1. Introduction and Who Guideline applies to

Paracetamol poisoning can cause hepatic dysfunction and death from liver necrosis. The most effective antidote is acetylcysteine (commonly abbreviated as 'NAC'), given intravenously as per a standardised weight-based infusion regimen for all age groups. NAC is almost 100% protective when started within 8 hours of a single ingestion. In such patients, the infusion can usually be discontinued after the standard treatment period. Patients presenting late or after a staggered ingestion (i.e. tablets taken over several hours) will often require further NAC treatment.

The Emergency Department (ED) has its own guidance for the initial management of suspected paracetamol poisoning in adults [1] and children, [2] and an Emergency Decisions Unit (EDU) pathway for NAC treatment in adult patients with uncomplicated paracetamol ingestion. [3]

This guideline focusses on the ongoing management of patients with more complex ingestions who are admitted to Acute Medicine, Gastroenterology, Intensive Care or the Children's Hospital until hepatic function has been restored or (rarely) referral to the regional liver unit is required. It also covers the management of renal dysfunction and AKI, which can occur independently of liver dysfunction, and applies to all UHL staff involved in the care of such patients.

Since the 1970s, standard NAC treatment consisted of three infusions given sequentially over a total of 21 hours. More recently, the Scottish and Newcastle Antiemetic Pre-treatment (SNAP – sometimes also called the Scottish and Newcastle Acetylcysteine Protocol) regimen has been shown to be just as effective while also lowering the risk of anaphylactoid reactions. [4] SNAP allows low risk patients to receive shorter treatment (two infusions given over a total of 12 hours) while patients requiring prolonged treatment actually receive an increased dose of NAC. This guideline is based on SNAP, which since April 2020 has been recommended by Toxbase [5] and the Royal College of Emergency Medicine [6] as an equivalent treatment regimen for all patients with paracetamol poisoning.

2. Guideline Standards and Procedures

2.1 Initial assessment and management

Emergency Department (ED) clinicians should use the ED paracetamol overdose guideline and Children's ED paracetamol overdose guideline, respectively (both are proformas). [3, 4]

NB: The proformas may also be used in other units or wards Where paracetamol poisoning is first discovered or suspected.

2.2 Diabetic patients with rising blood sugar while receiving NAC

NAC is usually administered in 5% glucose. If CBGs prove difficult to control, switch the 10-hour infusions NAC infusions to 0.9% NaCl instead.

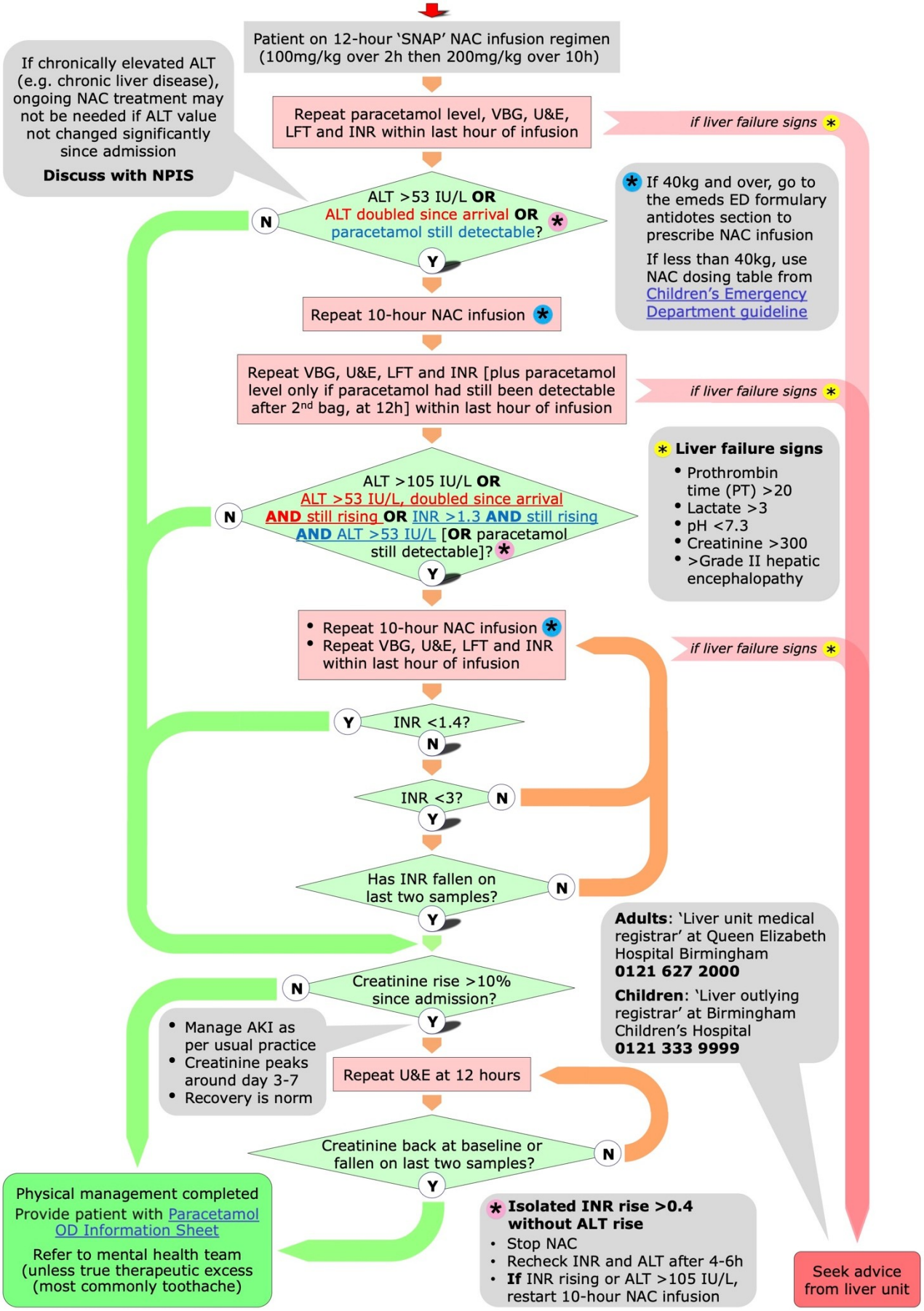
2.3 NAC treatment of uncomplicated adult patients

