liquor potassiae on the lesion and examined under the 10-mm objective of the microscope confirms the diagnosis.

Treatment is with application of 25% benzyl benzoate at a cleansing centre or with Lorexane ointment (50 g tube) at home following the usual treatment instructions. Sex contacts and others in close bodily contact in the family may need similar treatment.

Genital Lice (Pediculosis Pubis)

Genital lice are commonly transmitted by sex contact. They multiply in the pubic region, but from this area they may

spread to all the other hairy areas of the body, except the scalp. The patient complains of pronounced skin irritation of the areas affected. Pubic lice are seen anchored at the hair roots and can be removed with forceps for certain identification under the 10 mm objective of the microscope, when the typical crab-like legs will be seen. The nits (eggs and containers) on the hair, which can be cut off and also examined under the 10 mm objective, can be similarly identified. Treatment is with D.D.T. or gammexane. The latter is also available as a lotion (Quellada) for home use in 55-ml bottles with instructions for application. Where possible sex contacts must be traced, diagnosed, and treated. Other members of a family sharing a bed should also be checked.

Clinical Problems

Pain Relief in Hospital: the more Widespread Use of Nitrous Oxide

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Summary

A trial was conducted of Entonox for pain relief in minor, but painful, procedures which are conducted in wards, accident centres, and radiological units. The gas was self-administered by the patient using a demand apparatus. The administration was supervised by qualified nurses, specially trained in the properties of Entonox and the inhalational unit. The results confirm that the gas is safe in the hands of these personnel. Gratifying pain relief occurred in most patients with almost complete freedom from undesirable side effects. It is suggested that patient comfort in hospital can be considerably improved by utilizing this method of analgesia to the full.

Introduction

"On the day when the inflammation was most troublesome, I breathed three large doses of nitrous oxide. The pain always diminished after the first four or five respirations. . . . As the former state of mind returned the state of organ returned with it"—Davy.¹

Despite Sir Humphry Davy's crucial observation 170 years ago, the excellent general analgesia provided by nitrous oxide has remained almost exclusively confined to the field of obstetrics, though this specialty has no monopoly in the production of pain. Some of the reservations in the past have been due to

the shortcomings of the apparatus which often did not ensure a safe and stable percentage of oxygen in the inspired mixture.²⁻⁴

In the wards, accident centres, and radiological departments throughout the country every day patients are subjected to a variety of painful episodes often without thought to analgesia because the procedure is deemed a minor one by those who are administering the pain rather than receiving it. Yet it is these so-called minor events which often give the patient a very jaundiced view of his stay in hospital.^{5, 6} In the average general hospital, therefore, there is a need for a safe and effective general analgesic, of rapid onset, which is speedily eliminated to ensure a quick recovery. Many patients are deprived of pain relief for unpleasant procedures because of very reasonable caution in the use of opiates.

Nitrous oxide is a powerful analgesic and sedative which, if given with adequate oxygen, does not cause respiratory or cardiovascular depression or other undesirable side effects. The low blood or fat solubility plus the relatively low anaesthetic potency provide the scientific basis for Sir Humphry Davy's observation that this form of analgesia has a rapid onset, with a speedy recovery once inhalation stops. Entonox, a fifty-fifty mixture of nitrous oxide and oxygen contained in a single cylinder, was first prepared in 1961.⁷ The mixture remains as a stable single-phase gas, even when compressed to almost 2,000 lb/in² (140 kg/cm²) at temperatures above -6°C. Together with the development of the gas mixture came the design of a compact and reliable inhalational unit attached to the cylinder. This unit functions by using the demand or intermittent principle, so that the gas does not flow unless a negative pressure is applied to the inspiratory port. This, in essence, requires an airtight fit between the mask and the face. The patient should always hold the mask himself. Then if he becomes drowsy, his grip on the mask will relax, thus breaking the airtight seal and consequently gas flow will stop. By using this principle of self-administration the patient is safeguarded from a relative overdose of the gas, and he is prevented from inadvertently entering into the excitement stage of general analgesia or even loss of protective laryngeal reflexes at deeper levels.

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After successful trials of the gas at Portsmouth⁸ and other centres, the Central Midwives Board approved the use of Entonox by unsupervised midwives. The advantages of nitrous oxide analgesia associated with a high and stable percentage of oxygen were soon appreciated in situations outside obstetrics. Parbrook and Kennedy⁹ reported the value of nitrous oxide and oxygen mixtures in the field of postoperative pain relief, and it was found that the analgesia compared very favourably with that obtained with morphine in a dose of 0.16 mg/kg.¹⁰ Other workers emphasize the safety and potency of this form of analgesia in crushed chest injuries,¹¹ postoperative cardiac cases,¹² during colonoscopy,¹³ in burns dressing,¹⁴ in myocardial infarction,¹⁵ in neonatal resuscitation,¹⁶ and in victims of road accidents.¹⁷ In each of these situations the inherent freedom from the undesirable side effects, often associated with accepted mainstay analgesics such as the opiate group, provided outstanding advantages.

