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Audit of oxygen prescribing before and after the introduction of a prescription chart

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Oxygen, used to treat hypoxaemia, may be lethal and should therefore be considered a drug and be prescribed.[1] It is, however, recognised that oxygen is poorly prescribed by doctors.[2] To ensure the safe and effective delivery of oxygen the prescription should include the flow rate, the concentration, the delivery device, the duration, and the method for monitoring treatment.[2] We audited the prescription of oxygen to inpatients by doctors before and after the introduction of a specific prescription chart.

Participants, methods, and results

Junior doctors at the North West Lung Centre are given two lectures on practical aspects of oxygen delivery and prescribing at the beginning of their one year's rotation in respiratory medicine. In 1997 and 1998 the doctors were informed that an audit of their prescribing practice would take place some time during the next year. The outcome measures of the audit were whether the oxygen was prescribed and whether the prescription was accurate—that is, that the audit matched patient use in relation to the delivery device and that the flow rate and concentration were appropriate to that device.

The audit was conducted on three respiratory wards over three months. FK and AD identified all patients receiving oxygen within 24 hours of admission, and they recorded the device, oxygen concentration, and flow rate appropriate to the device for each patient. They consulted a drug Kardex for a prescription of the proposed oxygen treatment. If a prescription was present they recorded the device, concentration, and flow rate. After the first audit, a specific prescription chart for oxygen was developed to encompass all the oxygen delivery systems used on the wards (figure). The methodology for the second audit was identical to that of the first, with the exception that both the chart and the drug Kardex were examined for the prescription. The χ^2 test was used to analyse the prescription of oxygen before and after the introduction of the chart.

Overall, 115 patients were identified as receiving oxygen in the first audit and 121 in the second. In the first audit oxygen was prescribed for 63 of the 115 (55%) patients. After the chart was introduced the number of oxygen treatments prescribed increased to 110 of 121 (91%) patients ($P < 0.001$). The prescription was accurate for eight (7%) patients in the first audit and 93 (77%) in the second. The accuracy of prescription was 94% (73 of 78 patients) with the chart and 63% (20 of 32) with the drug Kardex.

Comment

Our first audit showed that oxygen was infrequently well prescribed, as previously described.[2 3] Junior doctors poorly understand the effects and dangers of oxygen, and lectures alone were insufficient to ensure safe and effective practice.[4] The prescription chart for oxygen listed the delivery devices, guided the doctor to prescribe the appropriate concentration and flow rate, and provided additional notes for the specific indications of each device.

The most common omission from the prescriptions was flow rate. The flow rate of fixed concentration masks should be adjusted for patients with high peak inspiratory flows. Flow rate is the only variable that is prescribed with nasal cannulas, and an accurate prescription of flow rate is essential as hypercapnic respiratory failure may occur.[4] Oxygen for delivery by nasal cannula is often prescribed by

concentration, with the assumption that an inspired oxygen concentration of 24% equates to 2 l/min; concentrations of 24%-35% with 2 l/min have been described.[5]

The prescription of oxygen is complex, and a drug Kardex does not accommodate the precise details required for the variety of delivery devices. This was clearly shown in the second audit, where the accuracy of the prescription was greater with the chart than with the drug Kardex. We have shown that a specific prescription chart for oxygen improved clinical practice in our specialist medical respiratory centre, and we recommend the use of such a chart.

Contributors: MED designed the study, analysed and interpreted the results, and wrote the paper. FK and AD analysed and interpreted the data. JCGS designed the study and the chart. AKW and CSH critically revised the paper. RMcLN designed the study and the chart and critically revised the paper.

Competing interests: None declared.

