



**British Society for  
Paediatric Endocrinology  
and Diabetes**

## **STEROID REPLACEMENT IN ADRENAL INSUFFICIENCY**

Steroids are hormones (chemical products of endocrine glands which are secreted into the blood and carry messages to other organs) formed in the body by the outer layer (cortex) of the adrenal glands, two small structures lying just above the kidneys.

The two most important steroid hormones are hydrocortisone, which has various functions including

- (1) controlling the blood sugar level,
- (2) helping the body combat stress and
- (3) reducing inflammation, and aldosterone, which regulates the body content of salt by controlling the rate of salt loss in the urine.

Adrenalin, the hormone involved in the response to fright, is not a steroid and is secreted by the inner part of the adrenal glands, this system seldom fails and replacement is not necessary.

Steroid replacement is needed when the natural secretion of the adrenals is inadequate. This arises in three different situations

- (1) when the drive to the adrenals from the pituitary (an important endocrine gland located in the head just below the brain) is lost, in addition to steroids there is then usually need for replacement of some or all of the other hormones secreted or driven by the pituitary, these are thyroxine, growth hormone, sex hormones and antidiuretic hormone
- (2) in congenital adrenal hyperplasia, a genetic condition in which there is a block in the production of steroid hormones and
- (3) when the adrenal cortex itself fails.

For replacement only small doses of steroids are needed to mimic the natural secretion of the missing hormones.

Hydrocortisone is available in tablet form (as dividable 20 milligram (mg), 10mg or 2.5mg tablets) and, if replacement of aldosterone is also needed, fludrocortisone (dividable 100 microgram (mcg) tablets), an artificial steroid which has the same action as aldosterone but is more effective by mouth, is given.



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It is usually satisfactory to give hydrocortisone and fludrocortisone in twice daily doses except in stress as detailed below. The adequacy of the doses can be checked by occasional tests on blood or saliva.

## Side effects:

Because only small doses, aiming to replace the natural secretion of steroids, are needed for replacement the notorious side effects of high dose steroid treatment, as sometimes needed to control inflammatory disorders such as arthritis, and including moon face, obesity, muscle wasting and thinning of the bones, are not seen. In children too large a dose of hydrocortisone will cause slowing of growth possibly with some weight gain and too small a dose a lack of energy and sometimes a tendency to low blood sugar (hypoglycaemia). Too much fludrocortisone will increase the blood pressure and too little will lower it and cause salt craving.

## Stress:

In order to combat the stress of illness or injury, the natural secretion of hydrocortisone is increased. Children on treatment with steroids also need an increased dose to cover such illness. Sudden interruption of replacement must be avoided. An important principle is therefore that steroid treatment must be given continuously and must be increased to cover illness. If the dose is repeatedly lost through vomiting it **MUST** be given by injection. (Do not be too concerned by these warnings, most children on steroids never need an injection).

The rules of treatment are therefore:

**\* Devise as reliable as possible a method of giving your child the medication. Even in the most organised households occasional doses are missed and fortunately this seldom matters as long as the child is well. Resume the normal dose as soon as the omission is noted. \***

To cover illness (beyond mild coughs and colds which do not require any change in treatment)

- (1) if the child is not eating give regular sweet drinks to avoid a fall in the blood sugar (hypoglycaemia)
- (2) give hydrocortisone in an increased dose (twice the usual morning dose given every eight hours) as below. It is not necessary to give an increased dose of fludrocortisone.

Continue the increased dose until the child is well.

**\* If the child is vomiting increase the dose as above and make sure that the tablets are retained for at least an hour. If the dose is vomited in less than an hour repeat it. If there is any doubt that the dose has been retained it must be given as an injection. If such a situation does arise it is certainly appropriate to call the GP or take the child to hospital but all families with a child on steroid replacement need to have available a 100mg ampoule of hydrocortisone and to know how to make it up and give it by intramuscular injection in a crisis. \***



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All children on steroids (or their parents) should carry an engraved bracelet or necklace and/or a note of the details of the treatment.

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## Treatment Plan:

.....'s current steroid treatment is

hydrocortisone.....mg (.....tablets) at .....mg (.....tablets) at .....

fludrocortisone..... ug (.....tablets) at .....ug (.....tablets) at .....

To cover illness give hydrocortisone.....mg (.....tablets) every 6 hours If an injection is necessary give hydrocortisone .....mg (.....ampoule) every .....hours

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## STEROID CHECK LIST

- 1. Discussion
- 2. Fact sheet
- 3. Hydrocortisone 100mg ampoule and injection technique
- 4. Card with treatment details
- 5. Necklace or bracelet