| *Patient Label, or* |
| --- |
| Name:<br>DoB:<br>Hospital number:<br>CHI: |

Multi Disciplinary Care Pathway for

# PARACETAMOL OVERDOSE

## Ingested over a period of one hour or less - presenting more than 24 hours after acute ingestion

This care pathway includes the **ADULT** SNAP based regimen for acetylcysteine and is **ONLY** for use in **NHS LOTHIAN**

For advice contact the on-call toxicologist at the RIE (Monday – Friday 8.30 am – 6 pm) or the National Poisons information Service Tel 0344 892 0111 (out of hours)

| Multi Disciplinary Care Pathway for<br>**PARACETAMOL OVERDOSE – More than 24 HOURS**<br>Date:<br>**Hospital: RIE ☐ SJH ☐ WGH ☐**<br>**Clinical area: ED/A&E ☐ AMU ☐ MAU ☐ Obs Ward ☐** | *Patient Label, or*<br>Name:<br>DoB:<br>Hospital number:<br>CHI: |
|---|---|

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**To be initiated once a PARACETAMOL overdose is suspected**

# Ingested over a period of one hour or less - presenting more than 24 hours after acute ingestion

| *KEY TO INITIALS OF **ALL** STAFF COMPLETING THIS CARE PATHWAY* | | | | |
|---|---|---|---|---|
| Print name | Designation | Initials | Signature | Date |
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |

**PATIENT:** This document is a supplement to your record of treatment for an admission with a suspected or confirmed paracetamol overdose.

**STAFF:** Should be completed in addition to the Inpatient Record (nursing admission, medical clerking, Toxicology Questionnaire), NEWS observation chart, ED shock chart, Infusion charts and Prescription & Administration Record.

| **SUMMARY** | **Initials & time** |
|---|---|

Ingestion date……

Ingestion time……

List all the drug(s) ingested

……

……

……

……

……

Alcohol ingested? Yes ☐ No ☐

Was paracetamol bought for overdose: Yes ☐ No ☐

Total paracetamol ingested …….g

Patient's weight…….kg

**CALCULATE**
The amount of paracetamol ingested ……..mg / kg

| Notes | **For obese patients weighing more than 110 kg**, the toxic dose in mg/kg should be calculated using 110kg, rather than the patient's actual weight.<br>**For pregnant patients** the toxic dose in mg/kg should be calculated using the patient's pre pregnancy weight |
|---|---|

There is a dosage calculator on TOXBASE® for calculating mg/kg.

This document represents the care expected for a majority of your patients. It is to be expected that some patients will need care other than that noted. This is referred to as a 'Variance' and should be noted as 'Var' in the appropriate space & explained fully on the 'Variance' sheet, page 8.
**Clinicians are free to exercise their own professional judgements as appropriate.**
However, any alteration to practice noted in this document should be noted as a 'Variance' in notes.

**Please tick boxes as appropriate and initial / time in conjunction with the Inpatient record.**

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**Ingested over a period of one hour or less - presenting more than 24 hours after acute ingestion**

Give acetylcysteine **immediately** to all patients if it is thought that 150 mg/kg or more paracetamol has been ingested as an acute overdose (i.e. all doses taken within one hour) or if they are symptomatic with jaundice or hepatic tenderness.

If the patient is asymptomatic and has ingested less than 150 mg/kg, wait for blood results before considering treatment with acetylcysteine.

| **STAGE 1 - IMMEDIATE ASSESSMENT AND MANAGEMENT** | |
|---|---|
| **Assessment**<br>Thought to have taken 150 mg/kg or more **OR** clinical features of hepatic injury Yes ☐ No ☐<br>• **If Yes,**<br>**START ACETYLCYSTEINE IMMEDIATELY DO NOT WAIT FOR BLOOD RESULTS** ☐<br>(Refer to SNAP based dosage table on Page 5)<br>**If no,**<br>• Wait for bloods results to determine if acetylcysteine is required ☐ | Initial & time |
| **Blood sampling** ☐<br>• Obtain urgent blood samples for paracetamol concentration, U&Es, $TCO_2$, LFTs, glucose, FBC, INR | |

