Degenerative Neurological and Neuromuscular Disease

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CORRIGENDUM

Detection of neuropathy using a sudomotor test in type 2 diabetes [Corrigendum]

Gandhi and Rao. *Degener Neurol Neuromuscul Dis*. 2015;5:1–7.

On page 2, the second sentence in the "SudoPath background" section is currently written: "The SudoPath is a patented system, and it uses the QSART method, by electrical stimulation of the postsympathetic cholinergic fibers and the switching of polarity, which induces microcirculation vasodilation and the release of chloride ions (Cl^-) via the sweat ducts."

It should have been: "SudoPath uses the quantitative sudomotor test method, by electrical stimulation of the postsympathetic cholinergic fibers and the switching of voltage polarity, which induces microcirculation vasodilation and the release of sweat."

On page 3, the first sentence in the "How does the SudoPath work?" section is currently written: "The electronic box generates a low-voltage output (maximum 1.6 V) with a weak direct current (DC) current that is fed to the active electrode and then delivered to the contralateral electrode in two directions for each pathway."

It should have been: "The electronic box generates a constant low-voltage output (of 1.28V) with a weak direct current (DC) that is fed to the active electrode and then delivered to the contralateral electrode in two directions for each pathway."

On page 3, the "Conductance at the anode marker" section is currently written: "The change in polarity during the measurement at the anode increases the voltage, and the Cl^- can be oxidized since the voltage is >1.31 V and the anode is of opposite polarity. Water molecules and Cl^- can be oxidized at the anode.[17] The oxidation reaction at the anode is:

$$H2O + Cl^- \rightarrow (ClOH) + (H^+) + (e^-)$$

Because the released sweat at the anode contain Cl^- ions, we suggest the more probable assumption that the conductance measured at the anode will be related to the release of the Cl^-; for this reason, we called the measured conductance at the anode "electrochemical skin response Cl^- ($ESRCl^-$)" because at a voltage lower than 10 V, the stratum corneum acts as a capacitor.[19] The only way for the Chloride ions to exit and react with the plate electrode is through the sweat ducts. Therefore, $ESRCl^-$ could be a valid test of the sweat gland nerve density."

It should have been: "Further to expert review of the method of measurement of the SudoPath system, the assumption that there is a release of chloride ions at the anode has been reviewed. Although the voltage applied is thermodynamically sufficient to drive electrolysis, the rate is so slow that the voltage of the external source would have to be increased to that to make the process proceed in a reasonable time frame.

In addition, there is a competition between the negative ions at the positive electrodes. The chloride ions compete with the hydroxide ions to release electrons to the positive electrodes. As there is a very low concentration of chloride ions in the sweat (0.2 to 0.5%), OH^- ions are preferentially released at the positive electrode. The oxidation reactions at the anode are:

$$4OH^- \rightarrow 2H2O + O2\ (g) + 4e$$

$$2H2O \rightarrow O2\ (g) + 4\ H^+ + 4\ e^-$$

This clarification does not affect the clinical evaluation or effectiveness and data analysis of the SudoPath based only on skin conductance measurements."