

What are the Ranges?

The ranges for plasma renin activity vary with age and vary between methods for measuring renin or plasma renin activity so best ask your team.

What we try to do is to keep the plasma renin activity or renin in the top end of the normal range, so that avoids us over treating the individual. We also interpret the plasma renin activity or renin measurement in terms of the hematocrit and blood pressure to gain as good an idea of how well we are doing over the long term as is possible.

How to measure Plasma Renin Activity or Renin

We measure the plasma renin activity or renin in a blood sample which is taken after lying flat for as long as is possible. Doing a resting sample it is not too difficult if we combine it with the 24 hour profile as part of the annual review because we can do the sample first thing in the morning before the person gets up.

We can also do a test a little bit later on in the morning when they are up about, so that we can then compare the results of the resting and non resting test to find if there is a marked difference between the two which is also another indication that more fludrocortisone is needed.

If the plasma renin activity or renin result is higher than the normal range, it means that the dose of fludrocortisone is not enough to have optimal blood volume and may need increasing. If the plasma renin activity or renin result is lower than the normal range it means the dose of fludrocortisone is too high and needs decreasing.

Both of these changes may occur well before any change of blood pressure or sodium in the blood, which makes the plasma renin activity or renin test a very useful one to monitor fludrocortisone replacement.

How often do I need to take my Fludrocortisone?

Usually you can take fludrocortisone on a once a day basis; the duration of action of fludrocortisone is quite long so it means that once a day or at the most twice a day, taking of tablets is fine.

Even if you are unwell you should continue to take the fludrocortisone in the normal daily dose. Unlike hydrocortisone when you are unwell, fludrocortisone **does not need to be doubled**.

Should you become unwell with vomiting and/or diarrhoea however, just like with hydrocortisone it is always best to check this out with your doctor or with your hospital team, so that they can measure the levels of sodium and potassium in the blood to make sure that all is well. Sometimes you may need some extra fluid given intravenously if you are not able keep all your fluids down.

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"The ideas expressed are independent of the editor's affiliations. Data provided is from current literature and should always be discussed with your endocrinologist first"



PLASMA RENIN ACTIVITY AND FLUDROCORTISONE

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MEASURING HOW WELL FLUDROCORTISONE REPLACEMENT IS GOING

Congenital adrenal hyperplasia is often treated with both hydrocortisone and fludrocortisone. Fludrocortisone is a steroid which replaces the aldosterone which the adrenal gland should normally make. Aldosterone is an important hormone as it helps retain salt in the body by its action on both the bowel and particularly the kidney. Lack of aldosterone leads to the salt losing crisis seen in congenital adrenal hyperplasia where water and sodium are lost from the body and potassium levels can rise in the blood to dangerous levels. As such replacement with fludrocortisone is extremely important and this can be given in tablet form once or twice a day.

Dosing

The dosing schedule for fludrocortisone varies. In the newborn and over the first year of life, a lot more fludrocortisone is needed per unit size of body than in teenage years. The dose is worked out initially on the body surface area of the individual and initially people will need 150 micrograms per metre squared (m^2) body surface area per day. During adolescence the requirement may reduce and it is relatively uncommon in adolescence and early adulthood to need much more than 100 mcgs per day.

How can we tell whether the amount of Fludrocortisone is enough?

It is quite difficult to judge fludrocortisone replacement from symptoms. Dizziness and feeling faint particularly on standing from the sitting position are often symptoms of under treatment with fludrocortisone along with headaches which may reflect a reduced circulating blood volume. These features however may be non specific. Symptoms of over treatment are very difficult to determine. Fludrocortisone has a dexamethasone like action, so if used in excess may promote weight gain but the more worrying situation with longer term use of fludrocortisone in high dose is development of high blood pressure.

The way in which we monitor the fludrocortisone dose relies on measurement of blood pressure in the clinic. We compare the blood pressure measurements with standard charts (Fig: 1) because blood pressure varies with age and height.

