

## CUSHING'S SYNDROME

**Cushing's syndrome** is a type of endocrine disorder which occurs when there is prolonged exposure of the body to high levels of cortisol hormone (produced by the adrenal gland). This condition, also known as hypercortisolism can either occur when the body produces more cortisol than needed and is also caused when there is usage of oral corticosteroid medication. This syndrome is observed more in women than men and often affects adults aged between 20 to 50 years.

### Symptoms:

This syndrome affects different parts of the body in both males and females. The signs and symptoms vary based on the levels of excess cortisol.

- **Brain:** Excess level of cortisol causes headaches, depression, anxiety, irritability, cognitive difficulties (difficulty in learning new things, trouble in remembering, cannot concentrate or make decisions), lack of emotional control, hyper tension and disturbances in sleeping patterns. There are also certain changes in the brain like cerebral atrophy.
- **Heart:** Increased levels of cortisol causes high blood pressure; further high blood sugar levels and insulin resistance can lead to Diabetes mellitus (Type 2). Hypercholesterolemia (increased levels of cholesterol in blood) is also observed.
- **Bones and muscles:** there are increased risk of fractures and also weakness in the muscles.
- **Kidneys:** patients suffering from this syndrome suffer from increased urination which further causes increased thirst (polydipsia).
- **Reproductive system:** In women, increased levels of cortisol can lead to irregular or absence of menstrual periods. In males, the decreased levels of the hormone can lead to erectile dysfunction and impotency. There is also decrease in libido and can cause fertility problems.
- **Skin:** appearance of acne and fragile skin which bruise easily. There is slow healing of wounds and increased pigmentation of skin. Hirsutism and striae (pink or purple marks) is observed.
- **Physical features:** Those suffering from this syndrome have a characteristic round red face, buffalo hump, abdominal obesity, thin arms and legs and also fatty tissue deposits.

