

Tap water instead of electrode jelly for electrocardiographic recording

Pleas for replacing expensive and messy electrode jelly with simple lubricants^{1,2} or even water² have largely been ignored, and it is common practice to use one of the commercial electrode jellies for hospital and domiciliary electrocardiographic (ECG) recording. The purpose of this paper is to show that using water instead of jelly does not detract from the quality of the ECG.

Patients, methods, and results

One hundred patients referred to the ECG department were randomly selected for study; the criterion for selection was the time available to the technician for recording and mounting the extra tracings. We have used water rather than jelly for some time, so the first or service ECG was recorded using water without any other skin preparation, and the second tracing was then taken using one of the commercial electrode jellies. Both traces were mounted separately and when the study was completed two physicians each examined 100 mixed tracings which did not indicate whether water or jelly had been used. These traces were carefully examined for quality and were assessed for alternating current interference (50 cycles per second), a wandering baseline ($+ or - 5$ mm), and other artefacts. One technician recorded all ECGs with a Siemens Cardiostat 3T (input resistance, standard leads: 2×5 MOhm (between R-L, L-F, F-R with aV and V leads: 600 KOhms); frequency response: 0-100 Hz, 5 dB; 50-Hz filter on mains only; battery power used for traces in this study) or Cambridge VS4 (input impedance: > 500 kOhms between any patient lead and ground under any conditions; frequency response: 0.08 to 40 Hz $+0.5$ dB, -3 dB; this machine did not have a Hertz notch filter). Electrode size was 3.8×5 cm for the Siemens machine, and 3.8×6.2 cm for the Cambridge. Tracings were taken in the ECG department, which is not specially shielded against AC interference.

All tracings—that is, 100 with jelly and 100 with water—were regarded as satisfactory for routine interpretation. The amplitude of the QRS complexes was not changed by using water, nor were there any significant differences in the S-T/T segments between the two techniques. Two tracings (one water, one jelly) were deemed “satisfactory but not a good tracing” due to the presence of alternating current interference. Slight alternating current interference was present in a further 10 ECGs (4 jelly, 6 water) but did not affect the overall quality of the tracing. A wandering baseline was present in one lead of six tracings (3 water, 3 jelly), but again the overall quality was

The Charitable Infirmary, Jervis Street, Dublin

ANN MARTIN, LRCPSI, senior house officer

RITA TIERNAN, MSCT, technician

MARY D'ARCY, LRCPSI, senior house officer

EOIN O'BRIEN, FRCPI, MRCP, physician (cardiology)

COPYRIGHT © 1979. ALL RIGHTS OF REPRODUCTION OF THIS REPRINT ARE RESERVED IN ALL COUNTRIES OF THE WORLD

good and interpretation was not affected. There was no evidence of the equivalent of a "jelly short" occurring with water. There was no significant difference in the quantity of discarded paper between the two methods.

Comment

With the early string galvanometer machines there was a low input impedance, and electrolyte pastes and jellies were necessary to overcome skin resistance. With the high input impedance of modern instruments, however, any liquid that moistens the skin will give a satisfactory recording—water, toothpaste, french mustard, and even marrons glacés have all been shown to be as effective as jelly.¹

The main advantage in using tap water rather than jelly is economy. The cost of jelly is about £2 per 100 ECGs. Swabs used to apply and remove the jelly at a rate of at least two per ECG cost some 42 p per 100 ECGs, whereas with water (which does not have to be dried) 20 swabs will suffice for at least 100 ECGs, or a damp sponge or towel may be used repeatedly, thus removing this expense entirely. By using the tap water there is, therefore, a saving of about £3.50 per 100 ECGs, which in a 300-bedded general hospital would amount to about £100 annually. The technician's time is also spared: it is easier and quicker to dampen a swab than to squeeze jelly from a tube (which may not be available in an emergency), and there is no need to clean the skin after recording. Furthermore, straps and electrodes do not need cleansing, and the electrodes do not erode with water.

Because of these advantages, we recommend that electrode jelly be replaced by tap water in the routine recording of ECGs.

We are grateful to Dr J Fielding who kindly helped to analyse the ECGs.

¹ Lewes, D, *British Heart Journal*, 1965, 27, 105.

Lancet, 1965, 1, 975.

³ Maxwell, J, *British Medical Journal*, 1957, 2, 942.

(Accepted 19 December 1978)