ACE inhibitors

This fact sheet explains ACE inhibitors, how they work, how they are given and some of their possible side effects.

What are ACE inhibitors?

ACE inhibitors are a group of medicines that are used for two reasons:

- to treat high blood pressure
- to reduce protein in the urine (proteinuria)

They are used in various illnesses, including heart failure, kidney problems and diabetes. ACE stands for ‘angiotensin-converting enzyme’.

How do they work?

ACE inhibitors work in two ways:

Keeping blood pressure normal

As well as removing waste products from the body, the kidneys also play a part in keeping blood pressure within normal limits. They release a series of chemical messengers called hormones that act on the walls of small arteries, making them narrow, which in turn increases blood pressure. ACE inhibitors block (or inhibit) these messengers keeping blood pressure at a more normal level.

Reducing protein in the urine (proteinuria)

This is a very important part of their use. We now know that the presence of protein in the urine is very bad for the kidneys. Many studies in adults show that using an ACE inhibitor can slow the risk of progression of chronic renal failure (CRF), and may even be able to stabilise it by reducing the protein in the urine. The ACE inhibitor does this by opening up the blood vessel leaving the glomerulus (efferent arteriole, see diagram).

This reduces the pressure within the glomerulus so that less protein is forced across the blood vessel and into the urine.

When do we decide to use an ACE inhibitor for proteinuria?

There is no good evidence about the best time to start, but at GOSH we feel that it is logical to stop the bad effects of protein as early as possible. We start with a very small dose of the ACE inhibitor. We then recheck the urine protein and build up the dose depending on the effects we see.
How are they taken?
The types of ACE inhibitor used most commonly at Great Ormond Street Children’s Hospital are enalapril and captopril. Enalapril is given as a tablet once a day and captopril is given as a tablet three times a day. Captopril tends to be used in very young children, as the dose is more flexible. Both enalapril and captopril can be dispersed in water if your child has trouble swallowing tablets.

What are the side effects?
There are normally very few side effects with ACE inhibitors. The most important are:

- Dizziness due to blood pressure being too low.
- Increase in creatinine, which needs to be monitored. A small increase is acceptable for the long-term benefit of the kidneys.
- Increase in blood potassium, which needs to be monitored.
- Dry cough is sometimes seen in adults, but very seldom in children.
- ACE inhibitors may harm an unborn baby so if your daughter is twelve years old or more, we will ask her about her periods and whether she could be pregnant. If she is sexually active, she should use a reliable form of contraception.

If you have any questions or concerns about these possible side effects, please discuss them with your doctor.

Important information
- Keep tablets in a safe place where children cannot see or reach them.
- In certain circumstances, medicines may be prescribed for a child outside the age range recommended by the manufacturer. Medicines are often used ‘off licence’ in children because trial data is not available for a specific use, for example, age. Please discuss this with your doctor.
- While your child is taking ACE inhibitors, it is important that you tell your doctor, nurse or pharmacist about any other medicines you are taking. This includes medicines on a prescription from your GP, medicines bought from a pharmacy (chemist) or any homeopathic or herbal medicines.
- Non-steroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, should not be taken alongside ACE inhibitors. Certain types of diuretics (water tablets) should be taken with care.
- If your doctor decides to stop treatment with ACE inhibitors, return any unused tablets to the pharmacist. Do not flush them down the toilet or throw them away.
- If your child vomits within a short time of taking a dose and you are able to see the tablet in the vomit, then give the dose again. If you cannot see the tablet, do not give it again.
- If you forget a dose, give the next dose as scheduled and try to keep to a regular routine.
Useful telephone numbers
GOS switchboard: 020 7405 9200
Eagle Ward: 020 7829 8815
Pharmacy Department: 020 7829 8680
Pharmacy Medicines Information: 020 7829 8608

Compiled by the Nephrology department in collaboration with the Child and Family Information Group

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