| **ON RECEIPT OF BLOOD RESULTS:** | Initial & time |
|---|---|
| • Date, time and blood results documented on page 4 ☐ | |
| **If treatment has not been initiated START acetylcysteine if:** ☐ | |
| • Paracetamol concentration is detectable (5 mg/L or more) **OR** ☐ | |
| • INR is greater than 1.3 (in the absence of another cause, e.g. warfarin) **OR** ☐ | |
| • ALT is above the upper limit of normal (50 U/L) ☐ | |

| Notes | Patients with a chronically elevated ALT (e.g. chronic liver disease), may not require acetylcysteine treatment if the ALT and INR have not significantly changed from previously documented values. These cases should be discussed with the National Poisons Information Service (NPIS) Tel 0344 892 0111<br><br>Haemodialysis may be indicated alongside acetylcysteine if the patient has a very high paracetamol concentration and an elevated lactate. For advice contact local toxicologist or NPIS out of hours |
|---|---|

| The patient is considered not to be at risk of liver toxicity if: | Initial & time |
|---|---|
| • Paracetamol concentration is not detectable (less than 5 mg/L) **AND** | |
| • INR is 1.3 or less **AND** | |
| • ALT is within normal range (50 U/L or less) **AND** | |
| • The patient is asymptomatic with no clinical features suggesting liver damage | |
| • If these criteria are met the acetylcysteine if not required ☐ | |
| • If these criteria are met and acetylcysteine has been started it can be discontinued ☐ | |

| **Assessment of renal function** | |
|---|---|
| • If acetycysteine is not required and the creatinine is normal the patient can be discharged. Provide the patient with a 'Patient Information Sheet' (available on TOXBASE) ☐ | |
| • If acetylcysteine is not required and the creatinine is abnormal the patient should remain in hospital for monitoring of renal function and if required, treated conventionally ☐ | |

If treatment with acetylcysteine is not indicated and further blood tests are not required, go to Stage 4 'Subsequent Management & Discharge' [p 8]

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|---|---|

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If you complete an entry on this page, initial as you complete each aspect of care then complete the 'KEY TO INITIALS' table on page 1 sign/print/designation.

| **Assessment blood results**<br>Date/Time of sample | **Repeat blood results (if required)**<br>Date/Time of sample |
|---|---|
| Urea | Urea |
| Sodium | Sodium |
| Potassium | Potassium |
| $TCO_2$ | $TCO_2$ |
| **Creatinine** | **Creatinine** |
| eGFR | eGFR |
| Bilirubin | Bilirubin |
| **ALT** | **ALT** |
| Alk Phos | Alk Phos |
| Hb | Hb |
| MCV | MCV |
| WCC | WCC |
| Platelets | Platelets |
| **INR** | **INR** |
| | |
| | |
| **Plasma paracetamol concentration…….<br>at……hours post ingestion** | **Plasma paracetamol concentration…….<br>at……hours post ingestion** |
| Glucose | Glucose |
| H+ | H+ |
| Lactate | Lactate |
| $HCO_3$ | $HCO_3$ |
| $TCO_2$ | $TCO_2$ |
| Other | Other |
| | |
| | |
| Initials date / time | Initials date / time |

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|---|---|

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## STAGE 2 – INITIATION OF TREATMENT WITH ACETYLCYSTEINE

**FOR OBESE PATIENTS WEIGHING more than 110 kg**
Calculate acetylcysteine dose using 110 kg rather than the patient's actual weight

**FOR PREGNANT PATIENTS**
Calculate acetylcysteine dose using the patient's actual pregnant weight

**THIS SNAP BASED DOSAGE TABLE IS ONLY FOR USE IN NHS LOTHIAN**

**Adult acetylcysteine prescription**

**(each ampoule = 200 mg/mL acetylcysteine)**

| Regimen | First Infusion | | Second Infusion | |
|---|---|---|---|---|
| Infusion fluid | 200 mL 5% glucose[1] or sodium chloride 0.9% | | 1000 mL 5% glucose[1] or sodium chloride 0.9% | |
| Duration of infusion | 2 hours | | 10 hours | |
| Drug dose | 100 mg/kg acetylcysteine | | 200 mg/kg acetylcysteine | |
| Patient Weight[2] | Ampoule volume[3] | Infusion Rate | Ampoule volume[3] | Infusion Rate |
| kg | mL | mL/h | mL | 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 |

[1] Check capillary blood glucose at least once in all patients, and 4-hourly in patients with diabetes

[2] Dose calculations are based on the weight in the middle of each band

[3] Ampoule volume has been rounded up to the nearest whole number.

