

# Evaluation of *Spot urine Cortisol-creatinine ratio* as a screening test in patients with *Cushing's syndrome*

Nitin Kapoor<sup>1</sup>, Thomas V Paul<sup>1</sup>, Victoria Job<sup>2</sup>, L Jayaseelan<sup>3</sup>, Simon Rajaratnam<sup>1</sup>

<sup>1</sup>Department of Endocrinology, Diabetes & Metabolism; <sup>2</sup>Department of Clinical Biochemistry, <sup>3</sup>Department of Biostatistics, **Christian Medical College, Vellore, India.**

**Background:** Even though Cushing's is a rare disease, it is frequently suspected, is associated with a high mortality & has recently been shown to have a rising prevalence. All these factors necessitate a good screening test for this disease. Currently the diagnosis of Cushing's syndrome depends on a conglomeration of clinical acumen, biochemical abnormalities and the results of provocative testing. This process of diagnosing is not only expensive but can also be very challenging. Even though, there are several tests available, not one of them fulfils the criteria of being an ideal screening test. Continuing the search for an ideal screening test, we explored the use of urine spot cortisol-creatinine ratio(UCCR) as a novel method of evaluating patients with Cushing's syndrome.

**Aims & Objective:** We aimed to study the efficacy of UCCR as a novel tool for screening patients with Cushing's syndrome and also to compare its values with obese

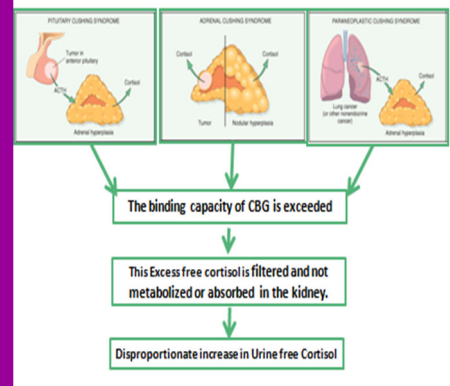
**Methodology:** This was a cross sectional prospective study conducted in our Hospital over a period of 1 year (2011- 2012). A morning urine sample was obtained for detecting the spot cortisol: creatinine ratio. This study was approved by the Institutional review board prior to initiation. All subjects with clinical and biochemical evidence of endogenous Cushing's Syndrome having a normal renal function were included. They simultaneously underwent the standard screening tests to diagnose Cushing's syndrome. The results obtained for patients with Cushing's syndrome were compared with that of obese subjects and normal weight individuals(controls).

## Ideal Screening test – Cushing's Syndrome

**? Urine spot cortisol creatinine ratio**

Parameters Studied	IDEAL	MID NIGHT CORTISOL	UFC	ODSST
Acceptability	✓	✗	✗	✓
Repeatability	✓	✓	✓	✓
Validity	✓	✓	✓	✓
Simplicity	✓	✗	✗	✗
Safety	✓	✓	✓	✓
Rapidity	✓	✗	✗	✗
Easy administration	✓	✗	✗	✗
Cost	✓	✗	✓	✓

## Principle of this test



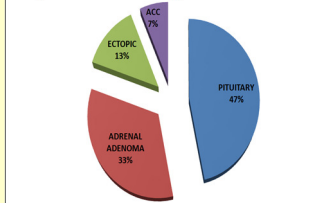
**The urine free cortisol is considered as an integrated measure of plasma cortisol when that urine is formed.**

## Results:

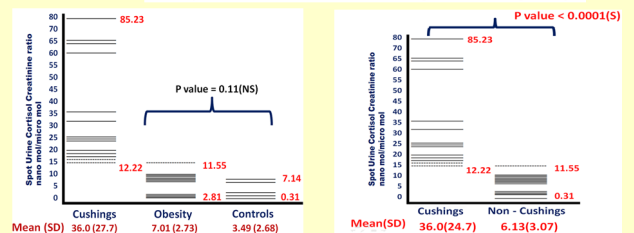
### Baseline characteristics

Parameter Studied	Cushings Subjects	Obese Subjects	Control subjects
Number of Subjects(N=35)	15	15	5
Mean age in yrs (SD)	31.6(8.4)	39.71(17.0)	40.81(18.8)
Male:Female Ratio	4:11	5:10	3:2
Mean Height in cms (SD)	158.4(8.3)	163.1(7.5)	162.6(11.4)
Mean Weight in Kgs (SD)	69.4(13.2)	84.90(16.5)	57.8(7.5)
Mean BMI in Kg/m <sup>2</sup> (SD)	27.7 (5.3)	31.8 (5.6)	21.89(2.07)

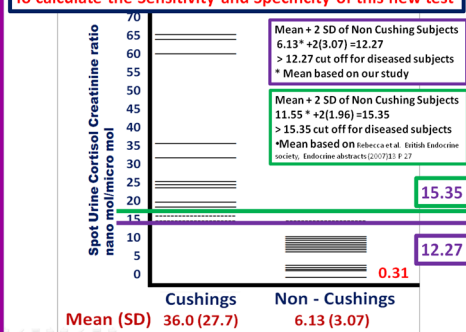
### Diagnosis of Cushing's and localization



### Comparison of UCCR among various groups



### To calculate the Sensitivity and Specificity of this new test



Test	Disease	Disease +ve	Disease -ve	TOTAL
UCCR ≥ 12.27	→ Cushing's	14	00	14
	→ Non Cushing's	01	20	21
	TOTAL	15	20	35
UCCR < 12.27	→ Cushing's	13	00	13
	→ Non Cushing's	02	20	22
	TOTAL	15	20	35

**Conclusions:** In this study we found that UCCR is similar in both Obese and Non Obese subjects(Non Cushing's) and was significantly elevated in individuals with Cushing's syndrome. Performing a UCCR as a screening test will be a sensitive, specific, non invasive, rapid and inexpensive test which can be done on an outpatient basis.