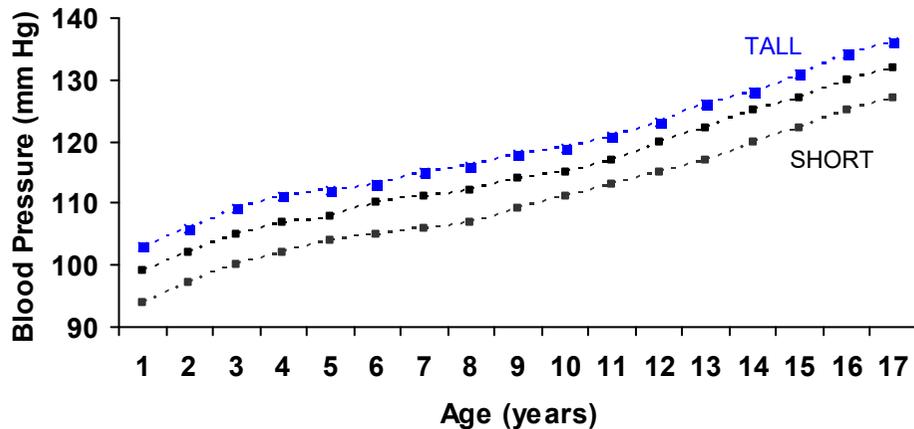


Fig:1

In addition to this we undertake a number of blood tests that can help.

Hematocrit

The hematocrit tells us how the circulating blood volume is doing. High hematocrit values of over 50 imply that the circulating blood volume is low whereas values below 25 suggest that there is too much water on board. These can only give us rough estimates and we rely more on another measurement called the Plasma Renin Activity or Plasma Renin to fine tune the fludrocortisone dose.

(Hematocrit:- the ratio of the volume occupied by packed red blood cells to the volume of the whole blood)

Renin

Renin is a protein made by the kidney in response to changes in the blood volume and amount of salt in the blood. If the amount of salt decreases then the amount of renin increases and similarly if the blood volume decreases, the renin also increases.

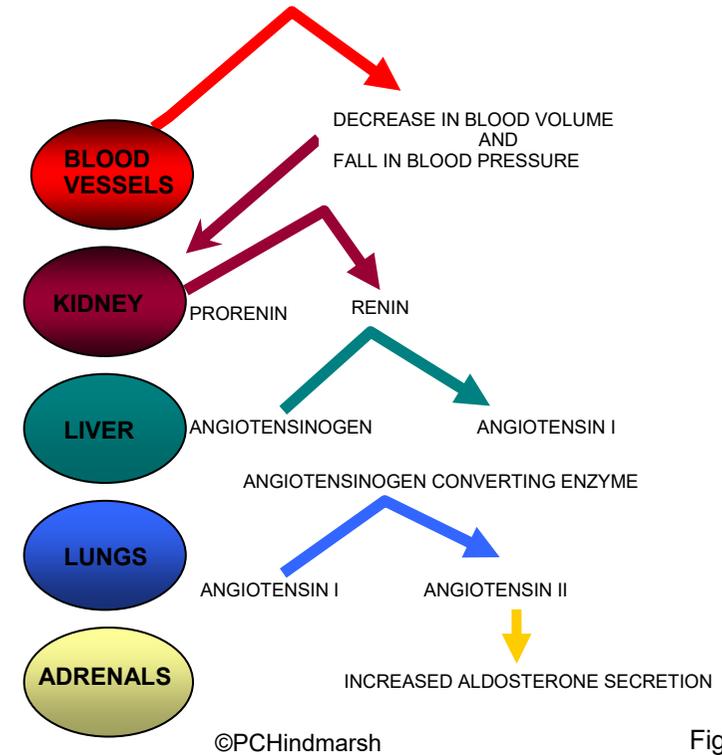


Fig: 2

Renin acts to convert another protein called angiotensinogen to angiotensin I in the liver. Angiotensin I is then converted into angiotensin II by the lungs and this makes the blood vessels reduce in size and helps to increase the blood pressure in the face of a reduction in blood volume. Angiotensin II also acts on the adrenal gland to tell the gland to make aldosterone and to act on the kidney to retain salt. Fig: 2

So we use the measurement of either renin itself or the ability to form angiotensin I from angiotensinogen (plasma renin activity) as a marker of how well we are replacing aldosterone with fludrocortisone.