

## Procalcitonin Testing in Adults – Full Clinical Guideline

Reference no: MIC-CG/2020/3640

### Background

Procalcitonin (PCT) is a protein produced in the C-cells of the thyroid gland in levels not normally detectable in the blood. However, during bacterial infection, toxins and cytokines stimulate production of PCT in other cells, leading to rapid increase in plasma levels in around 3-4 hours. It is therefore a sensitive and specific biomarker of bacterial infection. It has a short half-life of around 24 hours and is not dependent on renal function.

PCT has been used to help differentiate bacterial infection from viral infection, fungal infection, autoimmune disease and other causes of SIRS. Sensitivity and specificity vary between infection site, patient group and cut-off level. PCT can be used in conjunction with other tests and clinical judgment to determine if the patient's condition is likely to be due to bacterial infection and to help inform decisions about antibiotic therapy.

### Indications for testing

PCT levels are used to guide antibiotic use in the following situations;

- Patients where infection is suspected but criteria for sepsis not met and there is no confirmed evidence of infection
- Initiation or discontinuation of antibiotics is being considered
- On advice from a Microbiologist or Infectious Diseases Specialist

Procalcitonin testing should **not** be used;

- Where **bacterial** infection is highly likely or proven and antibiotics are indicated regardless of PCT result
- Patients who meet sepsis criteria
- Patients with significant positive cultures or clearly identified source of infection
- Severely immunocompromised patients
- Patients with cystic fibrosis or active tuberculosis

Procalcitonin levels will be increased in the following conditions and therefore **cannot** be used to guide antibiotic therapy;

- Surgery within previous 3 days
- Treatment that acts upon the pro-inflammatory CK cascade (OKT3, injection therapy TNF $\alpha$ , IL-2 and anti-lymphocyte globulins)
- Some cancers; medullary CT-cell cancers of the thyroid, pulmonary small-cell carcinoma and bronchial carcinoma
- Prolonged cardiogenic shock or haemorrhage
- Severe hepatic dysfunction
- Rhabdomyolysis

There is insufficient evidence for use of PCT monitoring in pregnant women so testing is not recommended.

## Practicalities

Blood should be sent in a yellow-top tube to biochemistry. The request for PCT may be 'added-on' to samples taken within 24 hours.

## Result interpretation

PCT testing is used to aid decisions to initiate or discontinue antibiotic use. The peak level taken within 24 hours of presentation and should be used as one part of clinical assessment and not in isolation.

Level < 0.1 ng/ml	Bacterial infection very unlikely
Level 0.1 – 0.25 ng/ml	Bacterial infection unlikely
Level 0.25 – 0.5 ng/ml	Bacterial infection possible
Level > 0.5 ng/ml	Bacterial infection likely

Adapted from Royal Hampshire Protocol written by K. Saad et al, and Leeds Teaching Hospital protocol written by Philip Howard and Royal Cornwall Hospital protocol written by Neil Powell et al.

## Some useful references

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