45 days, above it on 51, and below it on 84. Patients received heparin for a median of four days, and the kaolin cephalin clotting time was within the therapeutic range for a median of one day in each patient (though never in 13 patients) (table). Interestingly, there was no trend towards improved control with duration of treatment.

Day by day analysis of anticoagulant state of patients receiving heparin infusion (figures are numbers (%) of patients)

	Day 1 (n = 45)	Day 2 (n = 45)	Day 3 (n = 41)	Day 4 (n = 36)	Day 5 (n = 12)	Day 6 (n = 1)
Within therapeutic range	10 (22)	10 (22)	14 (34)	7 (20)	4 (33)	
Above therapeutic range	12 (27)	8 (18)	12 (29)	17 (47)	5 (42)	1 (100)
Below therapeutic range	23 (51)	27 (60)	15 (37)	12 (33)	3 (25)	

Doctors ignored 26% of all the measurements of kaolin cephalin clotting time that required a change in heparin infusion rate and changed the infusion rate in the wrong direction in 12%. Although in the right direction, 85% of the remaining changes failed to achieve a therapeutic kaolin cephalin clotting time. The therapeutic range was achieved on 27% of the days by infusion pump and on 19% of the days by burette ($p > 0.05$). The mean (SD) infusion rate required to achieve a therapeutic kaolin cephalin clotting time of 60 seconds was 1404 (432) U/h (n=28, range 690-2500 U/h) (1513 (417) U/h in men and 1278 (429) U/h in women ($p > 0.05$)). There was no significant relation between the therapeutic infusion rate and the age or weight of the patient.

Comment

Heparin control in our hospital is poor, with 26% of kaolin cephalin clotting times being ignored, 12% of responses being made in the wrong direction, and a high degree of inaccuracy in remaining responses. Accurate control is complicated by two other factors: firstly, there is wide interpatient variation in drug clearance and responses of the kaolin cephalin clotting time to given plasma heparin concentrations[3]; and, secondly, the response to heparin is not linear, so that a given increment in the heparin infusion rate will not result in a proportionate increment in the kaolin cephalin clotting time.[4]

Heparin should be delivered by infusion as this avoids potentially dangerous peaks of heparin activity (and correspondingly greater risk of haemorrhage) that sometimes occur after bolus injections.[5] Although we expected infusion pumps to maintain a steadier rate of infusion than burettes operated by nurses, the difference in control was not significant, and so other factors must also affect control.

If the concept of a therapeutic range of kaolin cephalin clotting time is accepted more attention should be paid to it when controlling treatment with heparin, a potentially dangerous drug. As the kaolin cephalin clotting time approaches the therapeutic range lower increments in the heparin infusion rate should be made to achieve equivalent increments in the kaolin cephalin clotting time. Individual titration of the infusion rate is necessary to optimise efficiency and reduce potential toxicity. Long and short kaolin cephalin clotting times should not be ignored.

We thank the consultant staff of Llandough Hospital for allowing us to use their patients for this study.

1 Duxbury B. Therapeutic control of anticoagulant treatment. *Br Med J* 1982;**284**: 702-4.
2 Basu D, Gallus A, Hirsh J, Code J. A prospective study of the value of monitoring heparin treatment with the activated partial thromboplastin time. *N Engl J Med* 1972;**287**:324-7.
3 Hirsh J, Van Aken W, Gallus A, Dollery C, Code J, Yung W. Heparin kinetics in venous thrombosis and pulmonary embolism. *Circulation* 1976;**53**:691-5.
4 Bjornsson TD, Woolfram KM. Determinants of the anticoagulant effect of heparin in vitro. *Ann NY Acad Sci* 1981;**370**:656-61.
5 Sabrion E, Degkin D, Shapiro R, Rosenburg R. Management of heparin therapy. Controlled prospective trial. *N Engl J Med* 1975;**292**:1046-50.

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Llandough Hospital, Penarth, South Glamorgan CF6 1XX
A G FENNERTY, MB, MRCP, research fellow
P THOMAS, MB, MRCP, registrar
G BACKHOUSE, FIMLS, technician
P BENTLEY, MRCP, MRCPATH, consultant haematologist
I A CAMPBELL, MD, FRCPED, consultant physician

Department of Pharmacology and Therapeutics, University of Wales College of Medicine
P A ROUTLEDGE, MD, MRCP, senior lecturer in clinical pharmacology

Correspondence to: Dr A G Fennerty.

Why do people seek treatment by alternative medicine?

Interest in complementary medicine is clearly increasing,[1 2] but no one has asked the general public why they seek such treatment. We carried out a study at the Centre for Alternative Therapies to evaluate the characteristics of patients seeking treatment. The scope of their presenting problems, the reasons why patients elect to be treated by complementary medicine, patients' knowledge, attitudes, and expectations about such treatment, and the efficacy of these methods in pain and depression were assessed. The centre is private, although 20% of patients are classed as socially disadvantaged and are seen either free of charge or for a small fee. The services offered include acupuncture, manipulative medicine, homoeopathy, clinical ecology, biofeedback, psychotherapy, the Alexander technique, and hypnosis.

