Sweat Test (sweat chloride, Cl and sodium, Na)

Pseudonyms: Iontophoretic Sweat Test; Cystic Fibrosis diagnostic test

Measurement of chloride in sweat is the gold standard diagnostic test for Cystic Fibrosis.
Patients with CF have higher levels of sodium and chloride in their sweat than unaffected individuals of the same age. This feature of CF is independent of genotype. Measurement of both sweat sodium and chloride are performed in this laboratory on the following patients:

- Patients presenting with clinical features of the disease
- Siblings of patients known to have the disease
- Patients referred through the Newborn Screening pathway.
- Known Cystic Fibrosis patients with the mutation G551D who are receiving Ivacaftor (Kalydeco) treatment

General Information

Collection Container:
In the UK, sweat for electrolytes or conductivity measurement is collected using one of two methods: the Wescor Macroduct system or the Gibson and Cooke iontophoresis method. For the MFT Trust, the Gibson and Cooke method is used. Sweating is induced by iontophoresis of a weak solution of pilocarpine, using Gibson-Cooke Sweat Test Apparatus, and is collected onto pre-weighed filter paper.

Type and volume of sample:
The minimum sweat amount is 1mg/m2/min. using our method, this equates to a minimum requirement of 71mg of sweat

Specimen Transport/Special Precautions:
N/A – samples collected by laboratory staff.

Laboratory Information

Analytical Method Principles:
Inductively Coupled Plasma Mass Spectrometry (ICP-MS)

Biological Reference Range or cut off:

AGE	SWEAT [CHLORIDE] mmol/L	INTERPRETATION
< 6 months	<30	CF unlikely but requires genetic and clinical correlation if clinical concerns continue
< 6 months	30-60	Concentration of 30-60 is an intermediate result which requires further CF assessment, including genetic and clinical correlation.
< 6 months	> 60	Supports the diagnosis of CF.
> 6 months	<40	CF unlikely but requires genetic and clinical correlation if clinical concerns continue.
> 6 months	40-60	Concentration of 40-60 is an intermediate result which requires further CF assessment, including genetic and clinical correlation.
>6 months	>60	Supports the diagnosis of CF

Turnaround Times:
Same week as patient appointment

Clinical Information

Factors known to cause risk to the patient and/or staff

1. Patients with an identified contagious infectious disease must not have a sweat test without discussion with infection control, and the consultant clinical scientist or senior BMS.
2. Patients who are on open oxygen must not have a sweat test performed. Oxygen delivery via nasal prongs is acceptable.
3. Very sick and/or ventilated patients must not have a sweat test performed without discussion with a senior BMS or consultant clinical scientist.

Factors Known to Significantly Affect the Results (1)

1. Patients with skin lesions/severe eczema must not be tested. The chemicals used during the test may worsen the skin condition and there is also less likelihood of obtaining sufficient sweat.
2. Patients who have creams/false tan etc. on their skin should have this wiped off and the area thoroughly cleaned prior to commencing the test.
3. Insufficient skin area to attach the electrodes on one arm. Electrodes must never be placed on opposite sides of the patient's body as there is a possibility of ventricular fibrillation.
4. Patients less than 2Kgs in weight are unlikely to produce sufficient sweat.
5. Patients less than 2 weeks of age are unlikely to produce sufficient sweat.

6. Sweat testing should be delayed in patients who are oedematous or under topiramate or receiving systemic 9α fludrocortisone
7. Sweat tests should be delayed in subjects who are underweight, dehydrated or systemically unwell

Clinical Decision Points:
Refer to reference range information above.

There are other conditions besides cystic fibrosis that can cause positive sweat chloride tests. These include anorexia nervosa, Addison's disease, Nephrogenic Diabetes Insipidus, and hypothyroidism

For more information visit https://www.labtestsonline.org.uk/tests/sweat-chloride-test

References:

1. Guidelines for the performance of the Sweat Test for the Investigation of Cystic Fibrosis in the UK v.2 (2014). http://www.acb.org.uk/docs/default-source/committees/scientific/guidelines/acb/sweat-guideline-v2-1.pdf ACCESSED 08/11/2018

(Last updated October 2019)