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Oxygen desaturation in apparent and relative polycythaemia

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Daytime hypoxaemia is known to cause secondary polycythaemia with an increased red cell mass. Occasionally, the arterial hypoxaemia can be shown only during sleep.¹ Less well recognised is the association between arterial hypoxaemia and apparent or relative polycythaemia (both of which are characterised by a raised packed cell volume but normal red cell mass) shown in a recent retrospective study.² Our prospective study was designed to examine this association further and include investigations during sleep.

Patients, methods, and results

We studied 16 patients (13 men and three women; mean age 57 years, range 31-75 years). They were consecutive referrals to this department with confirmed raised packed cell volumes (greater than 0.51 in men and greater than 0.47 in women) and normal red cell masses—that is, less than 125% of their predicted mean normal value.³ Seven had relative polycythaemia (plasma volume less than 87.5% of their predicted mean normal value) and nine apparent polycythaemia (normal plasma volume). The following observations were recorded: daytime arterial oxygen saturation and carboxyhaemoglobin measured in a radial artery blood sample taken when the patient was sitting (ABL2 Radiometer, Copenhagen), oxygen saturation measured by pulse oximetry when stabilised in sitting and supine

positions (Ohmeda BIOX 3700) and routine lung function measured by spirometry, lung volume, and carbon monoxide transfer factor. A sleep study with readings of oxygen saturation and heart rate by pulse oximetry, nose-mouth air flow, and observation by a sleep laboratory technician (SA) was performed in all patients for over five hours.

Four patients (two with relative and two with apparent polycythaemia) had appreciable oxygen desaturation during sleep (table) and these were the only patients with reduced oxygen saturation values of less than 92% by daytime pulse oximetry (all four when supine and only one when sitting).⁴ Only one of these four patients and none of the remaining 12 had low daytime oxygen saturation measured in an arterial blood sample. The fall in oxygen saturation during sleep in these four patients related to hypoventilation as none had appreciable apnoea scores. Two of these four patients and three of the remaining 12 showed appreciable impairment of respiratory function—that is, forced expiratory volume in 1 second less than 70% of the predicted value or carbon monoxide transfer value less than 75% of the predicted value, or both. One of the four patients with reduced oxygen saturation values and nine of the remaining 12 were classified as cigarette smokers on the basis of history and carboxyhaemoglobin concentrations.

None of a control group of 16 age and sex matched haematology outpatients without polycythaemia had oxygen saturation values less than 92% when tested by supine oximetry.

Comment

Four of 16 consecutive patients with polycythaemia but normal red cell mass had evidence of appreciable nocturnal oxygen desaturation due to hypoventilation.

Data for the four patients with arterial oxygen desaturation

Case No	Daytime arterial oxygen saturation (%)	Oxygen saturation measured by pulse oximetry (%)		Packed cell volume	Red cell mass (% predicted)	Plasma volume (% predicted)	Carboxyhaemoglobin (%)	% Total test time at saturation <90% from sleep study	Forced expiratory volume in 1 s (% predicted)	Carbon monoxide transfer factor (% predicted)
		Sitting	Supine							
1	97	91	88	0.53	114	99	1.0	79	99	96
2	95	95	90	0.52	110	98	0.9	5	95	>90
3	91	93	86	0.54	106	80	3.9	54	29	42
4	94	92	89	0.52	93	84	1.2	8	50	>90

In all four this was predicted by daytime oximetry in a supine position, although only one had a low arterial oxygen saturation when sitting. This probably relates to the difference in posture and the less stressful nature of oximetry. Coincidental pulmonary disease probably related to smoking was present in only one of the patients with arterial oxygen desaturation.

This study shows that it is important to investigate patients with apparent and relative polycythaemia for oxygen desaturation not only by measuring daytime arterial blood gases but also by supine oximetry. Studies of the mechanisms of plasma volume control, which are altered in hypoxaemia,⁵ may help to determine whether the association of hypoxaemia and raised

packed cell volume without an increased red cell mass is a causal one.

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Prescribing of psychotropic drugs to children and adolescents

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To date there have been no surveys of the prescribing of psychotropic drugs to children and adolescents, but this use of psychotropic drugs had been accepted since the first observations by Charles Bradley in 1937 that amphetamine sulphate (Benzedrine) modified the behaviour of children with severe behavioural disturbance.¹ Since those early reports there have been more and more reports favouring the use of stimulants,² tricyclic antidepressants (including their use for nocturnal enuresis),³ antipsychotic drugs in adolescent psychoses,⁴ and lithium in adolescent manic depressive disorder.⁵ Minor tranquilisers and sedative anti-histamines seem to be widely used to treat sleep disturbance, but there has been virtually no systematic investigation of this use. The aim of my study was to find how often these drugs are prescribed and the general pattern of drug type, indication, and prescriber.

Patients, methods, and results

The survey was based on a simple postal questionnaire (designed to maximise the response rate). Drugs were divided into seven different classes according to the drug group and indication for treatment (table). To

Numbers of prescriptions for psychotropic drugs given by 83 general practitioners and 22 consultant child psychiatrists in 3 month period to children aged ≤7, 8-13, and 14-17 years

Drug	Prescribed by general practitioners			Prescribed by consultants		
	≤7	8-13	14-17	≤7	8-13	14-17
Tranquillisers:						
Major	0	0	2	1	3	18
Minor	1	0	4	0	2	3
Hypnotics	61	3	6	13	0	0
Antidepressants:						
For depression	3	2	9	0	4	9
For enuresis	28	27	4	4	6	1
Lithium	0	0	1	0	1	4
Stimulants	0	0	0	1	3	0

maintain the simple design of the questionnaire three age ranges were used, which were chosen to reflect the logical differences in prescribing with age. The age ranges were 7 years and under, 8-13, and 14-17 years, reflecting the infant and developmental period, childhood, and adolescence, respectively.

One hundred general practitioners randomly indentified from the current Wessex Family Health Services Authority list and all 28 consultant child psychiatrists in practice in Wessex were surveyed. The

questionnaire inquired retrospectively about prescriptions given over the previous three months. It was emphasised that only those prescriptions given on a doctor's own initiative, rather than in response to another doctor's recommendation, should be counted. Those doctors who failed to reply were sent a second questionnaire.

Correctly completed replies were received from 83 general practitioners and 22 consultants. Sixty one general practitioners had given a total of 151 prescriptions and 16 consultants 73 prescriptions. The table shows the numbers of prescriptions given in each category.

Comment

This study provides some initial data about the pattern of psychotropic drug prescribing to children and adolescents in both general practice and child psychiatric practice. The response rate by both general practitioners and consultants was good, probably reflecting the simplicity of the questionnaire and the efforts made to encourage a reply. That in a three month period as many as 73% of general practitioners and 68% of consultant child psychiatrists prescribed a psychotropic drug to a child of 17 years or under was surprising and indicates a need for further studies. Perhaps there should also be some concern that several prescriptions of antidepressants for depression were made by general practitioners on their own initiative without the recommendation of a consultant. Also surprising is the prescribing of antidepressants for enuresis to so many children in the youngest age group, in whom such symptoms might be regarded as lying within the spectrum of normality. In addition, it is probably questionable whether young children or babies should be prescribed hypnotics for sleep problems. There are dangers in prescribing psychotropic drugs to children; in addition to the possibility of dangerous and unpleasant side effects there is the risk of accidental poisoning and deliberate self harm by overdosing, which is a common adolescent problem.

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