We thank the surgeons and anaesthetists of the London Chest Hospital for their co-operation, and in particular Mr. J. R. Belcher, who allowed us to use the method in his out-patient clinic.

REFERENCES

- Bayuk, A. J. (1957). *Anesthesiology*, **18**, 135.
 Buck, H. A. (1955). *Anaesthesia*, **10**, 313.
 Cheate, C. A., and Chambers, K. B. (1955). *Ibid.*, **10**, 171.
 Churchill-Davidson, H. C. (1952). *Ibid.*, **7**, 237.
 — (1953). *Ibid.*, **8**, 128.
 Doughty, A. (1957). *Brit. J. Anaesth.*, **29**, 407.
 Green, R. A., and Coleman, D. J. (1955). *Anaesthesia*, **10**, 369.
 Herron, R. A. C. (1950). *Ibid.*, **5**, 40.
 Kelsall, P. D. (1954). *Brit. J. Anaesth.*, **26**, 182.
 Kovacs, S. (1957). *Anesthesiology*, **18**, 335.
 Macintosh, R. R. (1954). *Anaesthesia*, **9**, 77.
 Mathewson, H. S., McIntyre, J. D., and Meriwether, D. R. (1956). *Anesthesiology*, **17**, 623.
 Morris, D. D. B., and Dunn, C. H. (1957). *Brit. med. J.*, **1**, 383.
 Pinkerton, H. H. (1957). *Brit. J. Anaesth.*, **29**, 421.
 Toker, P. (1955). *S. Afr. med. J.*, **29**, 40.

HAZARDS WITH LOCAL ANAESTHETICS DURING BRONCHOGRAPHY AND BRONCHOSCOPY

BY

SAMIR KUMAR GUPTA, M.B., M.R.C.P.Ed.

Medical Registrar, Islington Chest Clinic and Whittington Hospital, London

Since 1935 amethocaine hydrochloride, which belongs to the procaine group, has been widely used as a local anaesthetic by chest physicians and surgeons. A notable advance in 1943 was the introduction of lignocaine, a drug chemically allied to acetanilide. Lignocaine is regarded as a very safe drug (Hewer and Lee, 1957). Surprisingly, in Britain there have been few published case reports regarding the hazards of these drugs during bronchoscopy and bronchography, though reactions to amethocaine have been described (Hancock, 1939; Jackson, 1949). Here are reported five examples of untoward reactions to these drugs.

Our techniques for bronchoscopy and bronchography are as follows. For premedication we use butobarbitone, 3 gr. (0.2 g.), 90 minutes before bronchography. A subcutaneous injection of atropine sulphate, 1/100 gr. (0.65 mg.), is given one hour later, and simultaneously the patient begins to suck slowly a tablet of amethocaine (65 mg.). On arrival at the x-ray department the patient often spits out the remainder of the tablet when about 2–4 ml. of 4% lignocaine solution is slowly delivered over the back of the tongue into the tracheobronchial tree. Bronchography is usually carried out by "spoon-technique." For bronchoscopy the premedication is either morphine (or pethidine) with atropine sulphate in the usual dosage. Half an hour before the procedure the patient starts sucking amethocaine. In the operation theatre the throat is painted with 2 ml. of 4% lignocaine solution and the tracheobronchial tree is anaesthetized with 0.5% solution as spray.

Case Reports

Case 1.—In 1954 a boy aged 16 was admitted to hospital with a chronic productive cough. Prior to bronchography he was given 65 mg. of amethocaine to suck at 1.45 p.m. At 2.15 p.m. 8 ml. of amethocaine (2%) was administered through a nasal catheter, but was immediately coughed out. A further 8 ml. was given. Within two minutes he became giddy and semicomatose. The catheter was taken out immediately. He rapidly became unconscious, with widely

dilated pupils, not reacting to light. Cyanosis and vomiting soon followed, but there was no convulsion. His pulse and blood pressure remained normal throughout. Oxygen was delivered through a mask and his pharynx was repeatedly aspirated. Half an hour later he regained consciousness, with residual confusion. An uneventful bronchoscopy was carried out later under nitrous oxide and oxygen anaesthesia.

