SYNACTHEN TEST - 30 MINUTE

This procedure must only be performed by Medical Consultant or competent staff designated by Consultant.

See also Low Dose Synacthen Test (Appendix)

INDICATION

Screening test for adrenal insufficiency.

PRECAUTIONS AND CONTRA-INDICATIONS

Synacthen or Synacthen Depot is contra-indicated in patients with allergic disorders, (e.g. asthma)

PRINCIPLE

Adrenal insufficiency may result from destruction of the adrenal cortex (primary hypofunction) or from disturbance of hypothalamic or pituitary function (secondary hypofunction). Single cortisol estimations are often unhelpful, as they are frequently normal in patients with adrenal hypofunction. The adrenal gland is acutely stimulated by administration of tetracosactrin (ACTH analogue) and this provides a more specific screening test for distinguishing normals from patients with adrenal insufficiency.

If the patient is strongly suspected of having Addison’s disease, treatment with dexamethasone should be started immediately and not delayed until the test has been performed. This treatment will not alter the results of the test provided the test is undertaken within a short time after starting dexamethasone.

PATIENT PREPARATION

The test does not require hospital admission and should be started between 08:00 and 10:00. The subject need not be fasted. Ensure patient is not taking cortisone, prednisolone or synthetic corticosteroid analogue (except dexamethasone).

ITEMS REQUIRED

1 ampoule of Synacthen (Ciba) 250 microgram (µg) in 1mL of solution.

PROCEDURE

1. Take 4mL of blood into a plain gold topped Vacuette®. Clearly label this basal sample with time and date.

2. In adults inject Synacthen (250 µg) as a single intramuscular injection. In children give 36 microgram (µg) per kilogram (Kg) body weight up to a maximum of 250 microgram (µg).

3. Take further 4mL samples of blood into a gold topped Vacuette at exactly 30 and 60 minutes post Synacthen. Clearly label these samples with time and date.

4. Send all three samples to the laboratory for cortisol determinations.
INTERPRETATION

In the normal subject the basal level is usually greater than 140 nmol/L. The 30 and/or 60 minute sample should rise by >200 nmol/L to exceed 550 nmol/L.

Patients with primary or secondary adrenocortical insufficiency fail to meet these criteria. These cases may require follow up with the three day Synacthen test and ACTH determinations.

Equivocal Results: The test may be followed if the 60 minute result is equivocal, by a 24 hour depot synacthen test. The same protocol is followed but 1 mg depot synacthen is administered i.m. and the same samples taken as for the short synacthen test, at 2, 4, 8 and 24 hours.

<table>
<thead>
<tr>
<th>Time</th>
<th>95% confidence interval cortisol responses in normal subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1h</td>
<td>605 -1265 nmol/L</td>
</tr>
<tr>
<td>2h</td>
<td>750 – 1520 nmol/L</td>
</tr>
<tr>
<td>4h</td>
<td>960 – 1650 nmol/L</td>
</tr>
<tr>
<td>8h</td>
<td>1025 – 1600 nmol/L</td>
</tr>
<tr>
<td>24h</td>
<td>610 – 1500 nmol/L</td>
</tr>
</tbody>
</table>

A gradual rise with a peak cortisol response at 4 – 8 hours occurs in normal subjects. Failure to respond, or initial unsustained response at 60 min, indicates primary adrenal failure.

A response rising to a peak at 24 hours occurs in secondary adrenal failure i.e. due to pituitary failure or prolonged corticosteroid therapy. Some cases of long-standing adrenal atrophy will not respond even after 24 hours and may require several daily doses of depot Synacthen before an adrenal response is seen. These cases are usually identified by measuring plasma ACTH.

REFERENCE


APPENDIX

PAEDIATRIC PROTOCOL

Low Dose Synacthen Test
Date of Test:-
Drugs given and dose :-
Synacthen 0.5 mcg / 1.73m² i.v.

Test must be carried out first thing in the morning, preferably at 8am and no later than 9am. Measure weight and height and then calculate the surface area. Prepare Synacthen as follows:
- Inject 1ml of synacthen (250 mcg) into 500mls of normal saline.
- Mix thoroughly
- Withdraw 1ml of mixture (0.5mcg) and dilute to 10mls with normal saline
- Dose = 10 x (Surface Area / 1.73) mls

Insert cannula and withdraw first blood samples at baseline (0 mins as listed.)
Then give calculated dose of Synacthen i.v. Further samples to be taken at 30 and 60 minutes.
The child can eat and drink as they wish and can go home after the investigations are finished.

<table>
<thead>
<tr>
<th>Time of test (minutes)</th>
<th>Test</th>
<th>Baseline</th>
<th>30</th>
<th>60</th>
<th>90</th>
<th>120</th>
<th>180</th>
<th>240</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>ACTH</td>
<td>4mls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cortisol</td>
<td>4mls</td>
<td>4mls</td>
<td>4mls</td>
<td>4mls</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

ACTH in lavender top EDTA sample bottle
Cortisol in gold topped serum sample bottle.

Other Tests:-