Patients, methods, and results

We compiled a questionnaire to evaluate our aims after several open recorded interviews with patients. The questionnaire was given to all 65 new patients seen at the centre over four weeks. Twenty minute interviews took place after the patients had seen one of the doctors. Eight weeks after the first interview a follow up questionnaire was issued, and strenuous efforts were made to ensure maximum response.

Fifty six of the 65 patients completed the follow up questionnaires. The largest group of patients attending the centre were in social class II, married, female, and aged 26-50. Patients came with many chronic problems; pain accounted for 45% of the presenting complaints (table). Duration of symptoms varied from three months to 44 years (mean nine years). Most patients had seen both their general practitioner and a specialist; only three had bypassed conventional medicine. One third of the patients had consulted the doctor at the centre on the recommendation of friends, although general practitioners were responsible for 22% of referrals.

Presenting problems of patients

Complaint	No of patients	Specification of complaint
Pain	30	Arthritis, back pain, abdominal pain, headaches
Allergies	10	Eczema, urticaria, asthma, rhinitis
Non-specific symptoms	9	Malaise, feeling unwell, run down
Psychological	3	Anxiety, smoking
Gynaecological	2	Dysmenorrhoea, candidiasis
Gastrointestinal	3	Coeliac disease, spastic colon, diarrhoea, inflammatory bowel disease
Hypertension	2	
Loss of balance	2	
Others	6	Loss of voice, catarrhal deafness, Raynaud's disease, acne, muscle wasting, facial rash

Fifty four patients stated that failure of conventional medicine was their reason for attending. Most of these people had a good relationship with their general practitioner and thought that they had received satisfactory treatment from conventional doctors. Nineteen patients thought that they were rushed by their general practitioners, but 18 also claimed to be rushed by the doctor at the centre. About half the patients (31) thought that their general practitioner did not understand their problems; conversely, 53 thought that the doctor at the centre had a good understanding of their difficulties. Most of the patients said that they would return to conventional medicine for future problems.

The patients appeared to be well informed about alternative medicine, the main source of information being friends and the media. Attending the centre did not increase this knowledge. Two thirds of the patients believed that alternative methods worked, and many had high expectations of treatment. Expectations appeared to be correlated with outcome: if people expected to get better treatment was more likely to be effective. After eight weeks 33 patients felt much better, although only 19 had completed their treatment at this time. This subjective improvement was reflected in a decrease in the mean depression scores as measured by the Wakefield scale ($F = 4.996$, $p < 0.05$)[3] and a decrease in pain as measured by visual analogue scales ($t = 3.3$, $p < 0.01$).

Comment

Patients seen at the centre were not "cranks" and had not lost confidence in conventional medicine. They were well informed and seeking a solution to unresolved long term problems. Our study showed that 59% of patients attending the centre felt much better after eight weeks' treatment. Further studies should be directed at exploring the reasons for the increase in provision of alternative

medicine and, by implication, the problems that remain unresolved when treated conventionally.

We thank Dr Julian Kenyon for allowing us to interview his patients, all the patients who attended the centre, and Mrs J Burnham for her help with the manuscript.

1 Fulder S, Munro R. *The status of complementary medicine in the UK.* London: Threshold Foundation, 1982.
2 Taylor-Reilly D. Young doctors' views on alternative medicine. *Br Med J* 1983; **287**:337-9.
3 Snaith RP, Ahmed SN, Mehta S, Hamilton M. Assessment of the severity of primary depressive illness. Wakefield self-assessment depression inventory. *Psychol Med* 1971;**1**:143-9.

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Southampton University
JUDITH MOORE, fourth year medical student
KATHY PHIPPS, fourth year medical student
DONALD MARCER, BSC, PHD, senior lecturer in psychology

Centre for the Study of Alternative Therapies, Southampton SO1 2DG
GEORGE LEWITH, MRCP, MRCGP, director

Correspondence to: Dr George Lewith.

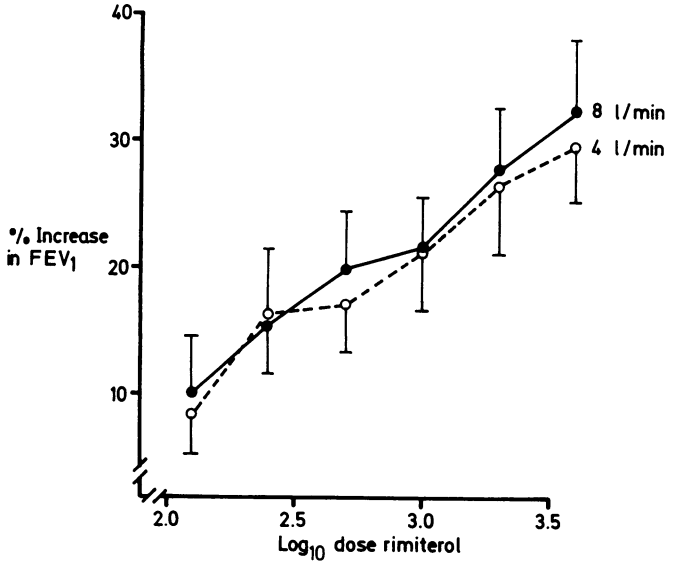
Is the flow rate used to drive a jet nebuliser clinically important?

