

Clinical Biochemistry Department
Endocrinology Department

WATER DEPRIVATION TEST (8 HOUR)
CLINB-CF-11

WATER DEPRIVATION TEST (8 HOUR)

INTRODUCTION

Polyuria due to lack of ADH usually exceeds 5 litres daily. In diabetes insipidus there is a tendency for the serum osmolality to be increased above normal; the reverse is true in compulsive water drinkers although there is overlap with normals. Other causes of polyuria, including diabetes mellitus and chronic renal failure (caused by osmotic diuretics, glucose and urea), hypercalcaemia (which causes nephrogenic diabetes insipidus due to calcium interfering with ADH action), and hypokalaemia, should be excluded before undertaking this test.

CONTRAINDICATIONS AND SIDE EFFECTS

Caution: Pre-renal uraemia is a hazard in patients with renal impairment.

Thyroid and adrenal function need to be normal or adequately replaced prior to starting the test. Urea, electrolytes, serum calcium and potassium also need to be confirmed as normal before proceeding. The patient can eat and drink and take all their usual medication prior to the test, excluding demopressin which must have been stopped for at least 24 hours prior to the test.

This test should only be carried out in a well-hydrated patient who is under careful medical supervision because those with ADH deficiency may become dangerously dehydrated, whereas compulsive water drinkers may steal water or other fluids during the test.

Weigh the patient before and hourly during the test to determine whether the patient is taking fluid or becoming dangerously dehydrated.

If more than 3% body weight is lost then fluids should be given immediately. Consider proceeding to the DDAVP test.

PATIENT PREPARATION

Both urine and plasma osmolality should be checked beforehand and this test should not be undertaken if the urine osmolality is >600 mOsm/kg.

The patient is encouraged to drink fluids overnight. A light breakfast is allowed without tea or coffee, but the patient must refrain from smoking 24 hours prior to and during the test. The test lasts 8 hrs (usually 08.30 – 16.30hrs) during which no fluids are allowed although some dry food is permitted.

PROTOCOL

Please inform the laboratory (extn. 7070) before starting the test so that arrangements for rapidly reporting urine osmolality results can be made. If urine osmolality exceeds 600 mOsm/kg at any time then the test can be terminated (since the patient can concentrate their urine!).

Eight plain containers (500ml) for the urine collections should be obtained prior to the test from Pathology despatch.

Urine is collected hourly into the containers supplied and the volumes recorded. The following timed specimens should be sent to Clinical Biochemistry Department for osmolality determinations.

A serum sample (SST yellow top tube) is taken at the mid-point of each urine collection period

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Suggested timings:

Urine:	First hour	08.30 – 09.30	Serum:	09.00 hours
	Third to fourth hour	11.30 – 12.30		12.00
	Sixth to seventh hour	14.30 – 15.30		15.00
	Seventh to eighth hour	15.30 – 16.30		16.00

DDAVP TEST

If no antidiuresis has been obtained after 8 hours water deprivation DDAVP (Desmopressin) may be given to distinguish between nephrogenic and cranial diabetes insipidus.

DDAVP (20ug intra-nasally or 2ug intramuscularly) is given immediately on completion of the water deprivation test. The patient may now drink normally, but fluid intake should be restricted to 1 litre during the remainder of the test. Urine is then collected each hour for a further 4 hours for osmolality determinations. The patient should be advised not to drink more than a further 1 litre of fluid until after midnight due to danger of water overload

INTERPRETATION

In normal patients the serum osmolality should not exceed 295 mosm/kg and the urine osmolality exceeds 600 mosm/kg at some time during the test. The serum osmolality exceeds 295 mosm/kg in cranial and nephrogenic diabetes insipidus. In the former condition, the urine osmolality remains less than 300 mosm/kg during water deprivation but exceeds 600 mosm/kg following DDAVP administration. In nephrogenic diabetes insipidus the urine osmolality fails to exceed 600 mosm/kg following DDAVP administration. Some patients show intermediate values and partial defects. Primary polydipsia and the adequacy of the test should be considered.