

# Oxygen Therapy in Cardiology: Local prescribing experience at a large regional cardiac centre

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## Abstract

Oxygen is a prescribed drug which is widely used in cardiac care. Its inappropriate use can have harmful effects to the patients and would be less cost effective. Aim: This study was carried out to gain an insight into clinical practice of prescribing oxygen therapy in busy cardiology unit and whether it's affecting patient care. Method: We prospectively audited twenty patients in different Cardiology Wards: two acute and two non acute wards over 2 months. Oxygen indication, mode of delivery, documentation in case notes and prescriptions on drug charts were studied. Conclusion(s): Oxygen was poorly prescribed. No patients were prescribed oxygen on drug chart and very few patients (5 patients; 25%) had documentation of oxygen therapy in case notes. Nasal prongs were the most preferred mode of delivery for oxygen. Review of current best practice and UK/European guidance on use of oxygen in acute cardiac care has also been discussed.

## INTRODUCTION

Oxygen therapy is widely used in both acute and chronic cardiac care. Various studies and audits in respiratory care have shown that oxygen is poorly prescribed by doctors [1-3]. It is over 100 years since the use of oxygen to relieve angina was first described [4].

Oxygen is a prescribed drug [5]. It is our medico-legal responsibility to prescribe it when initiating its therapy. The prescription should include dose (in percentage), mode of delivery and how long the patient is going to be on it for. These details should be present in medical records of the patient as well [6]. Proper communication with the nursing staff helps to avoid errors and reduces risk to patients from oxygen intoxication.

Our aim was to study oxygen prescription in Cardiology, and whether this is affecting patient care in any sense. We also review current guidance on oxygen prescription in recent onset chest pain.

## METHODOLOGY

We prospectively identified patients on ward who were receiving oxygen therapy. This was carried out across four Cardiology wards: Coronary High dependency unit, Coronary Care Unit and two general cardiology wards. This study was done for 3 months. We studied various aspects of clinical care related with oxygen therapy. These are

mentioned in Table 1. Once it was established that patient is on oxygen (by confirming from nursing or junior medical staff), we studied the observation chart and case notes to extract relevant information. Observation charts were helpful to see whether patient had any symptomatic criteria or indication for instituting oxygen therapy. These included respiratory rate and pulse oximetry recordings. Medical records were used to ascertain patient's diagnosis and reason for initiating oxygen therapy.

## Figure 1

Various aspects of clinical care related to oxygen therapy which were accessed.

Prescription of oxygen – in drug charts and case notes
Indication for initiation of oxygen therapy
Mode of delivery

## RESULTS

From 20 patients who were receiving oxygen therapy, we identified 11 patients with acute coronary syndrome. From these 11 patients, only one patient (9%) was identified to have hypoxaemia with oxygen saturation below 92%. Other indications for oxygen therapy identified were as follows: Hypoxaemia alone (n=1), Arrhythmias (n=4) and congestive heart failure (n=7). Out of 7 patients with C.C.F., 2 patients were hypoxic.

Various modes of delivery of oxygen used are listed in Table 2. Nasal prongs were the most preferred mode of delivery for oxygen. No patients were prescribed oxygen on drug chart and very few patients (5 patients; 25%) had documentation of oxygen therapy in case notes.

**Figure 2**  
Mode of delivery of oxygen

Mode of Delivery of Oxygen	Number of patients (Percentage)
Nasal Prongs	10 (50%)
Low Flow Mask	4 (20%)
Venturi Mask	2 (10%)
Non-Rebreath Mask (High Flow)	4 (20%)

**DISCUSSION**

In our study, we have identified few issues. Prescription of oxygen is very poor in Cardiology wards. There have been many reports of harmful effects of high flow oxygen in acute coronary syndrome and yet it is still widely used in acute cardiac emergencies, where the patient might not be hypoxic. High flow oxygen has been shown previously to reduce cardiac output [7], attributes to arterial vasoconstriction [8-10] and also to increase systemic vascular resistance [11]. More recently, there is evidence that high flow oxygen reduces coronary artery blood flow in patients with stable ischemic heart disease [12].

Improving the quality and appropriateness of oxygen prescription is crucial. One way of assuring this outcome is by incorporating oxygen prescription fields on drug charts, which has shown to increase the number of adequate oxygen prescriptions [13]. However, more effort is needed to improve the clinical practice of assessing the need for oxygen and titrating it according to patients’ needs [13]. Teamwork and communication failures are widely reported to be a common reason for patients’ harm [14]. Improving the communication skills of the members of the staff and implementing a multidisciplinary teamwork is another way to ensure the appropriate approach towards patients’ care and safety [15]. A nurse-facilitated reminder strategy, where nurses liaise with junior medical staff regarding the need for oxygen, is very promising [16].

Moreover, it is important to keep legible and clear medical records with precise management plans, including the details of oxygen therapy, as incomplete and poorly organised entries make it difficult to deliver a good quality of care [17].

Finally, developing local protocols and guidelines, as well as education programmes has shown to improve adherence to existing evidence based recommendations, for example the GAP project in myocardial infarction [18] or IMPROVE HF project in heart failure [19], and similar approach towards the oxygen therapy would be beneficial.

**REVIEW OF CURRENT GUIDELINES REGARDING OXYGEN THERAPY IN ACS PATIENTS**

In the UK, National Institute of Clinical excellence (NICE) has issued new guidance on oxygen use in recent on-set chest pain patients [20]. This is outlined in Table 3.

