.9% NaCl)

4mg/min (2ml/hr) for 30 mins

Signature [redacted] Date: 29/11/22

Lidocaine 2% (1g in 500ml 0.9% NaCl)

2mg/min (1ml/hr) FN 120 mins

Signature [redacted] Date: 29/11/22

Lidocaine 2% (1g in 500ml 0.9% NaCl)

0.75mg/min (0.375ml/min) 22.5ml/hr

Signature [redacted] Date: 29/11/22

ONDANSETRON 4mg IV stat

Patient label

Drug +Diluent lidocaine 1000mg / Glucose 5% 500ml	Date
~~Concentration~~ 120ml/hr for 30mins THEN	Time
~~Rate~~ 60ml/hr for 2hours THEN	Route
30ml/hr thereafter.	Batch
Signature [redacted] Date: 20/3/23.	Signat
Drug +Diluent	Date
Concentration	Time
Rate	Route
	Batch
Signature Date:	Signat
Drug +Diluent	Date
Concentration	Time
Rate	Route
	Batch

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The patient

- 100. Intralipid started using LA toxicity guidelines – which ones?
- 1345. D transferred to BNH cath lab
- 2x episodes of VF in cath lab 2 stents inserted
- 1825. D arrived on ITU BNH. Desaturated and hypotensive within 15 mins
- 1955. PEA cardiac arrest shocked 17 times intralipid finished at 1900.(total 1500ml given since 11am)
- Unfortunately D passed away at 2050. RIP

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The incident - pharmacy

- CT1 anaesthetic core trainee contacted ICU pharmacist at 9:20 asking how to prescribe lidocaine infusion. Pharmacist was in the dispensary screening as despite routinely go to ward at 10:30am for ward round staff shortages meant a slot had been swapped by rota manager.

- Pharmacist advised doses and how to write prescription (paper), double checked on Medusa and asked the doctor to confirm back what he had written.

- Doctor asked pharmacist if 3 bags of lidocaine needed to be made up and pharmacist stated no its one bag that you change the rate on. ‘like an IVIG prescription’.

- Doctor asked pharmacist where to get so much lidocaine. Pharmacist said ‘you wont need much its only one infusion, there is a box as stock on the ward and that is sufficient’

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The incident – Prescribing Doctor

- Doctor contacted pharmacist who told him to write infusion in one prescription as 3 variable doses (decreasing).
- Doctor understood this to mean 3 separate lidocaine infusions had to be made up and administered, he asked the pharmacist where to get the stock for so much lidocaine and was told it was only one infusion but different rates
- Doctor read back what they had written to pharmacist but unbeknownst to pharmacist the doctor hadn't understood and still thought 3 bags needed to be made and administered.
- Doctor did not check Medusa because he did not know what Medusa was – none of our doctors knew about Medusa

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The incident – urse

- Nurse (expe usions and questione
- Doctor .
- She ask was
- Adminis necked with the presc
- Nurse did no
- Nurse uncomforta t was an emergency

He was so confident in his answer that I felt he was correct

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Learning from the event- panel findings

- Multiple issues lead to the error
  - Choice of drug – Esmolol/vs lidocaine
  - Unfamiliarity - Lidocaine not administered in the previous 5 years at RHCH
  - Prescribing error – written as 3 separate infusions rather than 1
  - **Hierarchical bias**
  - Infusion set up error – nurse checking with doctor, not another nurse 5 Rs
  - Medusa not used
  - Lidocaine infusion not on DERs (Guardrails) software
  - Pharmacist not present on ward at the time
  - Toxbase LA toxicity guidance varied from AAGBI guidance!

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Learning from the event- Hierarchical bias

- **Hierarchy bias – the assumption that those in a more senior position provide greater effectiveness and are correct**
- Is there truly a flat hierarchy in your units?
- When you think about hierarchy do you think about seniority or experience?
- Do you think your nurses would challenge prescribing even in the face of a consultant prescription?
- What would you do if you were asked to administer a drug you've never given before?
- Would your pharmacists feel confident challenging a prescription written by a junior doctor versus a consultant?

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Trust changes

- Full electronic implementation and removal of paper charts on ICU
- Lidocaine infusion added to Guardrails profiles
- All doctors at Trust induction to be told about Medusa and where to find it
- Medusa link added to pharmacy tab on EPR and CHA CC
- Toxbase contacted to inform of differences in guidance to AAGBI
  - Will be reviewing datasheet in 24/25