In spite of these enthusiastic reports, however, Entonox is still relatively infrequently used in many general hospitals, and patients are not offered the pain relief which should be their due. In our view the reason for this is that it seems to have been assumed that a qualified doctor, if not an anaesthetist, had to be present during the self-administration of the gas by the patient. Doctors are not always present in the ward during these painful procedures; indeed, it would not be practicable. Must patients therefore be denied this form of analgesia? Midwives have supervised the administration of Entonox for several years, both in hospital and in domiciliary practice, without reports of any untoward results. A recent trial, in which the inhalation of Entonox was supervised by members of the Ambulance Service in Gloucestershire, produced most encouraging results without prejudicing the patients' condition in any way during transport to hospital.^{18 19} Several ambulance authorities have now adopted this practice. It is, of course, essential, and this cannot be emphasized too strongly, that the personnel supervising the administration of the gas must be trained to be thoroughly conversant with the physical and pharmacological properties of the gas and the mode of operation of the apparatus. The principle of self-administration must be rigidly adhered to.

The Trial

Partially stimulated by semiserious complaints from patients that analgesia in hospital was not up to the standard of the ambulance service, we decided to set up a pilot trial in two hospitals in Bristol. It was thought desirable that Entonox should be readily available to the patients in this trial, with minimal administrative and clinical obstacles. Our approach was regarded as sufficiently revolutionary as to be met with a degree of reticence in some quarters. Accordingly a public relations exercise was mounted to explain the aims and objects of the trial to nursing, physiotherapy, and medical staff. This took the form of explanatory meetings and talk on the principles of pain relief, the use and maintenance of the equipment, and the likely clinical indications. It also served to remove many fears and misconceptions about this form of analgesia.

To gain as wide an experience as possible, 12 Entonox units were installed in different units and wards, including accident centres, general surgical wards, general medical wards, orthopaedic wards, plastic surgical wards, intensive therapy units, and a postoperative cardiac unit. The qualified nurses and physiotherapists involved were trained in the properties of the gas and the use of the apparatus. They were instructed to offer the inhalation at least two minutes before any painful procedure was started so as to allow time for adequate uptake of the gas. Only patients who had some disturbance of consciousness and those with maxillofacial injuries were excluded from the trial. Each case was carefully documented by the nurse or physiotherapist supervising the administration. The degree of pain relief was classified as (a) marked to complete, (b) partial, or (c) absent. Both objective and subjective recordings were

made, but if these differed then the subjective opinion was taken to override that of the observers. Actually in only four cases were these opinions at variance. A placebo effect no doubt occurs, but in our opinion is only of academic interest since the whole object of this treatment is to make the patient feel more comfortable.

Results

The results are presented for the first three months of the trial. The apparatus was used on 237 occasions during this period. The patients' ages ranged from 6 to 82 years. The types of procedure for which analgesia was attempted are given in Table I. The overall degree of pain relief achieved was: marked in 147 (62%) cases, partial in 77 (32%), and none in 13 (6%). In Table II the results are partially broken down to show the analgesia achieved in the particular groups of procedures.

TABLE I—Painful Procedures Treated in First Three Months of Entonox Trial

General surgical wounds (dressing, packing, and probing)	..	..	..	71
Chest physiotherapy (thoracotomy and fractured ribs)	..	..	..	63
Chest physiotherapy (abdominal incisions)	..	..	..	33
Limb physiotherapy (contractures)	..	..	..	13
Fracture manipulations	..	..	..	28
Plastic surgical wounds	..	..	..	14
Removal thoracotomy drains	..	..	..	7
Injuries waiting in accident centre	..	..	..	4
Others	..	..	..	4
Total cases in first 3 months				237

TABLE II—Degree of Pain Relief Related to Each Procedure

Cases	Relief		
	Marked	Partial	None
Chest physiotherapy (thoracic) (63)	43 (69%)	19 (30%)	1 (1%)
Chest physiotherapy (abdominal) (33)	6 (18%)	25 (76%)	2 (6%)
Limb physiotherapy (13)	10 (79%)	1 (8%)	2 (13%)
General surgical wounds (71)	54 (76%)	14 (20%)	3 (4%)
Plastic surgical wounds (14)	10 (71%)	4 (29%)	0 (0%)
Thoracotomy drains (7)	3 (43%)	2 (28%)	2 (28%)
Fracture manipulations (28)	17 (60%)	10 (36%)	1 (4%)
Miscellaneous group (8)	4 (50%)	2 (25%)	2 (25%)

The side effects due to the gas were: drowsiness in 59 cases, dizziness in 7, noises in 2, nausea in 2, bad dream and abreaction in 1, amnesia in 1, and hyperventilation in 2. The patient-handling of the apparatus was satisfactory in 224 (94%) cases and unsatisfactory in 13 (senility 3, pain on breathing 7, and other reason 3).

