Medicine for Managers

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Addison's Disease

Addison's Disease, also called adrenal insufficiency, occurs when the body makes insufficient of the steroid cortisol and, often too little aldosterone as well. The disease can affect anyone and can be life threatening. The disease is named after Thomas Addison (1793-1860), one of the long line of great Guy's Physicians and the man who also first recognised Addison's anaemia, now better known as pernicious anaemia.

Thomas Addision was a prodigious physician. He became full physician at Guy's Hospital in 1837. With another great physician, Richard Bright, he wrote "*Elements of the Practice of Medicine*" in 1839. He first reported the diseases named after him in 1849 and in 1855 he published the seminal piece "*On the Constitutional and Local Effects of Disease of the Supra-Renal Capsules".*

The Incidence and Symptoms of the Illness

In the UK, the disease is estimated to affect about 14,000 people with about 320 new diagnoses each year. It is most common between the ages of 30 and 55.

The symptoms often develop insidiously over a period of months and early symptoms may be ignored by the patients, until an acute illness or stressor results in more severe symptoms.

Early symptoms are often vague and include:

- Lack of energy
- Loss of weight
- Lack of energy and enthusiasm

Often time, or with an acute event, they worsen resulting in

- Extreme fatigue
- More marked weight loss and loss of appetite
- Low blood pressure and possibly fainting
- Low blood sugar
- Nausea, diarrhoea and vomiting
- Muscle and Joint pain
- Depression and irritability
- Body hair loss and sexual dysfunction

On some occasions, the symptoms of Addison's disease appear suddenly with little warning and there are potentially severe and life-threatening consequences. This development is called an ***Addisonian Crisis***. Such features include:

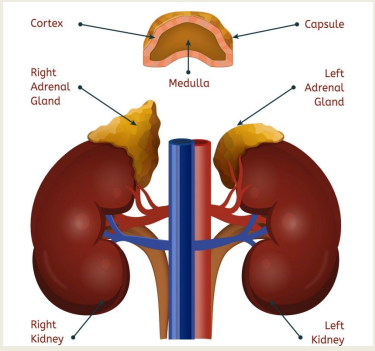
- Severe weakness

- Generalised pain, especially in the lower back
- Muscle and joint pain
- Severe abdominal pain with extreme vomiting and diarrhoea leading to dehydration
- Impaired consciousness and extreme confusion

So, Why Does Addison's Disease Occur?

There are two ***adrenal glands*** situated above the kidney on each side. The glands manufacture a range of steroid hormones influencing or controlling a large number of bodily functions affecting most organs. It is for this reason that so many diverse symptoms may be suffered by people with adrenal failure.

Each gland has an outer cortex and an inner medulla. The ***cortex*** manufactures hormones called ***corticosteroids***. These include:



- ***Glucocorticoids***, including ***cortisol*** which generate energy, are involved in immunity and help respond to stress.
- ***Mineralocorticoids*** including ***aldosterone*** which controls sodium and potassium balance in the body
- ***Androgens***, present in men and women, they cause male sexual development , increased muscle mass, libido and wellbeing

The ***medulla*** makes hormones similar to ***adrenaline***

The outer cortex of the adrenal gland in 80% plus of cases is damaged by an ***autoimmune disease*** (where the body mistakenly produces antibodies that attack itself).

The result is that corticosteroid production is reduced, especially of aldosterone and cortisol. Less commonly, tuberculosis, adrenal gland infection or secondary cancer may destroy the adrenal gland.

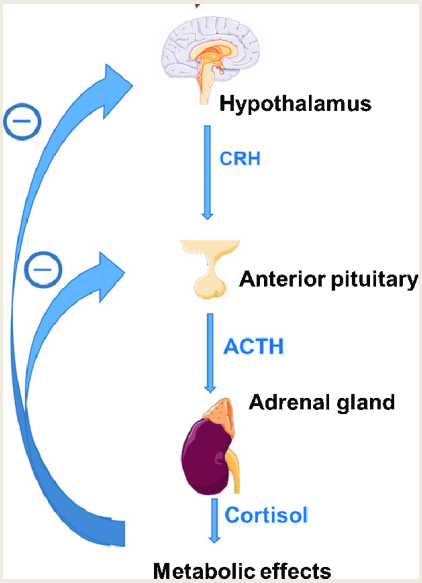
Patients with auto-immune Addison's Disease may also have other autoimmune diseases and may also suffer from low thyroid hormone or diabetes.

Secondary Adrenal Insufficiency

The adrenal glands are not in control of their own destiny in terms of manufacturing the various hormones. The ***pituitary gland*** about the size of a pea, is located beneath the brain. It manufactures a hormone which is called ***ACTH*** (***adrenocorticotrophic hormone***).

The hormone is released from the pituitary and circulates to the adrenal glands, causing them to manufacture the hormones. The system is a ***negative feedback*** mechanism. The adrenal hormone levels are monitored and identified by the ***hypothalamus*** in the brain, which manufactures a hormone, which in turn acts on the pituitary, which then produces the ACTH which acts on the adrenal glands to control the level of hormone released.

It sounds complicated but is actually very simple. If the brain or the pituitary identify too high a cortisol level, the ACTH released declines and the adrenal glands reduce their hormone output.



Conversely, in situations of (say) stress, the hypothalmus increases the release of ACTH which acts on the adrenal to increase its hormone output.

Risk and Prevention

Most people do not have any factors that put them at risk of developing Addison's Disease and it therefore cannot normally be prevented. However, once diagnosed, with appropriate management, the risk of an Addisonian Crisis, with its serious and sometimes life-threatening symptoms, can be largely avoided.

Diagnosis

Patients presenting with symptoms suggestive of Addison's disease will be tested to reach a diagnosis:

- ***Blood tests*** will be used to identify
  - Low sodium and high potassium
  - Low cortisol levels
  - Low aldosterone
  - High ACTH

  The latter two may be done in the hospital
- ***Synacthen Stimulation Test***
  Synacthen is synthetic ACTH. Injection of the drug which will stimulate cortisol and other hormones from the adrenal glands.

A raised ACTH and low cortisol and aldosterone is usually diagnostic of Addison's Disease.

- ***CT or MRI scan*** of the adrenal glands and, if necessary, of the brain and pituitary.

Management of Addison's Disease

Treatment is normally by steroid replacement therapy, which is lifelong. Depending on the recovery and any persisting symptoms, other treatments involving electrolyte adjustment or other medication may be necessary.

Most patients with effective treatment can continue with their normal life and activities, subject to maintaining their drug therapy regime. Patients are normally monitored at hospital and undergo regular hormone and electrolyte screening. They may also be tested for thyroid disease or diabetes, for which they are at increased risk. They must take care not to find themselves without their medication (for example on holiday) because of the risks of a Crisis if it is taken unduly late. Patients with Addison's Disease will all carry ***Steroid Cards*** and are advised to have ***Medic-Alert*** bracelets or necklaces.

Modern recognition of symptoms, investigation, diagnosis and management generally treat and protect patients with adrenal insufficiency or failure from the consequences of the disease. Scans, blood tests, synthetic ACTH and effective treatment programmes are all available to affected people. One has to marvel at Thomas Addison, who pretty-much worked it out nearly 200 years ago using nothing except observation and clinical examination.

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