Jet nebulisers are increasingly being used to provide high dose bronchodilator treatment, both in hospital and at home. The flow rate of the driving gas through a nebuliser directly affects the size of the particles generated, and for most nebulisers flow rates of less than 6 l/min produce droplets with a mass median diameter that is considered to be too large for tracheobronchial deposition.[1] This could imply that at lower flow rates the response to a bronchodilator aerosol would be diminished, even if the same dose of the drug is inhaled. We tested this hypothesis by comparing the bronchodilator response to rimiterol nebulised at 4 l/min and 8 l/min in a group of patients with chronic stable asthma.

Patients, methods, and results

Eight patients with chronic stable asthma took part in two cumulative dose response studies on consecutive mornings using nebulised rimiterol driven by oxygen at 4 and 8 l/min. Each patient had reversible airways' obstruction with an improvement of at least 20% in response to bronchodilators and had an initial forced expiratory volume in one second of 33-76% of the predicted normal value. Rimiterol was chosen because of its lack of gastrointestinal absorption,[2] which might have augmented the inhaled bronchodilator response. The forced expiratory volume in one second and the forced vital capacity before treatment were within 10% on the two study days. We had previously found that, of a 5 ml solution placed in an Inspiron Mini-Neb nebuliser, 2 ml was nebulised in six minutes at a flow rate of 4 l/min and 3·7 ml in six minutes at 8 l/min. Taking this into account we prepared dilutions of rimiterol for nebulisation to provide six doses in 5 ml for the two flow rates, starting with 125 μg and increasing by doubling dilutions to a cumulative dose of 7·9 mg. The duration of inhalation for each dose and flow rate was six minutes. The forced expiratory volume in one second, forced vital capacity, and pulse rate were measured immediately before and 15 minutes after each nebulisation. The next incremental dose was then given. The percentage changes in forced expiratory volume in one second, forced vital capacity, and pulse rate were plotted against the log cumulative dose of rimiterol to produce log dose response curves for each flow rate. Wilcoxon's rank sum test was used to compare the bronchodilator responses.

The figure shows the log dose response curves for the mean percentage increases in forced expiratory volume in one second at each flow rate. There were no significant differences between the mean percentage increases in forced expiratory volume in one second and forced vital capacity, and between the mean changes in pulse rate, with any dose of rimiterol at either flow rate, the dose response curves being similar and not separated.



Log dose response curves for percentage increases in forced expiratory volume in one second (FEV_1) after inhalation of nebulised rimiterol. Bars represent SEM.

Comment

The ideal diameter of particles for a β adrenergic bronchodilator aerosol is probably 2-5 μm.[3] When the flow rate is increased from 4 to 8 l/min the median diameter of the droplets generated by most nebulisers is reduced, which results in an increase in the percentage of the aerosol within the "optimum" respirable range.[1] Although an Inspiron Mini-Neb nebuliser generates an aerosol with a median particle diameter of 4 μm at 8 l/min and 11 μm at 4 l/min,[1] these flow rates in our study produced similar increases in forced expiratory volume in one second and forced vital capacity. This suggests that in patients with chronic stable asthma the clinical response to a nebulised bronchodilator does not diminish when the flow rate of the driving gas is reduced from 8 to 4 l/min. Thus the difference in distribution of particle sizes produced by a jet nebuliser at these two flow rates may not be critically important to the bronchodilator response.

Even at the "high" flow rate (4 l/min), a standard National Health Service oxygen cylinder driving a nebuliser such as the Inspiron Mini-Neb generates a distribution of particle sizes that are theoretically too large for tracheobronchial deposition.[1] Our study suggests, however, that this readily available method of delivering a bronchodilator aerosol is clinically effective.

1 Clay MM, Pavia D, Newman SP, Clarke SW. Factors influencing the size distribution of aerosols from jet nebulisers. *Thorax* 1983;**38**:755-9.
2 Evans ME, Shenfield GM, Thomas N, Walker SR, Paterson JW. The pharmacokinetics of rimiterol in man. *Xenobiotica* 1974;**4**:681-92.
3 Rees BJ, Clark TJH. The importance of particle size in response to inhaled bronchodilators. *Eur J Respir Dis* 1982;**63**(suppl 119):73-8.

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Respiratory Medicine Service, Northern General Hospital, Edinburgh EH5 2DQ
J GRAHAM DOUGLAS, MRCP, senior registrar
MOIRA J LESLIE, BSC, scientist
GRAHAM K CROMPTON, FRCP, consultant
IAN W B GRANT, FRCP, consultant

Correspondence to: Dr J G Douglas.

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