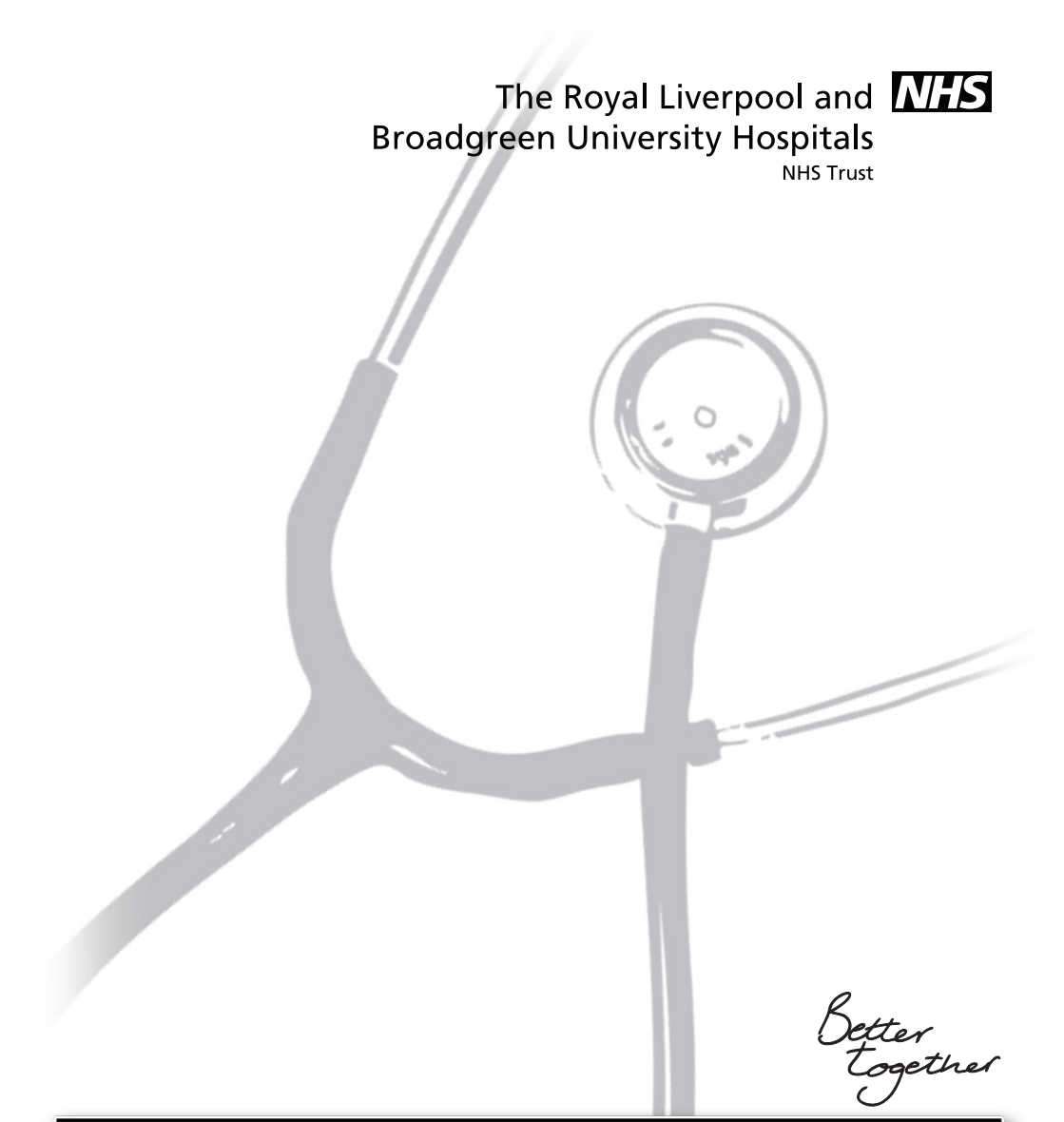
The Royal Liverpool and Broadgreen University Hospitals
NHS Trust



Better together

Patient Information

The Adrenal Gland

Surgical Directorate

PIF 838 V1

What is an Adrenal Gland?
Most people have two adrenal glands. They are triangular in shape and lie near the top of the right and left kidneys. It is a gland, which produces a variety of hormones.

What type of hormones?
The outer part of the gland releases a variety of steroid like hormones.

- **Aldosterone** - This hormone affects the blood pressure and if too much of it is being released (maybe by a small tumour) then the person will get high blood pressure and a low potassium level in the blood.

- **Cortisol** - This hormone is released when the body is under stress and helps the glucose balance of the body. If too much is released by a tumour then the person will have fat gain in the centre of the body and get a round face

- **Androgens** - These hormones make you hairy and are rarely linked to tumours

- **Adrenaline and similar hormones** - These hormones help us deal with stress and make our heart pump faster. However, if we have too much of these hormones it can be dangerous for the body.

What tests are carried out when we find a nodule that might be producing these hormones?
To find out whether the gland is releasing extra hormones we need to do some special tests. These tests will involve collecting blood or urine from you.

Aldosterone
This hormone level changes when we lie down or stand up - so we have to take levels of it after you have been lying down for sometime and then after you stand up and walk around for approximately half an hour. Sitting down during this time can spoil the test.