The North West Lung Centre Oxygen Prescription Chart

CONTINUOUS/NIGHT-TIME/DAY-TIME/PRN (please circle)

Tick device	NAME		HOSPITAL NUMBER	WARD	AGE	
	NASAL CANNULAE/ NIPPV	CHANGE 1	CHANGE 2	CHANGE 3	CHANGE 4	CHANGE 5	Nasal Cannulae are best suited for chronic usage. Concentration of oxygen delivered depends on factors other than flow rate.
	Circle flow rate L/min	1 2 3 4 _	1 2 3 4 _	1 2 3 4 _	1 2 3 4 _	1 2 3 4 _	
	Time & Date						
	Signature						

	VENTIMASK	CHANGE 1		CHANGE 2		CHANGE 3		CHANGE 4		CHANGE 5		Fixed concentration masks are suited to patients where concentration is critical. A common error is to fail to provide sufficient flow. Increased flow rate **DOES NOT** alter the conc[n] or increase the chance of CO^2 retention but reduces work of breathing. Flow rate changes for ventimask only can be prescribed without consultation with a doctor
	Tick concentration required and specify flow rate	CONCENTRATION	FLOW		FLOW		FLOW		FLOW		FLOW	
	Flow should be adjusted to patient comfort. Minimum and maximum allowable flow rates indicated	24%	(2-15)		(2-15)		(2-15)		(2-15)		(2-15)	
		28%	(4-15)		(4-15)		(4-15)		(4-15)		(4-15)	
		35%	(8-15)		(8-15)		(8-15)		(8-15)		(8-15)	
		40%	(12-15)		(12-15)		(12-15)		(12-15)		(12-15)	
		60%	15		15		15		15		15	
	Time & Date											
	Signature											

	HIGH FLOW						High flow rates are only required in special circumstances in breathless, hypoxic patients with a high respiratory drive
	Record concentration (33-100%)						
	Time & Date						
	Signature						

Prescription chart for oxygen introduced after first audit

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Refused and granted requests for euthanasia and assisted suicide in the Netherlands: interview study with structured questionnaire

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In 1995, physicians in the Netherlands received 9700 explicit requests for euthanasia or physician assisted suicide, of which 37% were granted and carried out.[1] Among the remaining requests, about half were refused by the physician; in the rest of the cases either the patient died before a decision had been reached or the physician's promise of help could be effected, or the patient withdrew the request.[2] Knowledge of specific characteristics of refused and granted requests for euthanasia or physician assisted suicide may give insight into physicians' decision making and into the role of criteria for prudent practice. We therefore compared the characteristics of refused and granted requests.

Subjects, methods, and results

In 1995 and 1996, 405 Dutch physicians, randomly sampled nationwide and stratified by specialty and region, were interviewed by over 30 specifically trained and experienced physicians using a structured questionnaire. The response rate was 89%. Euthanasia was defined as the administration of drugs with the explicit intention of ending the patient's life, at the patient's explicit request. Assisted suicide was defined as the prescribing or supplying of drugs with the explicit intention of enabling the patient to end his or her own life. All physicians were asked to describe their most recent case of a granted request (134 physicians had had such a case) and their most recent case of a refused request (148 physicians had had such a case).

Patients whose requests were refused, compared with patients whose requests were granted, were more often female and aged over 80; were less likely to have cancer; were more likely to have depression as a predominant complaint; were more likely to have a remaining life span of over six months; were less likely to have made a highly explicit request; were less likely to be competent; were less likely to be suffering utterly "hopelessly and unbearably," and were more likely to have access to alternatives for treatment (table).

In both the refused and the granted requests "avoiding loss of dignity" (42% (95% confidence interval 31.6% to 52.4%) and 56% (46.3% to 66.2%) respectively) and "unbearable or hopeless suffering" (39% (29.0% to 48.8%) and 74% (64.9% to 82.6%)) were most often mentioned as the patient's reason for requesting euthanasia or physican assisted suicide. Only two reasons were mentioned more often in refused requests than in granted requests: "weariness of life" (40% (29.8% to 50.5%) and 18% (10.2% to 25.5%) respectively) and "not wanting to become

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