Comment on Results

The overall degree of pain relief obtained for the wide variety of procedures is almost exactly the same as was found with experience in the ambulance service^{18 19}—that is, almost two-thirds of the patients classified their pain relief as marked or complete and nearly one-third experienced partial relief. Only 6% reported that they had obtained no relief.

The analgesia appears to have been particularly effective during general and plastic surgical wound debridement, packing, and dressing, in painful physiotherapy of the limbs, and in chest physiotherapy after thoracotomy or chest injuries involving rib fractures. It is interesting to confirm the clinical impression that an upper abdominal incision is more painful than a thoracotomy. Nevertheless, 94% of patients having chest physiotherapy after abdominal operations got some pain relief. We have found subsequently that very good results are obtained with these patients if Entonox is combined with a dose of an opiate small enough not to be associated with undesirable side effects.¹⁰

The incidence of side effects which were unwanted was extremely small, and in no case was the patient's safety jeopardized. Though 25% of the patients became drowsy, no patient was unrousable and no patient was uncooperative during physiotherapy as a result of stupor. One patient had an unpleasant dream during the procedure. The substance of the dream was not related to the manoeuvre which was being carried

out and he remained worried for about seven minutes after the gas was withdrawn. He then made a rapid and complete recovery, and though he said that he had felt no pain he did not wish to have the gas again. Two patients hyperventilated during inhalation and developed generalized muscle rigidity which, however, did not progress into a tetanic state. They made an uneventful recovery after the administration had finished. It was thought that this was a psychological effect of being asked to inhale from a mask.

Only 13 (6%) patients did not use the apparatus properly. This was due to the fact either that they did not hold the mask tightly enough to their face to obtain an airtight fit (six patients) or that they did not breathe deeply enough to trip the tilting demand valve (seven patients), which requires a negative pressure of -1 cm/H₂O. The latter group were all afraid to breathe deeply because of pain, and might have benefited from Entonox delivered from a continuous flow device in the manner described by Keane.²⁰ Entonox administered in this way must be supervised by a competent doctor, because the inherent safe principles of self-administration with the demand apparatus are then lost.

A few patients complained of the smell of the black antistatic mask which is provided as standard equipment with the apparatus. They found the optional Perspex mask with the latex rubber cuff much more acceptable.

Conclusion

The results of the trial have convinced us that Entonox is safe in the hands of some non-medical personnel such as State-registered nurses and chartered physiotherapists, provided that they are carefully trained and the principle of self-administration is rigidly adhered to. Obviously the gas is not the panacea for all pains, in all people, at all times, but a large proportion of patients gets substantial relief with almost complete freedom from undesirable side effects in circumstances where hitherto often no analgesia was attempted.

In recent years there has been a great deal of attention paid to patient safety—and rightly so. It is, however, also vital that we should look to our resources in providing patient comfort and, within rigid and stringent safety limits, utilize these resources to the full. The patient's feelings regarding his stay in hospital are often highly coloured by painful incidents, many of which can be simply ameliorated.

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Therapeutic Conferences

Cardiac Arrhythmias—II

FROM THE DEPARTMENT OF THERAPEUTICS AND PHARMACOLOGY, ABERDEEN UNIVERSITY

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PROFESSOR MACGREGOR: Our second patient also had ventricular instability but in his case the problem was somewhat different—he didn't look ill on admission, but he was.

Case 2—Myocardial Infarction and Ventricular Arrhythmia

HOUSE PHYSICIAN: This 63-year-old bricklayer, who had enjoyed excellent health since an inferior infarct seven years

ago, had some indigestion, vomited, and noticed pain in both shoulders and arms. On admission he was free of pain, and looked well. However, on examination pulse was found to be very irregular and blood pressure was 140/90 mm Hg—somewhat less than his usual reading of 170/105 mm Hg. He had a gallop rhythm but there was no other evidence of cardiac failure. The E.C.G. showed that he was in sinus rhythm and there were new changes suggestive of anteroseptal infarction. He was having frequent ventricular extrasystoles occurring at times almost on top of the T wave of the previous sinus beat (Fig. 1). While I was setting up the E.C.G. monitor he had a run of fast ventricular tachycardia but this stopped spontaneously before I could do anything about it. However, the ectopics persisted at 10 per minute or more.

PROFESSOR MACGREGOR: What did you do?

HOUSE PHYSICIAN: He was already on oxygen, and, as the basic rhythm was normal sinus at a rate of 80–90 per minute

Appointments of Speakers

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