

Low Dose Synacthen Test

Test Name: CHILD LOW DOSE SYNACTHEN TEST DFT

Please note that this test is no longer commonly used.

Principle

Adrenal glucocorticoid secretion is controlled by adrenocorticotrophic hormone (ACTH) released by the anterior pituitary. This test evaluates the ability of the adrenal cortex to produce cortisol after stimulation by synthetic ACTH (tetracosactrin: Synacthen). The low-dose test is thought to be a more sensitive version of the standard dose Synacthen test, using a physiological rather than a pharmacological dose of Synacthen.

Indication

The low-dose test may be indicated in children who have a normal response to the standard dose Synacthen test, but a clinical history (e.g., chronic steroid therapy or symptoms, such as hypoglycaemia), suggestive of adrenocortical insufficiency. Use this low dose test for children who have been on inhaled or topical steroids, on corticosteroid treatment and when partial adrenal insufficiency is suspected.

Precautions

- The test is unreliable in patients taking the oral contraceptive pill.
- The dose of Synacthen involved in this test is very low. Great care must be taken with preparation and administration.
- Do not perform at the same time as an oral glucose tolerance test.

Side Effects

- Severe allergic reactions to Synacthen have been described, particularly in children with a history of allergic disorders, but are very rare. In children with prior known synacthen sensitivity, a repeat synacthen test is not advisable. In such cases, morning basal ACTH and cortisol levels can alternatively test for adrenal function.

Preparation

- The patient does not need to be fasted.
- This test can be performed at any time of day
- All glucocorticoid therapy (other than dexamethasone or betamethasone) interferes with the assay of cortisol. If the patient is on prednisolone therapy, this must be discontinued for 24 hours prior to the test. If the patient is on a supra-physiological dose of hydrocortisone, this should be reduced to a physiological level (6 micrograms/m²/day) prior to the test. Omit the dose the night before and on the morning of the test. If the paediatric endocrine consultant is very anxious about the degree of adrenal insufficiency, then omit only the morning hydrocortisone dose. However, the patient should take their usual dose of corticosteroid as soon as the test is completed.

Protocol

1. Insert reliable cannula and rest patient for 30 minutes.
2. Prepare **1 microgram solution of Tetracosatide from 250 micrograms vial** as follows:
 - Dilute 1 mL to 50 mL with normal saline giving 250 micrograms in 50 mL
 - Take 1 mL of above solution and dilute with 9 mL of saline giving 5 micrograms in 10 mL.
 - The diluted dose must be freshly prepared.
3. Take basal blood sample for cortisol (t = 0 min).
4. Administer 2 mL of above solution (1 microgram) to patient i.v.
5. Flush the line with 5 mL saline to ensure that the whole dose has been administered.
6. Take blood samples at + 20 min
+ 30 min

+ 40 min
after Synacthen, for cortisol

Samples

Cortisol: 1.2 mL lithium heparin (orange top) or clotted blood (white top)

Interpretation

- A normal response is a peak cortisol level of ≥ 430 nmol/L. Levels below 430 nmol/L indicate a degree of adrenal insufficiency.
- In patients on long-term glucocorticoids, it is difficult to differentiate underlying adrenocortical disorders from the adrenal-suppressive effects of the treatment. A urine steroid profile may also be misleading after only 24 hours off hydrocortisone. The urine steroid lab at King’s College Hospital recommends changing the glucocorticoid to dexamethasone and stimulating with depot Synacthen for up to 5 days before sample collection, unless glucocorticoid treatment has been brief. Please discuss with the paediatric endocrine team and the laboratory.

References

1. Elder C.J., Sachdev P. & Wright N.P. (2012) The short Synacthen test: a questionnaire survey of current usage. *Arch Dis Child* 97: 870-873
2. Dickstein G. & Saiegh L. (2008) Low-dose and high-dose adrenocorticotropin testing: indications and shortcomings. *Curr Opin Endocrinol Diabetes Obes.* 15: 244-9