Adult patients who require NAC but are expected to complete their treatment after SNAP should be managed on the NAC treatment EDU pathway.

2.4 NAC treatment for children and complicated NAC treatment in adults

Patients who require onward admission to Acute Medicine, Gastroenterology, Intensive Care or the Children's Hospital should be managed as per the following treatment algorithm:

Paracetamol poisoning - continued treatment algorithm for patients of all ages



3. Education and Training

No additional skills are required to follow this guideline.

4. Monitoring Compliance

What will be measured to monitor compliance	How will compliance be monitored	Monitoring Lead	Frequency	Reporting arrangements
Frequency of NAC prescribing errors in the ED	Initial audit 3 months after implementation then ongoing	Mandar Marathe	Annually	ESM CMG quality and safety board

5. Supporting References

1. WieseMF. Paracetamol overdose UHL Emergency Department guideline. UHL PAGL. 2023 (accessed 12/03/2023).
2. WieseMF. Paracetamol overdose UHL Paediatric Emergency Department guideline. UHL PAGL. 2020 (accessed 28/08/2020).
3. WieseMF. NAC treatment (EDU pathway). UHL INsite Together. 2023 (accessed 12/03/2023).
4. PettieJM, CaparrottaTM, HunterRW, et al. Safety and Efficacy of the SNAP 12-hour Acetylcysteine Regimen for the Treatment of Paracetamol Overdose. EClinicalMedicine. 2019;11:11-17.
5. TOXBASE. Paracetamol, 2022. http://www.toxbase.org (accessed 12/03/2023).
6. RCEM (2021). RCEM Position Statement: Use of the SNAP Regime for the Treatment of Paracetamol Toxicity. London: Royal College of Emergency Medicine.

6. Key Words

Paracetamol, poisoning, ingestion, Toxbase, SNAP, proforma, ED, emergency department, EDU, n-acetylcysteine, NAC, antidote, hepatic, liver, necrosis, transplant, AKI, acute kidney injury

CONTACT AND REVIEW DETAILS	
Guideline Lead (Name and Title) Martin Wiese, Emergency Physician	**Executive Lead** Andrew Furlong, Medical Director
Details of Changes made during review: • Reference made to the fact that the SNAP regimen is sometimes also called the 'Scottish and Newcastle Acetylcysteine Protocol' • Algorithm revised as per Toxbase guidance changes dated August 2022 • Diabetics with CBGs that prove difficult to control while receiving NAC in 5% glucose can be switched to 0.9% sodium chloride as diluent instead (section 2.2) • For patients who weigh 40kg or more, NAC is now prescribed on Nervecentre emeds (algorithm updated accordingly) • Reference to RCEM position paper on SNAP regime added	