Tetracosactide (Synacthen®) Testing in Newborn Infants - NICU

Procedure Responsibilities and Authorisation

Department Responsible for Procedure	NICU
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Target Audience	Nurses, Nurse Practitioner, Clinical Nurse Specialist, Registrar, Consultant.
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Procedure Review History

Version	Updated by	Date Updated	Summary of Changes
3	Kathryn Thorn	08-Oct-2018	New format
4	Jutta van den Boom	30-04-2021	Updated dosage, new format

Tetracosactide (Synacthen®) Testing in Newborn Infants - NICU

1 Overview

1.1 Purpose

To outline the procedure to perform the "Short Synacthen® Test" to diagnose adrenal insufficiency in neonates.

1.2 Scope

All Waikato District Health Board (DHB) medical and nursing staff involved in the administration of tetracosactide (Synacthen®).

1.3 Patient / client group

Neonates.

1.4 Definitions and acronyms

CAH	Congenital Adrenal Hyperplasia
17 OHP	17 hydroxyprogesterone
ACTH	Adrenocorticotropic hormone

2 Clinical Management

2.1 Equipment

- IV equipment
- Sodium chloride 0.9% for flushing
- Blood tubes for samples (clearly labelled with times, '0 time', '30 min time' and '60min time')
- If there is diagnostic uncertainty, a blood sample at 45 minutes can be drawn so not to miss the peak.
- For CAH testing measure **17-hydroxyprogesterone (17-OHP)** at each time point as well as cortisol

Cortisol	1 tube (600 microlitre)	Heparin (green top blood tube)
		Serum Separator tube (SST) (yellow top blood tube
		(red top blood tube)

Cortisol and 17-OHP	2 tubes (600 microlitre each)	(red top blood tube)

- 1 ampoule tetracosactide (Synacthen®) (synthetic ACTH) 250 micrograms/ml

2.1.1 Indications

Clinical concern that child may have adrenal insufficiency e.g. suspected hypopituitarism, long term steroid therapy, ambiguous genitalia.

2.1.2 Procedure

The child should not be on steroids at the time of the test

This is a standard dose tetracosactide (Synacthen ®) stimulation test of 250 micrograms /1.73 m^2. (= 144 microgram/m^2).

The test can be performed at any time of day as diurnal variation not established.

Fasting is not required before or during procedure

- Calculate body surface area (BSA) in m^2
  BSA for neonates is calculated with the formula:
  $Body\ Surface\ Area\ (m^2) = \sqrt{\text{Body Weight (kg)} x\ Height\ (cm)/3600}$

  Dose calculation:
  144 micrograms/m^2 x calculated BSA (m^2)

- Calculate dose:
  144 micrograms/m^2 x calculated BSA (m^2)

  Example:
  3kg, 52cm
  BSA = 0.2m^2
  Dose: 144 x 0.2 = 28.8 micrograms

- Amount to be given:
  Example:
  28.8 micrograms / 250 = **0.12ml** (of 250 micrograms/ml solution)

- For volumes less than 0.2 ml, draw up into 5 ml normal saline, with final concentration of 250mcg/5ml = 50mcg/ml
  Example:
  28.8 micrograms / 50 = 0.58ml (of 50 micrograms /ml solution)

- Insert IV line (if no IV access can be given IM)
- Withdraw 'zero' blood sample, label tube "**0 time**" (if no iv access, needs heel prick sample)
- Give tetracosactide IV over 45 seconds
- Keep vein open with infusion of sodium chloride 0.9% flush
- Withdraw samples at **'30 min time'** and '**60 min time'**
- Send samples stored at room temperature to the laboratory.

2.1.3 Interpretation

Peak cortisol (at any time) < 400 nmol/L - Adrenal insufficiency.

Peak cortisol (at any time) > 400 nmol/L - Normal response. Adrenal insufficiency is unlikely unless there is recent or partial ACTH deficiency.

2.2 Potential complications

Observe the patient throughout test and for 30 minutes post procedure as hypersensitivity reactions can occur following tetracosactide administration in those with allergic disorders.

3 Audit

3.1 Indicators

- The dose of tetracosactide is calculated correctly using the formulary in 2.1.2.
- There is documented evidence that three blood samples were taken at the correct intervals – 2.1.2.
- Blood samples are collected in the correct tubes - all deviations from the described process in 2.1.2 are fully investigated and actions taken to prevent a reoccurrence.

4 Evidence base

4.1 Bibliography

- Watterberg et al. J Clin Endocrinol Metab 90: 6380-6385, 2005
- Tetracosactide monograph, New Zealand Formulary for Children v107 May 2021. Accessed via https://www.nzfchildren.org.nz/nzf_3952