Royal United Hospitals Bath
NHS Foundation Trust

Information for Clinicians

Clinical Biochemistry Department

Short Synacthen Test (SST) for suspected adrenal insufficiency

Indication:

Short synacthen test (SST) is performed for the investigation of suspected adrenal insufficiency. Synacthen (tetracosactrin) is a synthetic ACTH analogue which should stimulate the production of cortisol from the adrenal cortex.

Contra-indications:

- A baseline 9am cortisol of >300nmol/L excludes adrenal insufficiency and SST not required.
- Patients with severe atopic allergic disorders or previous hypersensitivity to synthetic ACTH should avoid SST.
- Avoid in pregnancy.

Precautions:

- If adrenal insufficiency is strongly suspected or cortisol <100 nmol/L, treatment should not be withheld pending a SST.
- Hypersensitivity reactions to Synacthen have been reported. Local or systemic reactions tend to occur within 30 min of injection; therefore the patient must be kept under observation for this time.
- Avoid in ITU or severely unwell patients, discuss with endocrinology if hypoadrenalism is suspected.

Preparation:

- Perform test in the morning (ideally 9am).
- Long term steroids (eg hydrocortisone or prednisolone) need to be stopped 24 hours prior to test. **The day before the test the patient may take their usual morning dose but must omit lunchtime and evening doses**. **On the day of the test the patient must omit their morning steroid dose.** The patient must bring their morning medication with them to take after the last blood test and the SST has been completed.

Procedure:

1. Take serum for **basal cortisol** (yellow top). Clearly label the sample with patient details, the actual time of collection and “time 0” or “baseline sample”

2. *If SST is being performed at RUH, please also take EDTA plasma sample (purple top) for **ACTH** and send this sample to the laboratory immediately packed on ice. ACTH Sample must be separated and frozen within 15 minutes of venepuncture.*

3. Give Synacthen 250 µg i.m or i.v.(adult dose).

4. Take a serum sample at **30 mins for cortisol** (yellow top). Clearly label the sample with patient details, the actual time of collection and also “time 30 min”.

5. Take further serum sample at **60 mins for cortisol** (yellow top). Clearly label the sample with patient details and the time of collection and also “60 min”.

6. Send all 3 yellow topped serum samples for cortisol to laboratory together.

Interpretation:
Post synacthen cortisol >420 nmol/L excludes adrenal insufficiency.

Cortisol <420nmol/L 30 mins post Synacthen and >420nmol/L 60 mins post Synacthen indicates a slow/delayed adrenal response.

Patients on opioid therapy and citalopram may demonstrate an inadequate response to synacthen.

If the patient is on oestrogen containing therapies interpret with caution as baseline levels will be higher. Oestrogen induces cortisol binding globulin (CBG) and leads to elevated serum cortisol. Lower reference limits post Synacthen on oral contraceptive pill (OCP) were quoted as 643nmol/l when measured by Mass spectrometry (Clin Endo 2012 El Farhan et al.), and the RUH assay (Roche Gen II) closely aligns to this method. Consider stopping oestrogen for six weeks prior to test. Other factors that can alter CBG include: increased in pregnancy, OCP, HRT and may be decreased in liver and renal disease.

The baseline ACTH sample will only be referred for analysis if there is evidence of adrenal insufficiency (cortisol <420nmol/L post-Synacthen) to distinguish between primary and secondary adrenal failure. In the presence of adrenal insufficiency: ACTH < 10ng/L indicates secondary adrenal failure; ACTH >200ng/L indicates primary adrenal failure.