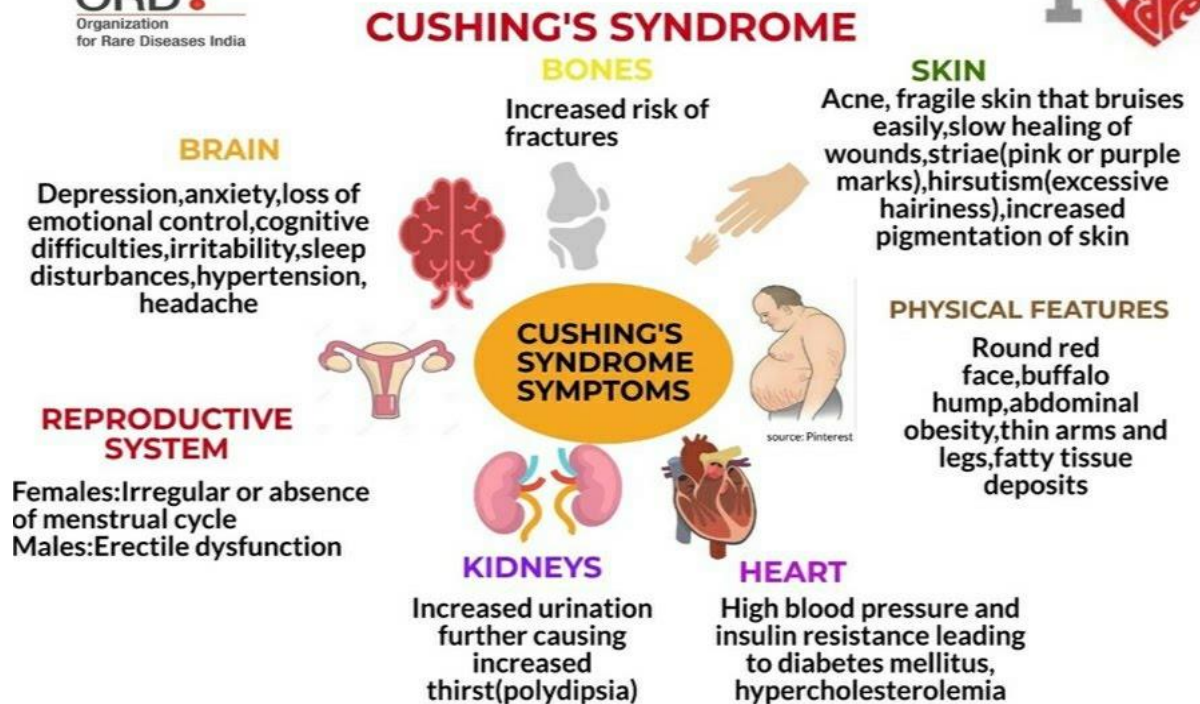


Figure 1: Symptoms of Cushing's syndrome.

### Causes:

Cushing's syndrome commonly occurs due to excess levels of cortisol hormone in the body, which is produced by the adrenal glands.

- **Exogenous Cushing's syndrome:** The increase in cortisol in the body can take place by increased use of oral corticosteroid medications in high doses over a long duration, for ex: Prednisone.  
One can also develop exogenous type of this syndrome by usage of injectable corticosteroids- like repeated injections for back pain, joint pain etc. Usage or inhaled steroid medicines (Asthma) and steroid skin creams (for skin disorders like eczema) also lead to Cushing's syndrome.
- **Endogenous Cushing's syndrome:** This occurs usually when there is overproduction of cortisol in our body. It might be due to overproduction of adrenocorticotrophic hormone (ACTH) or due to excess production by one or both adrenal glands.

It is observed that Cushing's syndrome can occur due to different reasons like -tumour in pituitary gland (pituitary adenoma); tumours in organs which do not produce ACTH like- lungs, pancreas, thymus gland; primary adrenal gland disease and also familial Cushing syndrome.

### **Affected population:**

It is believed that an estimated 10- 15 per million people are affected every year. Endogenous Cushing's syndrome is rare and is believed to affect around 40 to 70 people out of every million.

Pituitary adenomas affect 70 percent of cases in adults and around 60-70 percent of cases in children and adolescents. The commonly affected age groups are adults aged 20-50 years and is more common in females than males.

### **Diagnosis:**

Primarily, physical exams are conducted to look for signs of Cushing's syndrome like rounding of the face, fatty tissue deposits between neck and shoulders (buffalo hump) and thin skin with stretch marks and bruises.

The medications are also investigated by the doctor and further these diagnostic tests are followed to determine the cause:

- **Blood and urine tests:** Used to determine the hormone levels in the blood and urine and to see if the body is producing excessive cortisol.
- **Saliva test:** Small sample of saliva is collected at the night, doctors see if the cortisol levels are high, further they diagnose the patient for Cushing's syndrome.
- **Imaging tests:** Magnetic resonance imaging (MRI) scans and Computerized tomography (CT) scans are done to provide images and to detect any abnormalities in the pituitary gland and the adrenal glands.
- **Petrosal sinus sampling:** this diagnostic test is used to determine the cause of endogenous Cushing's syndrome. It is used to determine if the syndrome is caused in the pituitary gland or anywhere else.