**Extended treatment – continue acetylcysteine at the dose and infusion rate used in the 2nd treatment bag**

| **Patient's weight …….. kg** | |
|---|---|
| Prescription and Administration record completed ☐ | |
| **Date/time treatment commenced** | Initial |

| **REACTION to acetylcysteine** | | | | **COMPLICATIONS of paracetamol ingestion** | | | |
|---|---|---|---|---|---|---|---|
| None | ☐ | Wheeze | ☐ | Abnormal liver function | ☐ | Encephalopathy | ☐ |
| Flushing | ☐ | Hypotension | ☐ | Acute kidney injury | ☐ | Haemorrhage | ☐ |
| Vomiting | ☐ | Other | ☐ | Hypoglycaemia | ☐ | Other | ☐ |
| Rash/Itch | ☐ | Specify…… | | Acidosis | ☐ | Specify…… | |
| Date and time of reaction | | Initial | | Date and time of complication | | Initial | |

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## STAGE 3 – END OF TREATMENT WITH ACETYLCYSTEINE

- **End bag 2 blood samples**
  U&Es, $TCO_2$, LFTs, FBC, INR & **PARACETAMOL CONCENTRATION**

| | | |
|---|---|---|
| • **End of bag 2 blood results -** documented in table below | ☐ | Initial & time |

## Blood results

| | Admission Bloods | End of bag 2 bloods | End of extended bag 1 bloods | End of extended bag 2 bloods | End of extended bag 3 bloods |
|---|---|---|---|---|---|
| Notes | * Copy from page 4 | Obtain blood samples at the end of bag 2 | Obtain blood samples at the end of extended bag 1 | Obtain blood samples at the end of extended bag 2 | Obtain blood samples at the end of extended bag 3 |
| | | Date/time taken<br>Initial | Date/time taken<br>Initial | Date/time taken<br>Initial | Date/time taken<br>Initial |
| Urea | | | | | |
| Sodium | | | | | |
| Potassium | * | | | | |
| $TCO_2$ | | | | | |
| Creatinine | * | | | | |
| eGFR | | | | | |
| Bilirubin | | | | | |
| ALT | * | | | | |
| Alk. Phos | | | | | |
| Hb | | | | | |
| WCC | | | | | |
| Platelets | | | | | |
| INR | * | | | | |
| Paracetamol | * | | | | |
| Reviewed by<br>Decision | | Initial<br>Continue / stop | Initial<br>Continue / stop | Initial<br>Continue / stop | Initial<br>Continue / stop |

**END OF BAG 2 bloods review:**

- **Criteria for DISCONTINUING acetylcysteine after Bag 2 are:**
  ALT is less than 50 U/L **AND**
  ALT is less than double the admission measurement (even within normal range) **AND**
  PARACETAMOL concentration is less than 10 mg/L
- **If criteria are NOT met continue with extended acetylcysteine**

***Patients with isolated INR rise of less than 0.5**

For patients who have an isolated INR rise of less than 0.5, stop acetylcysteine and recheck INR and ALT after 4-6 hours.

- **Criteria for DISCONTINUING acetylcysteine at this point are:**
  INR is unchanged or falling **AND**
  ALT is less than 50 U/L
- **If criteria not met – restart acetylcysteine at the dose and infusion rate of the last treatment bag.**

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If creatinine is abnormal or is 10% greater than at presentation, further acetylcysteine is not required but renal function should be monitored as an inpatient. Re-check 12 hours later.

| | | |
|---|---|---|
| • **End of bag 2 blood results reviewed by medical staff (of grade FY2 and above)**<br>• **Decision to discontinue or continue acetylcysteine documented in the table above and on page 7** | ☐<br>☐ | Initial & time |

