

Background

Use of a pulse oximeter is one of the minimum requirements for monitoring during anaesthesia as specified by the Royal College of Anaesthetists⁽¹⁾. Pulse oximeters are often used to guide therapeutic interventions⁽²⁾. Increasingly, surgical and non-surgical wards are using SpO₂ to intermittently monitor patients.

However there are potential limitations associated with the use of SpO₂⁽³⁾. Pulse oximeters measure red and infrared light transmitted by light-emitting diodes (LEDs) through a tissue. One of the limitations of pulse oximeter accuracy is LED wavelength variability⁽⁴⁾, especially with cheaper non-generic probes. This variation can produce significant alteration in absorption of the light and therefore inaccuracy of pulse oximeters

We therefore, decided to survey the accuracy of the pulse oximeter sensors used at the R.G.H.

Method

This survey was conducted in July 2004. the Lightman (Celtic ElectroMedical, Gwent, UK) (Fig.1) a portable microspectrometer, was used to test the accuracy of the SpO₂ probes. This device is designed to test light emitting accuracy of the LED and photodiode sensitivity of the SpO₂ probes. The Lightman was taken to various clinical areas where the sensors were tested with minimum disruption to clinical services. An erroneous reading of +/- 2% at 90% oxygen saturation was considered acceptable⁽³⁾.

Fig.1



Results

We tested 100/126 probes of various makes giving a pick up rate of 79%. This survey detected reading errors in 11% (11/100) of tested probes.

Table 1 . Pulse Oximeter Sensors Tested

Error at SpO ₂ 90%	Hewlett Packard	Nellcor D'scope	Viamed	Datex Ohmeda	Total
Over Read > +2%	0/42	1/41	3/11	0.6	4/100
Under read > -2%	3/42	1/41	3/11	1/6	7/100

Discussion

A sensor with positive error will lead clinicians to believe that the patient is better oxygenated than is the case, with possibly serious consequences. Low reading probes will give an erroneous impression that the patient has lower oxygen levels than is the case. This may lead to unnecessary and perhaps harmful intervention. Hence the need for the introduction of routine pulse oximeter probe checks before and during clinical use.

References

1. AAGBI Recommendations for standards of monitoring during anaesthesia
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3. Grace RF. Med J of Australia 1994; 160: 638-44
4. Kellher JF. J Clin Monit 1989; 5: 37-62