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The UK Paediatric Laboratory Medicine Network

Audit of Sweat Testing by Bilateral Sequential Stimulation, May 2018

A questionnaire was circulated to UK clinical biochemistry laboratories who participate in the UK Paediatric Laboratory Medicine Network.

The aim of the audit was to establish whether sweat collection by bilateral sequential stimulation (BSS) is performed widely in the UK and whether there is evidence that it improves successful sample collection.

Ten responses were received and the answers to the questions are summarised below.

1. What method do you use for sweat collection?

Method	Number of laboratories
Wescor	7
Gibson and Cooke	3

2. It has been proposed that all sweat collections are performed on both the right and left arm at the same visit. This is sometimes called 'bilateral sequential stimulation'. When do you perform Bilateral Sequential Stimulation?

Response	Number of laboratories
Never	7
Some sweat tests*	2
All sweat tests	1

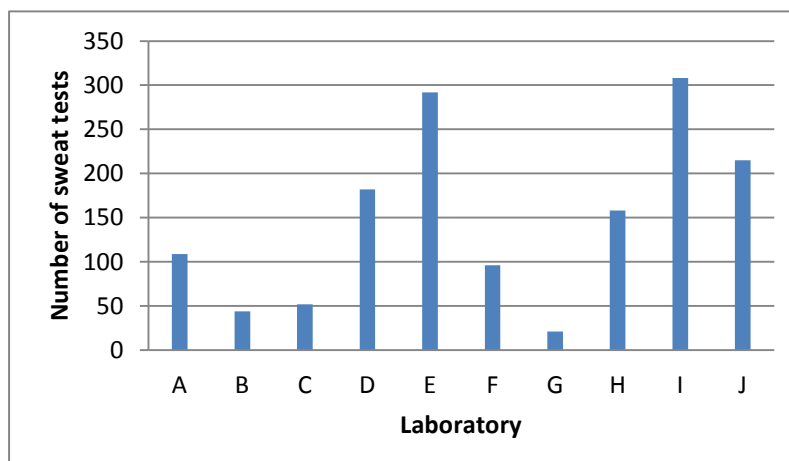
*Those who performed BSS on some sweat tests stated that they did so:

only if the first collection is insufficient and the carer agrees;

for patients on ivacaftor, positive NBS patients and previous insufficient patients.

3. Questions based on annual workload – please use the data from your most recent audit

a. How many sweat tests did you perform during the year April 1st 2017 to March 31st 2018, or the audit period if different?



The annual sweat test workload for each laboratory.

For labs which gave results from a period < 12 months, the number of tests has been corrected



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- b. *How many of these were done by bilateral sequential stimulation?*
- c. *Of the sweat tests performed by bilateral sequential stimulation,*
how many had sufficient quantity of sweat collected on both stimulations?
how many had sufficient quantity of sweat collected on one stimulation?
how many had sufficient quantity of sweat collected on neither stimulation?
- d. *Did any of the samples collected by bilateral sequential stimulation show discrepant results?*

Seven laboratories did not perform any sweat tests by BSS so answered 'not applicable' to these questions.

The responses from the other three laboratories are as follows:

When is BSS performed?	Total number of sweat tests	How many by BSS	How many sufficient on both limbs?	How many sufficient on only one limb?	How many sufficient on neither?	Number of discrepant results
If 1 st collection is insufficient	43 (in 10 months)	3	0	3	0	0
Patients on ivacaftor, positive NBS and previous insufficient	182	61	46	3	12	0
All sweat tests	158	156	108	22	28	0

4. *Please comment on the desirability of routine sweat test collection by bilateral sequential stimulation.*

- Clinical team have asked us to do bilateral stimulation on all patients, but evidence that this improves success is unclear. My opinion, based on experience, is that some patients don't sweat sufficiently due to age, hydration state or acute illness, and repeating the same day would not change that; usually repeating a week later can make a big difference. Changing practice would require increased staff time and reagent costs.
- Not desirable at the moment due to staff time and patients selected.
- We do not routinely perform bilateral sequential stimulation but will attempt a second collection on the second arm at the same visit if the first collection is insufficient or borderline. Using this approach we had no failed collections during the period audited i.e. no repeat visits required. Therefore, the introduction of routine bilateral sequential stimulation has little advantage in terms of reducing repeat visits.
- It would seem that there is no advantage to testing by bilateral sequential stimulation
- Literature suggests it to reduce insufficients, but at increase in consumable cost. I would like more evidence of value. In the past when we repeated stimulation (time and staff permitting) and collection we



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found insignificant improvement in failure rate – such that we no longer try to repeat stimulation same day.

- We currently only have one set of electrodes for stimulation. We routinely audit our process, including the % of insufficient collections, against the RCPCH guidelines. The failure rate has consistently been below the recommendation of <10%.
- This not something that we currently do. Maybe it would be worth looking at again if other responses from this questionnaire show that it may be worthwhile. We are considering moving over to the new Wescor Macroduct system in the near future so may be worth trialling it with the new system.
- Our overall failure rate is low (~10% overall) and meets the guidelines and we only attempt 1 sweat collection per visit. This would seem unnecessary for the 90% of sweat tests which are successful at the first appointment and not cost-effective. We would not have sufficient resources to schedule longer appointments to enable bilateral sequential stimulation to take place. We are inadequately funded for the service we provide as it is. Feedback from our staff who carry out the sweat collection (MLA/senior clinical scientist) was that they think it would be very difficult to put the equipment back on the patient for a second go. It is sometimes difficult enough the first time and in fact patients often ask 'Both arms?' and are reassured / it is a selling point that we are just going to do one.
- Due to the nature of our patients we have a relatively high insufficient rate. We found we were having to repeat a significant number of sweat tests due to insufficient sample when done unilaterally. Therefore we adopted our approach to reduce the time in clinic which benefits the (lab) staff, in terms of time out of the lab, patients/families (reduces their stress) and reduces the occupancy of the clinic room (scarce resource). If our insufficient rate was lower, I don't think we would do bilateral collections because of the reagent cost.

Conclusions

Performing sweat tests routinely by bilateral sequential stimulation is not widely performed in UK laboratories. Of the ten laboratories which responded to the questionnaire, three perform two sweat collections and analyses at each visit on all or some patients.

One laboratory has adopted this approach to all sweat tests, due to some specific local requirements. Two other laboratories use it in certain circumstances, and both stated in their comments that they didn't believe that routinely doing two sweat tests on each patient improved the success of the procedure.

Several laboratories stated concerns about adopting this approach including the requirement for increased staffing, increased costs and stress for the patient.

Some large CF centres did not respond to the questionnaire, so these data are incomplete. However, from the data collected there does not appear to be evidence that routinely performing two sweat tests on each patient at each sweat test appointment improves success of the procedure.



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