# Adrenal Vein Sampling from an Adult

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## 1. Purpose of guideline

To facilitate the safe and effective care of a patient whilst distinguishing unilateral adenoma from hyperplasia when Computed Tomography (CT) /Magnetic Resonance Imaging (MRI) is non-diagnostic, within Auckland District Health Board (Auckland DHB).

Once prescribed, in accordance with the *Medications - Prescribing* policy, all medication should be administered and documented in accordance with the *Medications - Administration* policy (see Associated documents).

## 2. Adrenal vein sampling process

The table below describes the stages in the adrenal vein sampling process:

| Stage | Description |
|---|---|
| **Indication** | • Follow-up investigation for the cause of established primary hyperaldosteronism in a hypertensive patient. Other tests are thought to be non-specific (postural test) or insensitive (scintigraphy).<br>• Suppressed plasma active renin usually < 15mU/L when off nonsteroidal anti-inflammatory drug (NSAIDs) and beta-blocking drugs.<br>• Plasma aldosterone > 200pmol/L after Sodium chloride 0.9% or fludrocortisone suppression.<br>• CT scan or MRI of adrenals do not show a clear-cut unilateral adenoma usually ≥ 1 cm and < 40 y/o age. |
| **Pre-requisites** | • A patient on spironolactone or amiloride for more than two weeks can return the renin - aldosterone system to normal but should discontinue therapy for six weeks before the test. Loop diuretics, beta-blockers, ACE inhibitors and calcium-channel blockers can be continued.<br>• Check for medication changes with the endocrinology consultant before booking. |
| **Preparation** | • Ensure the patient is off interfering medication (as above).<br>• Presently rapid plasma Cortisol measurements are being used to confirm correct adrenal vein catheterisation. Give biochemistry a few days' notice and remind laboratory again on the day just prior to the procedure.<br>• Notify the senior endocrinology consultant of arrangements and provide referral details. |
| **Nurse's equipment** | • Intravenous (IV) equipment for two peripheral lines<br>• One x 500 mL bag sodium chloride 0.9%<br>• One volumetric infusion pump and dedicated giving set<br>• Blood tubes (numbered in sequence and in pairs)<br>• One ampoule of Synacthen® (tetracosactide) 250 micrograms/mL<br>• Dedicated lab forms with radiology extension number. |

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| Stage | Description |
|---|---|
| **Nurse's procedure** | • Obtain venous access on both arms (one for Synacthen® infusion, the other for blood sampling) keep both veins open.<br>• IV line for peripheral blood sampling is positioned opposite the radiologist.<br>• Add 250 micrograms Synacthen® to 250 mL sodium chloride 0.9% (shake well) and prime pump set- this makes a concentration of 1 microgram/mL.<br>• While the radiologist is scrubbing, infuse 50 mL of the Synacthen® mixture as a bolus over 10 minutes, then commence infusion at 50 mL/hr (50 micrograms/hr).<br>• Notify the laboratory when the procedure is under way.<br>• The right adrenal will be catheterised first and blood drawn as nurse simultaneously withdraws a peripheral sample. **Note:** There may be several paired samples taken close together if radiologist is uncertain of placement.<br>• Both samples from peripheral and adrenal should be transported with prepared form to the laboratory technologist involved immediately provide phone number on the form of the theatre for laboratory to call with results.<br>• The left adrenal vein will be sampled next with simultaneous peripheral samples then both taken immediately to the laboratory. The radiologist will wait for the cortisol results from the right adrenal and peripheral vein if confirmation of placement required.<br>• Turnaround time likely to be 40 minutes from the laboratory. |
| **Interpretation of correct catheter positioning** | • In the adrenal vein if the peripheral/adrenal vein cortisol ratio is > 5 (may be interpretable with lower values > 2 to 5).<br>• Not in the adrenal vein if the peripheral/adrenal vein cortisol ratio is < 2; further catheterisation required.<br>• Discuss results if required with the senior endocrinology consultant. |
| **Samples** | • Aldosterone x 8 tubes (more may be needed)<br>• Cortisol x 8 tubes (more may be needed)<br>• Aldosterone and cortisol are taken for each sample. |
| **Interpretation** | • Unilateral versus bilateral aldosterone secretion is adjusted using aldosterone/cortisol (A/C) ratio to correct for dilution. This ratio should be 4x higher in the adrenal effluent from a unilateral adenoma when compared to the opposite side. The A/C ratio from the contralateral (suppressed) side is typically lower than the peripheral sample during adrenocorticotropic hormone (ACTH) stimulation. |

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## 3. Supporting evidence


- Doppman, J. L., & Gill Jr, J. R. (1996). Hyperaldosteronism: sampling the adrenal veins. *Radiology*, *198*(2), 309-312.
- Young Jr, W. F. (1997). Primary aldosteronism: update on diagnosis and treatment. *The Endocrinologist*, *7*(4), 213-221.
- Young Jr, W. F., Stanson, A. W., Grant, C. S., Thompson, G. B., & van Heerden, J. A. (1996). Primary aldosteronism: adrenal venous sampling. *Surgery*, *120*(6), 913-920.


## 4. Associated Auckland DHB documents

- Hand Hygiene - Infection Prevention
- Infection Prevention & Control
- Informed Consent
- Intravenous Catheters - Peripheral - Adults and Children
- Intravenous Fluid Prescription - Adult
- Medication Administration
- Medications - Allergies & Adverse Drug Reactions (ADRs) Identification, Documentation & Reporting
- Medications - Intravenous & Infusions Administration CVICU
- Medications - Prescribing
- Standard Precautions - Infection Control
- Tikanga Best Practice

## 5. Disclaimer

No guideline can cover all variations required for specific circumstances. It is the responsibility of the health care practitioners using this Auckland DHB guideline to adapt it for safe use within their own institution, recognise the need for specialist help, and call for it without delay, when an individual patient falls outside of the boundaries of this guideline.

## 6. Corrections and amendments

The next scheduled review of this document is as per the document classification table (page 1). However, if the reader notices any errors or believes that the document should be reviewed ***before*** the scheduled date, they should contact the owner or Document Control without delay.