

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 (second part of 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) at least 1 working day 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.

FIRST PART OF TEST

Urine volume is recorded every hour. Urine samples for osmolality are sent of at the end of the 1st, 4th, 7th and 8th hours (U1 – U4). Serum samples (S1 – S4) for osmolality and U&E (yellow top SST tube) are taken at the mid-point of each urine collection period. Weight is recorded each hour and the test terminated if $\geq 3\%$ of weight is lost.

SECOND PART - 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 (U5 –U8). 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

Blood Sciences

WATER DEPTIVATION TEST

PF-BSM-CP-30

Weight at start of test:	kg	97% of baseline weight:	kg
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If patient drops below 97% of baseline weight, give fluids and proceed to part 2 of test (DDAVP)

Time	Urine sample (U1-4)	Urine volume (ml) Record below	Weight (kg)	Serum sample (S1-4)
0830		Discard urine		
0900				Collect S1
0930	Collect U1	Hour 1 vol ml		
1000				
1030		Hour 2 vol ml		
1100				
1130		Hour 3 vol ml		
1200				Collect S2
1230	Collect U2	Hour 4 vol ml		
1300				
1330		Hour 5 vol ml		
1400				
1430		Hour 6 vol ml		
1500				Collect S3
1530	Collect U3	Hour 7 vol ml		
1600				Collect S4
1630	Collect U4	Hour 8 vol ml		
If indicated, give DDAVP				
1730	Collect U5	Hour 9 vol ml		
1830	Collect U6	Hour 10 vol ml		
1930	Collect U7	Hour 11 vol ml		
2030	Collect U8	Hour 12 vol ml		

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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.

CONTACTS

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