## **Treatments:**

- **Surgery:** Here, there is removal of the benign tumor present in the pituitary gland by surgery called transsphenoidal adenomectomy. An incision is made either near the gums above the upper front teeth or nose and further extended through the sphenoid sinus and there is removal of the adenoma with the help of a microscope or and endoscope. This procedure is said to have a success rate of 60 to 70 percent among those with Cushing's syndrome. In some cases where the tumor cannot be identified, half of the pituitary gland is removed (hemi hypophysectomy) or in some cases major portion of the gland is removed (subtotal hypophysectomy).
- **Radiation therapy:** This treatment is followed when the pituitary adenoma is not completely taken out by surgery. Radiation decreases the level of cortisol in half of the adults and also in most children with this disease. Medications like Metyrapone and Ketoconazole are given to lower adrenal cortisol production while waiting for the effects of radiation. Radiation is given over a period of 6 weeks in small doses or also by a technique known as stereotactic radiosurgery.
- **Medications:** This type of treatment is followed to control the production of cortisol when radiation or surgery does not work effectively. Drug therapy can be recommended either before surgery to reduce surgical risk. The medications which are given to control excessive production of cortisol in the adrenal glands are Mitotane (Lysodren), Metyrapone (Metopirone), etc. Mifepristone is given to those having type 2 diabetes and suffer from Cushing's syndrome. This drug is effective in blocking the cortisol's effect on tissues.
- **Adrenalectomy:** Here, the surgeon removes the adrenal glands which stops excess cortisol production. However, after this surgery, the patient should depend on glucocorticoid and mineralocorticoid replacement therapy throughout their life.

These treatments are used to lower the higher level of cortisol in the body and type of treatment depends on cause of the syndrome

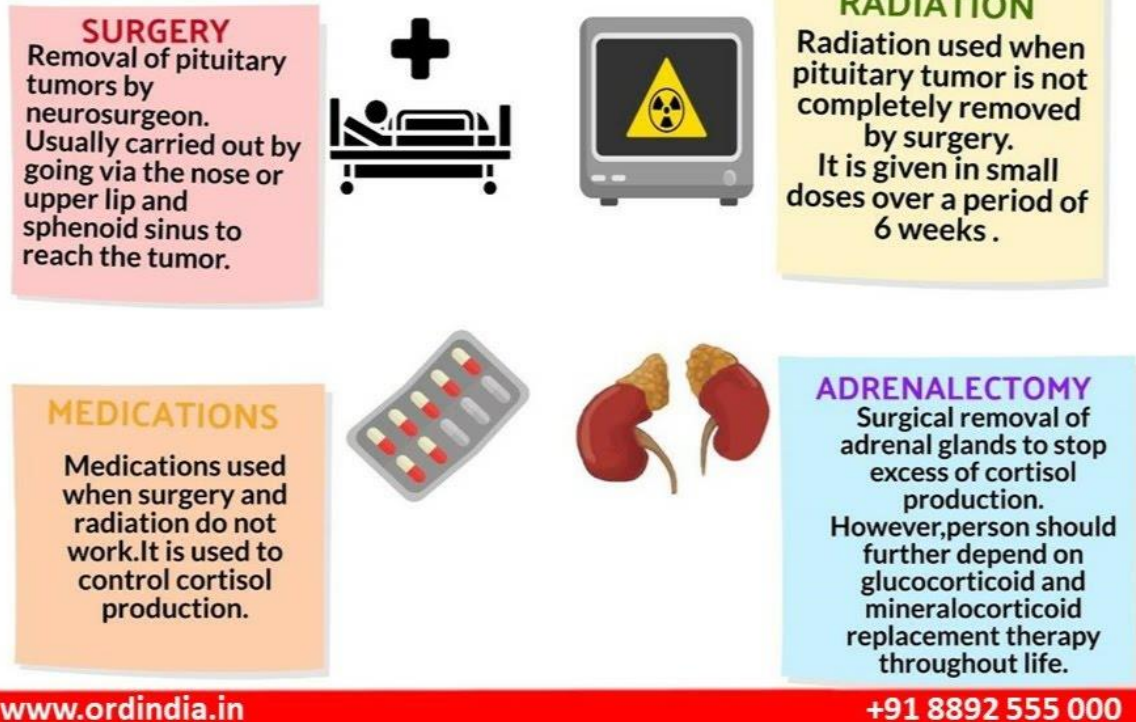


Figure 2: Treatments of Cushing's syndrome.

**Other names for this condition:**

- Tertiary or secondary hypercortisolism
- Cushing disease
- Tertiary or secondary hypercorticism
- Itsenko-Cushing disease.

**References:**

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