Cortisol
This is a hormone that varies under the control of another hormone (ACTH) from the brain (pituitary gland). We often take this hormone level early in the morning.

One blood sample will give us an idea of whether the adrenal gland is releasing too much or too little. However, it is better to assess this by doing a series of blood tests and giving medicines that either stimulate or suppress the adrenal gland.

To test whether the gland is releasing too much we undertake a low dose Dexamethasone test.

Overnight Dexamethasone suppression test
We take a blood test for Cortisol at 9.00 am and then you will be given a tablet of 2mg of Dexamethasone to be taken at 10pm that evening. We will then take a further blood test for Cortisol at 9.00 am the next morning.

Low dose Dexamethasone suppression test
This is sometimes needed if the results from the overnight Dexamethasone test were difficult to interpret. We take a blood test for Cortisol at 9.00 am on the first morning and then you will be given a tablet called Dexamethasone 0.5 mg every six hours (9.00 am, 3.00 pm, 9.00 pm, 3.00 am) for 48 hours (two days). We take a further blood test at 9.00 am on the third morning.

High dose Dexamethasone suppression test
This is the same as the low dose test but with a slightly higher dose tablet (2mg) and is often undertaken if the low dose test was difficult to interpret. We take a blood test for Cortisol at 9.00am on the first morning and then you will be given a slightly higher dose tablet (2mg) to be taken every six hours (9.00am, 3.00pm, 9.00pm, 3.00am) for 48 hours (two days). We take a further blood test at 9.00am the third morning.

Conns test
You have to lie down flat overnight for eight hours. Before you get up a blood test will be taken for Aldosterone and Rennin (a hormone which is secreted by the kidneys). You then need to walk around for three hours when another blood test is taken. Sitting down during this time spoils the test.

Androgens and other male and female hormones
Consists of having one blood test in the morning.

Adrenaline and Noradrenaline
To understand if you are putting out too much of this hormone, we will ask you to undertake three 24 hour urine collections. We will give you all of the equipment and written information needed to complete this test. A member of the nursing staff can also explain the procedure to you before you leave clinic.

All the urine passed over the 24 hours is put into a container that contains a small amount of acid. Do not pass urine straight into the container. The acid burns!

You can then start the second collection, complete that and continue to the final one.

What happens next?
When all the results have been collected we hope to be able to tell whether the adrenal gland is producing too much of any one hormone. Sometimes when we are not sure which gland it is we have to do extra tests.

If the lump on your adrenal gland is four centimetres or bigger then we often remove it, as there is a risk of it changing into a cancer. Some of the smaller lesions we follow up using CT scans.

Other tests that may be needed
If you have to have any of the tests listed below you will be given more in depth information about the tests.

- **Ultrasound scans** - The same machine is used to look at babies in mothers' wombs. There are no X-rays used so this is completely harmless.

- **CT scan** - This scan involves a series of X-rays taken while you are lying on a trolley. You will go through a large machine that looks like a big polo mint.

- **MRI scans** - This scan involves magnetic radiation. It can sometimes give us a lot of extra information. If you have a pacemaker however you will not be allowed to have an MRI. It involves lying still whilst going through a large round magnet, (you must have no metal on or in your person e.g. pacemakers). The MRI is a difficult scan to do and may be quite claustrophobic but gives excellent information about the tumour.

- **MIBG scan (Nuclear medicine)** - If you are producing too much Noradrenaline, Dopamine and / or Adrenaline this is the test to try to find out which gland is doing this. It is carried out in the Nuclear Medicine Department.

- **Venous Sampling** - This is a test in which local anaesthetic is injected in to your groin. A small cut is made in your groin and a thin tube is placed into the vein in the groin. A wire is then passed down this tube and blood samples taken from the vein that drains your adrenal gland. You will need to stay in hospital overnight so that we can observe your groin as bleeding and a large bruise may occur initially after having this done. This test is done in a special X-ray Department because you have to have X-rays taken to ensure the wires are in the correct position.

Removal of the Adrenal Gland

If you have been told you have to have your adrenal gland removed there are different ways to do this. This will be discussed further and you will be given more information if we need to remove your adrenal gland.

Laparoscopic Adrenalectomy

In this operation the adrenal gland is removed using keyhole surgery (laparoscopic). The number of cuts needed to remove the gland is somewhere between three and five cuts each approximately 12 millimetres (less than half an inch) in size. The scars are usually near the lower part of your ribs and in your upper abdomen. It takes approximately one to four hours to do the operation; it will vary depending upon the difficulty.

Complications

- The main possible complications are bleeding (rarely a patient may need to go back to theatre because of bleeding)
- Very rarely there can be injury to other organs near your adrenal gland; to the right is your liver and kidney, to the left is your spleen, your pancreas and your kidney
- Laparoscopic surgery means a faster recovery but it cannot be performed in every case.

Open Adrenalectomy

This operation is undertaken through a 15 to 20 cm (six to eight inch) incision (cut) across the upper abdomen. The possible complications are the same as for the laparoscopic surgery but recovery takes longer and the abdominal muscles do not always work as well after the operation.

Further Information:

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The above information is available on request in alternative formats including other languages, easy read, large print, audio, Braille, Moon and electronically.