Low Dose Dexamethasone Suppression Test (LDDST)

In normal subjects, dexamethasone suppresses ACTH and therefore cortisol secretion. Patients with Cushing's syndrome, from whatever cause, lose the normal negative feedback control by circulating glucocorticoids on ACTH release and thus exhibit detectable plasma ACTH and cortisol concentrations after dexamethasone administration.

Indications

Screening test for Cushing's syndrome, especially if the result of the overnight suppression test is inconclusive.
In women with a high testosterone this test may be used to differentiate PCOS and partial hydroxylase deficiencies (CAH) from autonomous androgen secreting tumours.

Contraindications

- Patients on enzyme inducing drugs e.g. anti-convulsants may rapidly metabolise dexamethasone.
- Oestrogens (e.g. pregnancy, HRT or COC) may induce cortisol binding protein and artificially increase total cortisol levels.
- Care in diabetes mellitus and patients who are psychologically unstable.

Side Effects

None

Requirements

- A total of eight doses of dexamethasone should be written up (0900, 1500, 2100, 0300, 0900, 1500, 2100, 0300 and **must adhere strictly to the 6-hourly dosing frequency, especially important not to omit or delay the 0300 dose**) Adult dose 0.5mg
- 2 x brown top serum tubes for cortisol
- 2 x orange top lithium heparin tubes for ACTH which must be sent to the laboratory immediately, preferably on ice. If ice not available then sample must be received in laboratory within 1 hr of collection.

PATIENT PREPARATION

Stop all oral oestrogen therapy 6 weeks prior to test. Patients on sex steroid implants might generate results that are difficult to interpret. Measuring SHBG might be helpful in this circumstance.

Procedure

Time	Procedure	Samples
Day 1		
0845	Take basal samples for **cortisol** and **ACTH**	1 x brown top serum tube (cortisol) 1 x orange top Li Hep plasma (ACTH) – send immediately
0900	Patient takes 0.5mg dexamethasone p.o	
1500	Patient takes 0.5mg dexamethasone p.o	
2100	Patient takes 0.5mg dexamethasone p.o	
Day 2		
0300	Patient takes 0.5mg dexamethasone p.o	
0900	Patient takes 0.5mg dexamethasone p.o	
1500	Patient takes 0.5mg dexamethasone p.o	
2100	Patient takes 0.5mg dexamethasone p.o	
Day 3		
0300	Patient takes 0.5mg dexamethasone p.o	
0900	Take samples for **cortisol** and **ACTH**	1 x brown top serum tube (cortisol) 1 x orange top Li Hep plasma (ACTH) – send immediately

Interpretation of results
If the 0900h cortisol value on day 3 (T=48hrs) is <50nmol/L the patient has shown appropriate suppression.

Failure to suppress is seen in the autonomous secretion of cortisol found in Cushing's syndrome. However, since there are several common conditions associated with impaired cortisol suppression following a LDDST (e.g. morbid obesity, depression), the result should always be interpreted in conjunction with the degree of clinical suspicion.

In patients who fail to suppress, a pre-test ACTH level of <5ng/L is highly suggestive of an adrenal cause of Cushing's syndrome.

In virilisation from PCOS or partial hydroxylation deficiencies there will be complete/partial suppression of testosterone. This is not seen in ovarian or adrenal tumours.

Sensitivity and Specificity
Suppression in patients with Cushing's syndrome is rare (2-5%). Sensitivity for Cushing's Syndrome is above 95% with a reported specificity of 70%. Some reported cases metabolise dexamethasone slowly and so achieve higher circulating levels than expected. This test is more specific than the overnight suppression test with a lower false positive rate. Failure of suppression in patients may be seen in patients with systemic illness, endogenous depression, or on enzyme inducing drugs e.g. phenytoin or rifampicin. The predictive value of all tests is falling as morbid obesity becomes more common.