SHORT SYNACTHEN TEST – PAEDIATRIC PROTOCOL

INTRODUCTION

This Short Synacthen test involves the administration of Tetracosactrin (Synacthen, Cortrosyn), a synthetic preparation comprising the first 24 amino acids of ACTH, to assess adrenal cortical reserve. Indications for use are in the assessment of suspected adrenal insufficiency or in suspected congenital adrenal hyperplasia (CAH) – both classical and non-classical forms. It is also increasingly being used as an alternative to the insulin tolerance test for secondary hypoadrenalism.

CONTRAINDICATIONS AND SIDE EFFECTS

Not required if random cortisol >450 nmol/L.
Not to be used in early post-operative assessment of the HPA axis as response may be normal.
Possible allergic reaction.

PATIENT PREPARATION

The child does not need to fast. The test is best performed early in the morning. If the patient is on hydrocortisone, the final dose should be at midday on the day prior to the test. Steroid cover with dexamethasone can be provide if absolutely necessary. Any oestrogens should be discontinued for 6 weeks before the test.

If screening for 21-hydroxylase deficiency, perform the test in the follicular phase (if post-puberty) – this is to avoid any cross reactivity between progesterone and 17-hydroxyprogesterone.

The patient is placed in a reclining position to rest for 30 minutes prior to the test.

PRECAUTIONS AND PATIENT CARE DURING TEST

Preparation for the treatment of anaphylactic reaction should be made in advance

1. The patient should rest on the bed for the duration of the test.
2. Tetracosactrin can cause an allergic reaction within approximately half an hour of the injection; the patient should therefore be kept under observation during this time.
3. If there is a local or systemic reaction e.g. marked redness and pain at the injection site, urticaria, pruritis, flushing, faintness or dyspnoea, treat for anaphylactic shock.

Emergency Treatment for Anaphylactic Reaction

1. Adrenaline 0.4 to 1mL of a 0.1% solution IM or 0.1 to 0.2mL of a 1% solution in 10mL of physiological saline slowly by IV.
2. Hydrocortisone 100-500mg IV three to four times in 24 hours, repeat if necessary.

PROTOCOL

Please use separate pro-forma to record samples taken and timing.

1. Cannulate the child and wait 30 minutes before taking baseline (time 0) samples.
2. Take baseline (time 0) blood samples as per proforma for cortisol and ACTH (and 17-hydroxyprogesterone if querying CAH).
3. Administer the Tetracosactrin according to the dosage chart below:

Tetracosactrin (Synacthen) Dosage (I.M.)	
Infants under 6 months	15 mcg/kg
Children over 6 months and under 2 years	125 mcg
Children over 2 years	250 mcg

4. Take second set (time 30 minutes) of blood samples as per proforma for cortisol (and 17hydroxyprogesterone).
5. Take final set (time 60 minutes) of blood samples as per proforma for cortisol (and 17-hydroxyprogesterone).

INTERPRETATION

Interpretation in adrenal function

A normal cortisol response would be a rise to a peak >450 nmol/L. Equivocal results are sometimes obtained in the neonatal period. Low normal levels or partial responses are compatible with some degree of adrenocortical impairment and are an indication for further investigation. A clearly normal response excludes primary and secondary adrenocortical insufficiency and indicates that further tests are not required.

Interpretation in 21-hydroxylase deficiency

With a block in cortisol synthesis, 17-hydroxyprogesterone levels will rise after Tetracosactrin is administered, but there will be little increase in cortisol. In suspected CAH, a peak 17-hydroxyprogesterone of 100 to 200 nmol/L is suggestive of 21-hydroxylase deficiency (higher reference range for preterm infants, if partial deficiency is suspected, 17-hydroxyprogesterone >30 nmol/L may be suggestive).

CONTACTS

Basildon Hospital Biochemists: ext. 3029 / 3095 / 3539

Southend Hospital Biochemist: ext. 8795

REFERENCES

1. Ogilvy-Stuart A and Midgley P. Practical Neonatal Endocrinology, Cambridge Clinical Guides 2006

2. Method-specific serum cortisol responses to the adrenocorticotrophin test: comparison of gas chromatography mass spectrometry and five automated immunoassays
Nadia El-Farhan et al Clinical Endocrinology (2013) 78, 673–680

3. The effect of serum matrix and gender on cortisol measurement by commonly used immunoassays
AJ Dodd et al. Annals of Clinical Biochemistry 2014, Vol. 51(3) 379–385

Endocrine society guideline. Primary adrenal insufficiency – February 2016.