Hydrogen Breath Test

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Background

A 'hydrogen breath test' is an investigation used to assess the activity of hydrogen fermenting bacteria in the gut.
Not all children have hydrogen producing bacteria (5-10% produces Methane). However, if present, the activity of these bacteria can be used to investigate:

- 'Bacterial overgrowth'
- 'Intestinal transit time'
- 'Sugar (fructose/ lactose/ sucrose) malabsorption'.

Hydrogen (H2) is generated in the intestinal lumen by bacterial action on carbohydrates in the large or small intestine. The resultant H2 diffuses in to the bloodstream and is expired through the lungs. Thus, accurate timing and measurement of H2 in parts per million (ppm) in expired air can reveal abnormal levels/ distribution of bacteria and/or malabsorption of carbohydrates.

The normal value for fasting breath hydrogen is <20ppm.

A positive test is defined as a rise in breath hydrogen concentration of >20ppm above fasting baseline.

The department uses the Bedfont Gastrolyser which is a portable, hand held sampling technique. It has a T-piece sampling system which enables end-expired breath to be sampled hygienically, using one time disposable cardboard tube mouthpieces. For younger children a facemask arrangement can be used, 3 sizes are available.

Method

Prior to commencing a hydrogen breath test:

Only Verbal consent is required to perform the test.
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All patients/carers should receive instruction sheet detailing the procedure and advice in the post.
This will include these advices:

1. Anti-reflux medicines (PPI) should not be given for seven days prior to the procedure
2. Antibiotics should not be given for 4 weeks
3. Laxatives should not be given for 3 days
4. To wait 4 weeks post Colonscopy.
5. The day prior to the test to avoid onions, leeks, garlic, cabbage and beans.

Contra-indication: Suspected Hereditary Fructose intolerance (lead to severe hypoglycaemia).

The child must have nothing to eat and only water to drink prior to the test for:

- 6 hours (under one year old)
- 12 hours (over one year old).

Prescribe the substance to be challenged the day before the procedure. It is as follows:
1. Glucose bacterial overgrowth: glucose 1g/kg (max 50g) – Preferred option
2. Lactulose bacterial overgrowth: lactulose 0.5g/kg (max 10g)
3. Fructose malabsorption: fructose 1g/kg (max 25g)
4. Lactose malabsorption: lactose 1g/kg (max 50g)
5. Sucrose malabsorption: sucrose 2g/kg (maximum 50g)

The test substance should be dissolved in10mls water/kg.

On the morning of the hydrogen breath test:

- Ensure patient brushes teeth well, to minimise/ remove oral hydrogen producing bacteria.
- Explain to child and family why the test is being performed and what the procedure involves.
- Ensure the patient is fit and well and has followed the recommended diet regime and drug restrictions prior to the investigation.
- Switch the H2 monitor on and allow it to self-calibrate Follow the display.
- Connect T-Piece Sampling System with cardboard disposable mouthpiece or facemask connector and press the corresponding button (a child with mouthpiece or a child with a mask). The display will count down from 15 seconds.

Two pre-load fasting breath samples are taken by blowing directly into the cardboard mouthpiece. The child should blow whilst sealing his or her lips around the mouth piece. Ask the child to hold breath for 15 seconds and then exhale slowly and fully for as long as possible.

Alternately, in the younger child, the face mask is placed gently but firmly over the mouth and nose, avoiding any leaks, and kept in position until the connector close to the sensor steams up with expired breath. (no need to hold breath)

- The display will flash while the ppm H2 is rising, and become constant once the maximum value is reached.
- Give prescribed solution to be challenged. Record time on the sheet.
- The child's teeth must be cleaned once more.
- The child may not eat or drink during the remaining test.
- Continue to take further recording of breaths each half hour for three hours.
- Stop taking samples if the test is positive (20 ppm above baseline) for 2 consecutive measurements. This does not apply if you are doing the test for bacterial overgrowth.
- Keep diary of symptoms during and following the test. When test is complete patient may eat and drink normally (order snack box in advance).
- The results are forwarded to the referring consultant with copy in the notes.

Calibration of the machine:
The machine usually require calibration once a month, it would prompt you to do so if due when you switch it on.
Please follow step by step guidance provided from bedfont to calibrate.
Order new hydrogen canister from the company if runs out.