Staggered paracetamol overdose

(Ingested total overdose in >1 hour time period in the context of self harm)

START acetylcysteine (NAC) in all patients Take baseline bloods at least 4hrs since *Clinical judgement required last ingestion (U&Es, HCO3, LFTs, FBC, INR, glucose, paracetamol level) • Bedside hepatic toxicity: Jaundice, tender liver, hypoglycaemia, encephalopathy, unexplained lactic Assess for hepatotoxicity (ANY*) · Some patients have a chronically 1. Paracetamol level >10mg/L or raised ALT/INR. 2. ALT > normal range 3. INR >1.3 • Review old LFTs/INRs and if chronic derangement discuss with a senior clinician before proceeding to NAC. If no features If features of of hepatotoxicity AND hepatotoxicity then normal bloods then continue NAC NAC can be stopped. Psychiatry liaison referral, <u>see UCAMHS referral flowchart</u> for details. Referral to be sent by admitting team including estimated time to completion of infusion. Take bloods 2hrs before the end of infusion 2: U&Es, LFTs, INR and paracetamol level **Blood monitoring** • Checking a paracetamol level 2hrs Capillary blood gas (CBG) before the end of bag 2 is NEW for sampling every 6 hours whilst on this protocol. NAC • U&E, LFTs and INR should be done 2hrs Before the end of each infusion 2. Ensure results are READY for the end of the infusion. Discontinue NAC after infusion 2 IF following met: ALT normal AND ALT <2x admission value AND If unable to achieve blood sampling paracetamol level <11 at the correct time and a delay of >90 minutes is predicted then proceed to the next infusion to avoid prolonged omission of If criteria for discontinuing not met **CAMHS REVIEW** NAC. Bloods should be checked then proceed to infusion 3*** at the earliest opportunity and (same dose and rate as infusion 2) discontinuation criteria referred to. Capillary Blood Glucose (CBG) 6 hourly while on NAC. Discontinue NAC after infusion 3 if: INR ≤1.3 (or has not increased If rapid or progressive biochemical from previous measurement) AND ALT within normal value AND deterioration then discuss with ALT <2x admission value AND paracetamol level <11 senior and consider referral to regional transplant centre. For patients with an increase in INR and normal ALT see NAC prescribing sheet or If criteria for discontinuing not met then proceed full SNAP guideline for clinical guidance to infusion 4*** (same dose and rate as infusion 2) and repeat if needed until: INR ≤1.3, or INR falling on two

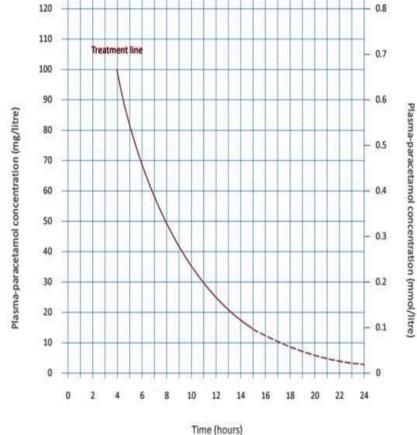
consecutive bloods AND INR < 3.0

*** Bloods should be done 2 hours

before the end of infusion 3 and 4.

Paracetamol treatment nomogram and 12-hr shortened N-acetylcysteine dosing schedule (SNAP protocol)





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If unclear which of the five paracetamol overdose protocols to follow, discuss with ED / paeds Reg / Cons.

In situations where paracetamol levels will be used to determine need for acetylcysteine (refer to appropriate protocol), plot the measured plasma concentration (in mg/L) against the time since ingestion. If plasma level falls above the line then give acetylcysteine as detailed below.

The nomogram is less accurate between 15-24 hours and accurate ingestion time is even more vital.

Actual weight should be used for calculating both the toxic dose and the acetylcysteine dose - up to a **maximum of 110 kg**

Reactions to acetylcysteine include flushing, nausea & vomiting.

Please use 'Acetylcysteine Antidote Adverse Effects – Features & Management' guidance to document any adverse events and guide further management.

Hypersensitivity and anaphylactoid reactions with acetylcysteine are not contraindications as the benefit of treatment still outweighs the risk of not treating.

True anaphylaxis is rare with acetylcysteine but can be managed by stopping the infusion and then restarting at a slower rate.

Table 1. 12-hr shortened N-acetylcysteine dosing schedule (SNAP protocol).

Regimen	First inf	fusion	Second (& extended) infusion			
Infusion fluid	200mL sodium chloride (0.9% or 5% glucose	1000mL sodium chloride 0.9% or 5% glucose			
Preparation	Use 250mL infusion bag and add required volur		Add required volume of acetylcysteine to 1000mL infusion bag			
Duration of infusion	2 hc	ours	10 hours			
Drug dose	100mg/kg ace	etylcysteine	200mg/kg acetylcysteine			
Weight (kg)	Ampoule volume (mL)	Infusion rate (mL/h)	Ampoule volume (mL)	Infusion rate (mL/h)		
30-39	18	109	35	104		
40-49	23	112	45	105		
50-59	28	114	55	106		
60-69	33	117	65	107		
70-79	38	119	75	108		
80-89	43	122	85	109		
90-99	48	124	95	110		
100-109	53	127	105	111		
≥ 110	55 128		110	111		

Each ampoule = 200mg/mL acetylcysteine. Dose calculation based on weight in middle of band. Ampoule rounded up to nearest whole number.