Case 2.—A housewife aged 27 had had pulmonary tuberculosis since 1952. On September 8, 1955, a left upper lobectomy with a left apical thoracoplasty was performed. On September 10 x-ray examination showed a collapsed left lower lobe. Bronchoscopy was immediately arranged. At 3.15 p.m. the back of her throat and pyriform fossa were painted with 2 ml. of 2% amethocaine solution. She at once developed a severe headache. Unconsciousness with a convulsion rapidly followed. She became very pale and cyanosed, her pulse became thready, and her blood pressure was unrecordable. Immediate artificial respiration was begun with oxygen through a mask. Intravenous thiopentone sodium (500 mg.) was given while blocks were placed under the foot of the bed. The trachea and pharynx were frequently aspirated. Improvement quickly followed the administration of intravenous thiopentone. At 4 p.m. nikethamide (250 mg.) was administered intravenously. By 5 p.m. she was merely semicomatose. One hour later she was conscious, although very weak, was slightly confused, and had hypotension (90 mm. Hg). Next morning she was normal.

Case 3.—A 50-year-old housewife came for a bronchogram in August, 1955. One amethocaine lozenge (65 mg.) was given to suck, followed by local instillation of 2% amethocaine (4 ml.) down her air passage. She immediately complained of intense headache and giddiness. She became semicomatose, and remained so for 15 minutes. The foot of the bed was raised on blocks and a careful watch was kept on her. One hour later she was again normal. The bronchography was carried out uneventfully.

Case 4.—A housewife aged 25 was admitted to hospital with increasing dyspnoea on exertion. She had signs of a tight mitral stenosis with sinus rhythm, and also signs of left basal bronchiectasis. Three weeks later, at 2 p.m., she was given one amethocaine lozenge (65 mg.) to suck. The trachea was anaesthetized with 4 ml. of 4% lignocaine solution and within 15 minutes she appeared to be comatose. At 3.30 p.m. she was deeply unconscious, apnoeic, and cyanosed. Artificial respiration and oxygen administration were begun. Intravenous nikethamide (250 mg.) was given, and was repeated twice. She had no convulsion. Solution of adrenaline hydrochloride, B.P. (0.5 ml.), was given subcutaneously. Repeated rigors followed. After two hours of artificial respiration breathing was resumed, but she did not regain consciousness until 7 p.m. She remained confused till late at night. Next morning she was quite normal.

Case 5.—A woman aged 32 was arranged to have a bronchial lavage. Sucking of an amethocaine lozenge (25 mg.) was uneventful. Fifteen minutes later, 1 ml. of 4% lignocaine was poured over the back of the tongue. She complained of immediate palpitation, with tingling and numbness over her right hand. She became pale, sweated, and was slightly breathless. She appeared normal in about 10 minutes, but complained of numbness for another hour. Lavage was done uneventfully.

Discussion

In this series, Case 5 was undoubtedly hypersensitive. Case 2 was probably also hypersensitive, as the symptoms appeared immediately following the amethocaine paint. In Case 4 it is difficult to determine the offending drug; lignocaine might have been responsible, as the drowsiness appeared shortly after its administration, and the pattern of symptoms supports this view (Morrisset, 1957). Case 1 was a definite case of toxicity: this patient had at least four times the safe

dosage of amethocaine; moreover, it was administered through a nasal catheter—a very dangerous method, as pointed out by Steinhaus (1952). Case 3 was probably a case of toxicity to the same drug. No history regarding previous sensitization to local analgesics was available in any of the cases. None of these patients had suffered from any obvious allergic disorder, except Case 4.

Summary

Five cases of hypersensitivity and/or toxicity to amethocaine and lignocaine during bronchoscopy and bronchography are reported.

I thank Drs. J. V. Davies, H. D. Palmer, and N. Whittaker for allowing me to publish these cases. I am indebted to Dr. R. H. Elphinstone for supplying the details for Case 3.

REFERENCES

- Hancock, P. E. T. (1939). *Proc. roy. Soc. Med.*, **32**, 538.
 Hewer, C. L., and Lee, J. A. (1957). *Recent Advances in Anaesthesia and Analgesia*, 8th ed., p. 121. London.
 Jackson, C. A. (1949). *Brit. med. J.*, **1**, 99.
 Morrisset, L. M. (1957). *U.S. armed Forces med. J.*, **8**, 741.
 Steinhaus, J. E. (1952). *Anesthesiology*, **13**, 577.

Medical Memoranda

Subacute Delirious State due to "Preludin" Addiction

"Preludin" (2-phenyl-3-methyl-tetrahydro-1,4-oxazine hydrochloride) has been introduced as a safe treatment for obesity by controlling appetite. The case described below is of interest as an illustration of preludin addiction causing a subacute delirious state, with auditory hallucinations and visual illusions, merging into the dysmnesic syndrome.

