Sweat test : Information sheet to parents

What is Cystic fibrosis ?
Cystic fibrosis (CF) is a genetic condition that affects glands in the lungs, intestines, bile duct, and pancreas, as well as the sweat glands.
CF affects up to 1:2,500 live births in Caucasian population but it is a much rarer disease in Asian population. The incidence is not well known but is probably around 1:10,000 -1:50,000. It is an autosomal recessive disorder. Heterozygous carriers (those who have inherited only one copy of the defective causative gene) are asymptomatic. Two defective genes are required for CF presentation. That means a child must inherit a defective gene for the disorder from each parent or there are spontaneous mutation of the two genes.

What is a sweat test?
People with CF have a higher amount of salt in their sweat than normal because there is a defect in the transport of chloride ions across cell membranes in the sweat gland. A sweat test is thus carried out to collect and measure the amount of salts in sweat and it remains the key laboratory test to support the diagnosis of CF.
Diagnosis of CF is made based on two positive sweat tests. Although in some cases, additional genetic testing is needed. It is important to diagnose this condition as soon as possible so that the best treatment can be started.

What are the possible indications for the test?
- babies or children who get a positive family history.
- phenotypes suggestive of CF e.g. recurrent chest infections or bronchiectasis, frequent and unexplained loose pale stool ,failure to thrive.
- those who get a positive newborn screening test.

Under what conditions that sweat test will not be done?
- babies smaller than 2 weeks of age or lighter than 3 kg
- systemically unwell
- subjects who are dehydrated or oedematous
- widespread eczema affecting the potential stimulation sites
- subjects receiving oxygen supplement as there is a risk of explosion due to generation of an electrical spark

Is there any preparation for the sweat test?
- There is no restriction on activity or diet or special preparations before the test.
- Creams or lotions should not be applied to the skin within 24 hours before the test.
- Most regular medications can be continued except systemic steroids

How is the test performed?
- The selected skin site will be cleaned with alcohol and distilled water, then dried. Usually, the flexor surface of either forearm is the preferred site.
- Special pad, soaked in a chemical called pilocarpine to stimulate sweat production, is attached to an electrode which is then held firmly in place onto the skin.
- A small painless electric current is passed through the pads from a battery box to further stimulate the sweating process.
- The current is applied for 5 minutes and the pads are removed.
- The skin is then washed with distilled water and carefully dried.
- A piece of pre-weighted filter paper is placed over the stimulated area and sealed by plastic film to prevent evaporation.
- Your child will have to wait for 30 minutes while the sweat is absorbed into the filter paper.
- During this waiting time, he/she can play and eat normally except to avoid salty foods e.g. crisps to minimize risk of contamination.
- The filter paper is then removed and reweighed to determine the amount of sweat collected.
- The sweat is eluted from the filter paper for further analysis of the salt concentration.
- A second sweat test will be performed on other skin site.

Is there any risk of the test?
During the sweat test, a very tiny electric current is used to help draw sweat to the surface of the skin, where it can be collected and analyzed. Some children may experience a local irritation with tingling sensation or the skin may stay red for a few hours after the test .But it's not painful and the reactions are self-limiting. Burns or blisters are extremely rare. This test has been performed safely worldwide on many children before and no significant adverse reactions being reported so far. You can stay with your child throughout the test.

How should the test result be interpreted?
- A sweat chloride concentration of > 60 mmol/L supports the diagnosis of CF. This should however, be interpreted in the context of the patient's age and clinical phenotype.
- Intermediate chloride concentration of 40 - 60 mmol/L is suggestive but not diagnostic of CF. A repeated sweat test or blood test for mutation study may be needed.
- A sweat chloride of less than 40 mmol/L is normal and there is a low probability of CF.

Under what situations will a sweat test be repeated?
- Technical problems e.g. not enough sweat collected (less than 75mg).
- Sometimes, even with enough sweat, the result can be borderline which is hard to interpret and the sweat test has to be repeated.
- If the sweat test result is not in keeping with the clinical phenotype and/or genotype.
- A repeated sweat test is needed to confirm a diagnosis of CF.

Where and how long will the test be performed?
The test is usually performed on Friday morning in our department. The whole test takes about 45-60 minutes.
If you have further questions, please kindly consult the doctor who referred you for this test.