Acetylcysteine Prescribing and Administration Chart for 12-hr shortened N-acetylcysteine dosing schedule (SNAP protocol) – **RHC Glasgow**

Infusion 1 & 2 only

Please ensure that acetylcysteine is also prescribed on the patient's HEPMA Kardex.

Name:	
Address:	
DoB:	
CHI:	
	Affix patient data label

Weight:....kgs
(NO NOT USE If patient <6 years of age)

Infusion 1 Acetylcysteine 100mg/kg over 2 hours Prescription										
					Preparation	Administration checks				
Date	Time	Dose (mL)	Diluent (200mL)	Infusion rate (mL/hr)	Prescriber's signature	Prepared/ Checked by	Date Time	Volume remaining (mL)	Volume infused (mL)	Checked by
Comme	Comments: Stopped by		by:							
				Date:	Time	Signature				

Infusion 2 Acetylcysteine 200mg/kg over 10 hours			0 hours							
Prescription					Preparation	Administration checks				
Date	Time	Dose (mL)	Diluent (1000mL)	Infusion rate (mL/hr)	Prescriber's signature	Prepared/ Checked by	Date Time	Volume remaining (mL)	Volume infused (mL)	Checked by
Comments: Stopped by:										
				Date:	Time	Signature				
					1	1	•		† 	†

EXTENDED TREATMENT

- If extended treatment with acetylcysteine is required (see clinical guideline) then continue at the dose and infusion rate used for the infusion 2 and prescribe on the infusion 3 & 4 chart.
- Recheck bloods as per guideline 2hrs before the end of the infusions and refer to guideline regarding discontinuation of extended treatment.

Patients with an increase in INR and normal ALT

Both paracetamol and acetylcysteine treatment may cause an increase in INR in the absence of liver injury. Patients who do not meet any of the criteria for continuation of acetylcysteine treatment but have an increase in INR of 0.4 or less (e.g. 1.1 to 1.5) AND have a normal ALT do not require further acetylcysteine.

Patients who have an increase in INR of 0.5 or more (e.g. 1.1 to 1.6) <u>without</u> an ALT rise - **STOP** acetylcysteine & recheck INR and ALT **after 4 - 6 hours**. If bloods show INR is unchanged or falling <u>AND</u> ALT is less than two times the upper limit of normal then no further treatment is required.

If the criteria above are not met - restart acetylcysteine at the dose and infusion rate used in the last treatment bag.





Acetylcysteine Antidote Adverse Effects – Features & Management

REACTION to acetylcysteine			COMPLICATIONS of paracetamol ingestion						
None	Wheeze Hypotension Other: Specify		Abnormal liver function Acute kidney injury Hypoglycaemia Acidosis		Encephalopath Haemorrhage Other: Specify				
Date and time of reaction	Initia		Date and time of reaction Initial						
MANAGEMENT OF SIDE EFFEC									
 N-acetylcysteine may cause anaphylactoid reactions in 2% of cases with this protocol. Flushing, pruritus, rash, hypotension, angioedema, bronchospasm and vomiting are most common. Reactions can be managed by stopping the infusion. Consider chlorphenamine for flushing/itch, nebulised salbutamol if there is bronchospasm and ondansetron if there are GI side effects. Restart the infusion once the reaction has resolved at half the rate to completion of infusion. Previous reaction is NOT a contra-indication to N-acetylcysteine and cases should receive treatment if indicated. Reactions are now considerably less common with the 12-hour SNAP protocol compared to standard regimes. 									
Ondansetron oral or IV slow	(over 2 mins) in	ection (Nause	a and vomiting) - Age 6 mo	nths-1	6 years				
Body weight		Do							
Up to 10kg			ng three times daily						
10 - 40kg			ng three times daily						
41kg and above	المامنة المرسم	8m	mg three times daily						
· - ·	Chlorphenamine ORAL (Rash and itch)								
Age			Dose Ima tuico pordav						
1-23 months			1mg twice perday 1mg 4-6 hourly (maximum 6mg perday)						
2-5 years			2mg 4-6 hourly (maximum 12mg perday)						
6-11 years			4mg 4-6 hourly (maximum 24mg perday)						
12-16 years Chlorphenamine IVINJECTIO	IN (Rach and itch		g 4-0110dily (Maximum 2	411181	Del day)				
Age	<u>ny</u> (Nasiranana	•	oose						
1-5 months			50 micrograms/kg (maximum four times daily)						
6 months - 5 years			5mg (maximum four times daily)						
6 - 11 years			mg (maximum four times daily)						
12 - 16 years		mg (maximum four times daily)							