PULSE OXIMETRY

Pages with reference to book, From 30 To 30

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Tissue hypoxia is one of the major causes of death in most humans undergoing anaesthesia. Among the causes of tissue hypoxia is a failure of oxygen delivery, which depends on the oxygen supply, lung function and cardiac output. It is directly related to oxygen capacity and affinity of blood which, in turn, depends on the concentration of functioning haemoglobin and its P50. These factors can be compounded by inadequate experience of the anaesthetists[1-2]. The recent development of pulse oximeters which monitor both the heart rate and provide a continuous measurement of arterial saturation, represents a major advancement in monitoring[3]. These devices may be placed on the finger, ear lobe or nasal septum and differ from previous oximeters in that they are able to eliminate the background absorption attributable to tissue by measuring the light absorption at two different wavelengths at frequent intervals during each pulse. It is, therefore, possible to derive an absolute measure of oxygen saturation without precalibration. The accuracy of pulse oximeters has been evaluated in normal adults[4-5] and in patients with cardiorespiratory disease[6]. In the range of 56-99.5%, all studies found good correlation with arterial blood samples with correlation coefficients(r) of 0.82-0.99. Pulse oximeters are usually unaffected by skin pigmentation but are sensitive to motion artefacts and may give inaccurate results when the pulse volume is reduced by blood loss or severe vasoconstriction due to hypothermia. They may be affected by the presence of excessive external illumination, bilirubin or extraneous dyes in blood or marked venous pulsations[7], also by uni and bipolar diathermy due to very high frequency generated by the latter. Pulse oximeters maybe used to advantage as continuous, noninvasive, rapid response monitors of oxygenation in all patients during the immediate pre, intra and postoperative period and in patients in intensive care units who are undergoing respiratory therapy or who have significant respiratory or cardiovascular disease. It also acts as a second line monitor of oesophageal intubation and ventilator disconnection. Pulse oximeters present an opportunity for considerable increase in patient safety. An argument can be made for their use in every patient who is unconscious or at risk of sudden arterial desaturation. These instruments are reliable and safe and suffer from no major disadvantages. Unfortunately they are relatively expensive in comparison to most of the equipment used by anaesthetists (but not by other medical specialities). They nevertheless represent significant advance in patient monitoring todate as they noninvasively and safely provide a continuous indication of adequate circulatory and respiratory function.

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