CASE REPORT

The patient was a single young woman aged 23. At the age of 17 she began taking dexamphetamine sulphate tablets, and two years later had reached her maximum dosage of 17.5-mg. tablets daily. She had been admitted to a mental hospital twice suffering from irritability, restlessness, and difficulty in carrying on as a student nurse. When the drug became no longer freely available on request she began purchasing preludin instead, increasing the dosage until, after 18 months, she was taking 20 tablets daily.

On August 23, 1957, I visited the patient at her home. She was a young woman of average build who was reluctant to enter into rapport to any real extent. She was restless and elated and had a shallow insipid smile on her face throughout the interview. At intervals she broke into outbursts of laughter that had no obvious relevance to her conversation. There was some clouding of consciousness, and it was difficult to hold her attention for an appreciable length of time. During the examination her condition fluctuated, and at times her thinking became incoherent and frankly confused.

After admission to the psychiatric department of a general hospital she remained elated and had periods of moderate confusion. On the day of admission (August 31), and during one of her lucid periods, she stated that she had heard voices speaking to her three months previously and indicated that she had apparently experienced visual illusions. She added, "I imagined I heard voices. They said, 'Pray hard.' I saw one or two hallucinations—things moving. The mirror would move, then the wall, and then the window." There was memory impairment, particularly for recent events. She

gave the date as August 2, 1957, and thought the Prime Minister was President Truman. She was very slow and hesitant in concluding that she had only come into hospital on the day she was being examined.

The personal history showed that when 17½ years old she began training as a nurse but would rarely arrive on duty in time. She failed one of her examinations, had a row with the matron, and was finally discharged from the course. She ran away from her mother and lived in a convent for a short period. For three years prior to admission to hospital she associated with a married man, sexual intercourse having occurred. The history contained nothing else of note. Her mother was a highly strung, irritable woman. Her eldest brother was a nervous individual who suffered from "twitches." A sister had attempted suicide.

After admission she was placed on paraldehyde, 2–3 dr. (7–10.5 ml.) p.r.n., and "parentrovite" (vitamin-B complex and ascorbic acid), 7 ml. of the "high potency" preparation intramuscularly, daily for one week, followed by the "maintenance" preparation, 4 ml. intramuscularly daily for a further week. Subsequently she was placed on "orovite" (vitamin-B complex), 2 tablets t.d.s., and tabs. vit. C., 100 mg. t.d.s.

She responded to treatment quickly. She became more composed and her confusion and elation subsided. Following the rapid improvement in her frank psychotic state, she insisted on leaving hospital, against advice, on September 17.

COMMENT

This is a further example of addiction to preludin with a resultant toxic psychosis. Like Bethell's (1957) patient her history showed evidence of marked instability. In addition the family history was adverse. The tendency to preludin addiction therefore would appear to be in line with that recognized for amphetamine sulphate in particular, if not for addiction in general—namely, its restriction to neurotic and psychopathic personalities.

For six months before admission she had been on her maximum dosage of preludin. This phase coincided with the period when she was off work, and it was during this time that she was having sexual relations with her boy friend. It seems possible, therefore, that the drug may have played some part in producing sexual excitement, this being a feature that has been recognized in amphetamine addiction (Bleuler, 1949).

Bethell's patient required approximately 12 preludin tablets in order to experience a similar effect to that produced by "a few" tablets of dexamphetamine. However, Randell (1957) gained the impression that preludin was more powerful than amphetamine. The case reported lends support to the findings of Bethell in so far as after two years' habitual usage the maximum number of dexamphetamine tablets taken was 17, whereas after 18 months' addiction to preludin the maximum number of tablets required was 20. This finding also gives limited support to the claim of the manufacturers that the drug's effect on the nervous system is weaker than that of amphetamine. Thomä and Wick (1954) also concluded, on the basis of experiments with unanaesthetized dogs, that the quantity of preludin needed was six times that of amphetamine to produce the equivalent degree of excitement.

This patient showed fluctuating clouding of consciousness, incoherence of thought, and moderate confusion—the essential features of the "subacute delirious state" (Mayer-Gross, Slater, and Roth, 1954). Also, she had experienced auditory hallucinations and visual illusions, and subsequently she developed the