## STAGE 3 – END OF TREATMENT WITH ACETYLCYSTEINE

| | | |
|---|---|---|
| **If criteria for discontinuing acetylcysteine at end of Bag 2 are met:**<br>• **Discontinue** acetylcysteine. Time infusion discontinued..... | ☐ | Initial |
| **Decision**<br>• If further treatment or blood sampling is not required go to Stage 4 'Subsequent Management & Discharge'(page 8)<br>• If monitoring of renal function is required obtain blood samples 12 hours later followed by a medical review<br>• **If extended acetylcysteine is indicated follow advice below** | ☐<br>☐<br>☐ | Initial & time |

| | | |
|---|---|---|
| **If criteria for discontinuing acetylcysteine at the end of Bag 2 are NOT met:** | ☐ | Initial & time |
| • **Continue** extended acetylcysteine treatment at the dose and infusion rate of bag 2 (page 5)<br>• Obtain blood samples for U&Es, $TCO_2$, LFTs, FBC & INR at the end of extended bag 1<br>• Extended bag 1 bloods due at …..……..... obtained at ….....…. | ☐<br>☐<br>☐ | |

**End of Extended bag 1 bloods review:**

- **Criteria for DISCONTINUING acetylcysteine after extended bag 1 are:**

  INR is 1.3 or less and has not risen by 0.5 or more from admission measurement* **AND**

  ALT is less than two times the upper limit of normal (less than 100 U/L) **AND**

  ALT is less than double the admission measurement

- **If the criteria for discontinuing are NOT met continue with further extended acetylcysteine**

If creatinine is abnormal or is 10% greater than at presentation, further acetylcysteine is not required but renal function should be monitored as an inpatient. Re-check 12 hours later.

***Patients with isolated INR rise of less than 0.5**

For patients who have an isolated INR rise of less than 0.5, stop acetylcysteine and recheck INR and ALT after 4-6 hours.

- **Criteria for DISCONTINUING acetylcysteine at this point are:**

  INR is unchanged or falling **AND**

  ALT is less than two times the upper limit of normal (less than 100 U/L)

- **Otherwise commence 2nd extended bag of acetylcysteine**

| | | |
|---|---|---|
| • **End of extended bag 1 blood results reviewed by medical staff (of grade FY2 and above)**<br>• **Decision to discontinue or continue acetylcysteine documented in the table on page 6 and in the decision box below** | ☐<br>☐ | Initial & time |
| **Decision**<br>• If further treatment or blood sampling is not required go to Stage 4 'Subsequent Management & Discharge'(page 8)<br>• If renal function monitoring is required obtain samples 12 hours later followed by medical review<br>• **If further extended acetylcysteine is indicated follow advice below** | ☐<br>☐<br>☐ | Initial & time |

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|---|---|

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| **If further extended treatment is required:** | | Initial & time |
|---|---|---|
| • Continue acetylcysteine at the dose and infusion rate used in the 2nd treatment bag (Page 5) | ☐ | |
| • Ward level capillary blood glucose monitoring (BMs) at least four times daily | ☐ | |
| • Recheck U&Es, LFTs, FBC and INR every 9 hours to assess the course of liver injury (1 hour before the end of each extended bag). Document results on page 6 | ☐ | |

**Discontinue further extended treatment when:**

- INR 1.3 or less; OR falling towards normal on two consecutive blood tests, and less than 3.
- There is no clinical advantage to treating ALT rises after this normalisation in INR (indicating restoration of hepatic synthetic function)

| Extended treatment with acetylcysteine was required Yes ☐ No ☐<br>If YES, number of extended bags required …… | Initial & time |
|---|---|

Once treatment with acetylcysteine is discontinued and further blood tests are not required go to Stage 4 'Subsequent Management & Discharge' (page 8)

## STAGE 4 – SUBSEQUENT MANAGEMENT & DISCHARGE

**Target** — Initial/time

Treatment with acetylcysteine tolerated N/A ☐ Yes ☐ No ☐

- Patient eating and drinking. Yes ☐ No ☐
- Seen by Psychiatry team member N/A ☐ Yes ☐ No ☐

Comment……..

**Discharge** — Initial/time

- Treatment complete N/A ☐ Yes ☐ No ☐
- Criteria for discharge met Yes ☐ No ☐

Comment……

- Discharge advice given, **including paracetamol patient discharge sheet** (available on TOXBASE®) ☐
- NOK informed Yes ☐ No ☐

Comment……

Left department Date…….. Time……..

**Follow-up** — Initial/time

- Has follow-up been arranged? N/A ☐ Yes ☐ No ☐

Comment……

| Notes | Medical follow-up arrangements are not normally required if blood results are within acceptable range |
|---|---|