The role of oxygen therapy in the recovery phase of day surgery

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Oxygen therapy in the inpatient setting is standard practice in the postoperative phase. The aim of this study was to evaluate the need for the routine use of oxygen in the transit phase from the operating theatre to recovery, and its continued use in recovery, in patients undergoing day surgery. ASA I-II patients undergoing body surface surgery, using anaesthetic agents with a rapid recovery profile, are not subject to many of the factors that predispose to postoperative hypoxaemia. This study showed that in our unit the majority of patients do not require oxygen therapy in the theatre-recovery transit phase, and that attention to patient positioning, airway patency, and elimination of the second gas effect may be sufficient. Each day surgery unit (DSU) must make decisions on the need for postoperative oxygen therapy based on the unit layout and the condition of the patient.

Key words: Day surgery, oxygen therapy

Introduction

Oxygen therapy after inpatient surgery is standard practice in the postoperative phase. Postoperative hypoxaemia is the result of many factors: upper airway obstruction, respiratory depression, altered CO2 sensitivity, the second gas effect, a decrease in SVO2, decreased functional residual capacity (FRC), increased closing volume and an increase in ventilation/perfusion (V/Q) mismatching. Major surgery is associated with constant or episodic decreases in oxygen saturation over up to five nights postoperatively1, and postoperative confusion has been found to be associated with a decreased Spo2 postoperatively2. These changes are not found in patients undergoing minor surgery1. Most day surgery patients are ASA I, unpremedicated and are undergoing body surface surgery with anaesthetic agents of rapid recovery profile. Therefore the factors that contribute to postoperative hypoxaemia may be minimized. The routine use of oxygen therapy for day surgery patients may thus be unnecessary, particularly with the advent of pulse oximetry.

Methods

It is our standard practice not to give oxygen therapy in the theatre-recovery transit phase. One hundred patients in our day surgery unit (DSU) undergoing general anaesthesia were included in the study to re-evalu-
Table 1. Day surgery centre pulse oximetry readings

|--------|----------|------------|-------------|-------------|--------------------------------------------------------|------------------------|-----------------------------|-------------------------------|---------------------------------|------------------------------------------------|----------------------------------|

Last SpO₂ in theatre ............................................................................................................
First SpO₂ in recovery ..........................................................................................................
Time in transit to recovery .................................................................................................

Table 2. Summary of statistical analysis

Fisher's Exact Test; Rearranged table

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<thead>
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<tr>
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<tr>
<td>90</td>
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<td>100</td>
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2-tailed probability (by summation) = 0.000054

Uncorrected $x^2 = 37.5$ $P<0.0001$
Yates-corrected $x^2 = 27.80671$ $P<0.0001$.

Proportion difference = 0.4
Near exact (MaE) 95% confidence interval = 0.16818 - 0.687326

Anaesthetist conducted 84 of the procedures. The mean transit time between theatre and recovery was 1 min (range 20 s–2 min).

Ranges in SpO₂ in theatre were 100–93% both during the procedure and as the last measurement before leaving. The range in recovery was 99–87%. On arrival in recovery 10 patients had an SpO₂ <94%. Of these, six were unresponsive, three drowsy and one awake. Four were smokers and four had intraoperative SpO₂ <94%. Of the other 90 patients whose saturation was >94% all were either drowsy or awake ($P<0.0001$ Fisher’s exact test). Three patients had a documented airway problem; one required an oropharyngeal airway, one was described as snoring and one had bronchospasm. Seven had been given opiate drugs (Fig. 1).

Discussion

Supplemental oxygen therapy seems to be administered out of habit rather than according to individual patient requirements. Whereas this use of oxygen is unlikely to harm any patient, it is probably not useful for the majority and does incur a cost penalty. It has been our observation that the placement of an oxygen mask on the patient is believed by some staff to provide a panacea cure, which then causes problems such as an obstructed airway to be overlooked. Russell and Graybea showed that low Sao₂ in recovery correlated positively with patient age, body weight, ASA status, general anaesthesia and administration of large volumes of fluid. No correlation with opiates was found. The paediatric population show a greater tendency to desaturate, especially in the first 10 min postoperatively, and here the length of the procedure and not the use of opiates is important. A video surveillance study in

Figure 1
inpatients showed how often the oxygen facemask is removed either by the patient or by the nursing staff, thus rendering the treatment intermittent at best. Many patients find oxygen masks claustrophobic and nasal spectacles uncomfortable.

Our study shows that, in the majority of patients, oxygen therapy is unnecessary in the theatre-recovery transit phase. This is in itself the most likely time for desaturation, after the patient has been transferred from operative table to trolley and is then transported, usually with no monitoring, into the recovery area. We also identified a group of patients who are at risk of hypoxaemia, namely the unresponsive patient, and those with previous intraoperative desaturation, prior to transfer. The cause rather than the effect should be treated here, with attention to patient positioning, airway patency with or without aids, and elimination of the second gas effect by extended oxygenation in the theatre before transfer. In certain situations where the patient's condition is already optimized, oxygen may still be required for transfer, either as a result of patient factors or difficulties in a prolonged transfer, i.e. the anaesthetist being required to perform multiple tasks such as opening doors and steering the trolley as well as maintaining the airway. Pulse oximetry in this situation would alert the anaesthetist to any desaturation occurring despite oxygen therapy.

This lack of requirement for supplemental oxygen therapy may extend into the recovery phase after transit. Monitoring the $\text{SpO}_2$ with the aid of continuous pulse oximetry in the recovery area has been shown to reduce the incidence of episodes of desaturation, and so we suggest that in the day surgery setting, attention to the airway, patient positioning and continuous pulse oximetry measurement may be sufficient for most patients, to prevent hypoxaemia. This would represent not only a potential increase in patient comfort but also a cost saving by reducing the use of the disposable equipment required for the delivery of oxygen. The need for individual oxygen cylinders on trolleys, with the expense and upkeep that they entail, particularly in the high turnover environment of day surgery, would also be eliminated. We would recommend that each DSU assess its own facilities, such as transit time from theatre to recovery, usage of lifts and the case mix of patients with respect to ASA, age and type of surgery, with a view to assessing feasibility for changing the routine use of supplemental oxygen. Are we treating the patient or ourselves?

References