Paracetamol

Pseudonyms – Acetaminophen, N-acetyl-p-aminophenol

Paracetamol is a common analgesic that acts as a competitive inhibitor of cyclooxygenase enzymes. It is metabolised in the liver through various pathways, including glucuronidation and sulfation, to enhance its excretion from the body. At therapeutic doses, approximately 10% of paracetamol is metabolised by cytochrome P450 enzymes to N-acetyl-p-benzoquinone imine (NAPQI), a highly reactive, hepatotoxic compound. NAPQI is rapidly conjugated with glutathione to a non-toxic metabolite for excretion. However, with toxic doses of paracetamol, glucuronidation and sulfation pathways become saturated, and glutathione stores can become depleted. This results in accumulation of NAPQI, causing hepatocellular damage and potentially leading to acute liver failure.

General information

Collection container:

Adults - serum (with gel separator, 4.9mL Sarstedt brown top)
Paediatrics - lithium heparin plasma (1.2mL Sarstedt orange top tube)

Type and volume of sample:

Serum or lithium heparin plasma, minimum 1 ml whole blood required (200 µl separated serum/plasma).

Specimen transport/special precautions:

Sample should be collected four hours after ingestion/overdose, or immediately if the patient presents after four hours.

Laboratory information

Method principle:

Automated colorimetric assay (Roche cobas platform).

Paracetamol is hydrolysed by an arylacylamidase to yield p-aminophenol, which in turn is converted to an indophenol in the presence of o-cresol and a periodate catalyst. The production of indophenol is followed colorimetrically and is directly proportional to the drug concentration in the sample.

Biological reference range or cut off:

The paracetamol overdose treatment graph can be found on the Pharmacy section of the Trust intranet, in the BNF and on TOXBASE. Ensure the correct units (mg/L) are used to interpret the result.

Turnaround time: Results are available within 2 hours (urgent - phone lab in advance of sampling) or 4 hours (routine).

Clinical information

Factors known to significantly affect the results

Samples collected less than four hours post-ingestion cannot be reliably interpreted.

Interpretation is also difficult in suspected staggered overdose or where there is doubt of the time of paracetamol ingestion (refer to TOXBASE guidance for management of staggered overdose or where time of ingestion is unknown).

Clinical decision points

For acute overdose, refer to the paracetamol overdose treatment graph and follow guidance from the National Poisons Information Service (NPIS). Further information and advice is available on the TOXBASE website or from NPIS (0344 892 0111).

References

1) National Poisons Information Service: https://www.toxbase.org/

(Last updated November 2019)