**Figure 3**  
NICE guidance on oxygen therapy in recent on-set chest pain patients.

1	In myocardial infarction and ACS, aim at an oxygen saturation of 94 to 98% or 88 to 92% if the patient is at risk of hypercapnic respiratory failure.
2	Patients with serious emergency conditions such as myocardial infarction and ACS should be monitored closely but oxygen therapy is not required unless the patient is hypoxaemic: <ul style="list-style-type: none"><li>• If hypoxaemic, the initial oxygen therapy is nasal cannulae at 2 to 6 l/min or simple face mask at 5 to 10 l/min unless oxygen saturation is &lt; 85% (use reservoir mask) or if at risk from hypercapnia</li><li>• The recommended initial target saturation range, unless stated otherwise, is 94% to 98%</li><li>• If oximetry is not available, give oxygen as above until oximetry or blood gas results are available</li><li>• If patients have COPD or other risk factors for hypercapnic respiratory failure, aim at a saturation of 88% to 92% pending blood gas results but adjust to 94% to 98% if the PaCO2 is normal (unless there is a history of respiratory failure requiring NIV or IPPV) and recheck blood gases after 30 to 60 minutes.</li></ul>

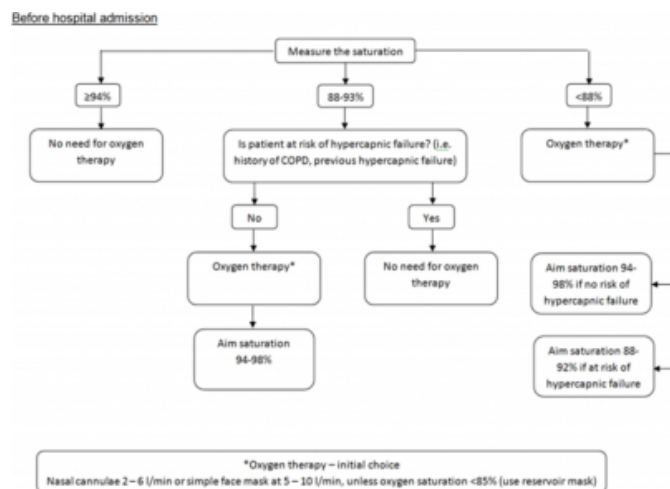
European guidelines (2008) are slightly more lax [21]. These recommend oxygen therapy in patients presenting with chest pain if they are breathless or have any features of heart failure or are in shock. This should ideally be by nasal prongs or mask. Approximately 2-4L/min regime should be used. Non-invasive monitoring of blood oxygen saturation greatly helps in deciding on the need for oxygen administration or, in severe cases, ventilatory support.

We suggest using a simple protocol in patients presenting with acute chest pain for oxygen therapy. We have developed flow charts which guide paramedics, nurses and doctors to prescribe oxygen therapy to their patients based

on NICE and BTS guidance on oxygen handling. (Flowchart 1, Flowchart 2)

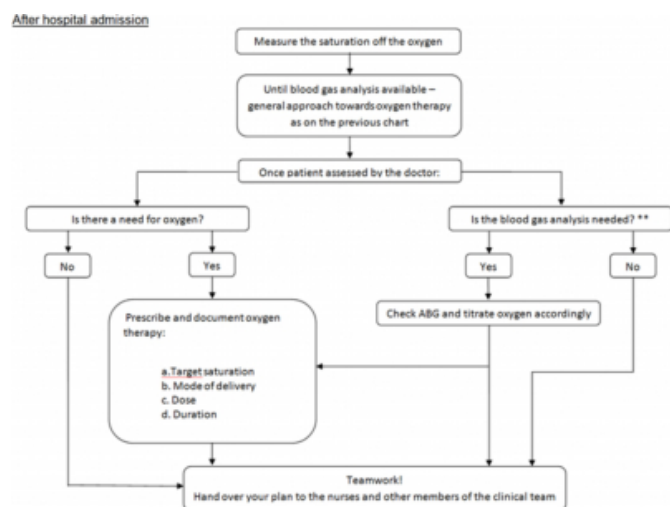
**Figure 4**

Guidance on use of oxygen therapy before hospital admission in acute chest pain patient.

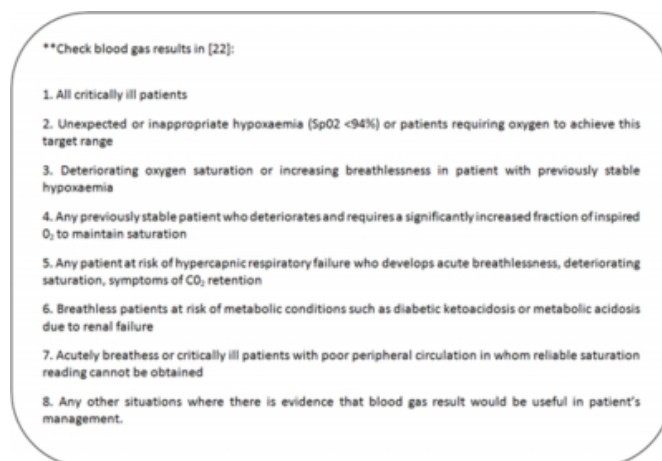


**Figure 5**

Guidance on use of oxygen therapy after hospital admission in acute chest pain patient.



**Figure 6**



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