ready in the operating theatre. The present case has shown, however, that, despite its dramatic effect, procaine may have no action for about five minutes, during which time severe damage to the brain will occur. Time should therefore not be wasted in awaiting the result of the procaine injection, and cardiac massage should be started at once. Our experience with the above case showed the difficulty of compressing the heart satisfactorily from below the diaphragm, as mentioned by Nicholson (1942), and that the trans-diaphragmatic incision carries a risk of injury to the heart. Unless the abdomen be already open, Lahey and Ruzicka recommend a direct transthoracic approach through the fourth interspace, dividing the fourth and fifth costal cartilages. Lahey and Eversole (1950) suggest that a disconnected needle be passed through the fourth interspace into the ventricle as soon as the pulse becomes imperceptible; if no movement be observable, or begins after the needle prick, the case is one of true cardiac arrest and not momentary inhibition as may occur following accidental pressure on the carotid sinus; the procaine-adrenaline mixture is then injected in two instalments of 5 ml. each, and if there is no response within 30 seconds cardiac massage should be started at once. Lahey and Ruzicka report 46% of complete recoveries in 15 cases; Hamilton Bailey had only four survivors of 40 cases, though the heart restarted in 13; and Barber and Madden (1945) reported 48 recoveries in 143 cases

Summary

A case of cardiac arrest is reported in which complete asystole persisted for 45 minutes despite cardiac massage and adrenaline, but normal rhythm was restored after two intracardiac injections of procaine, though the patient survived for only four hours. The immediate use of procaine, injected into the heart in preference to or with adrenaline, is suggested, but in view of its delayed action cardiac massage should be performed at once so that there is no interruption of the cerebral circulation.

I wish to acknowledge the counsel and assistance given at a time of stress by Dr. John Elam and Mr. Alan Small, to whom I am also indebted for permission to publish this report.

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A conference was held on July 14 at Salford, Lancashire, under the auspices of the public health department, to consider the better co-ordination of home and hospital services in the sphere of mental health. The conference was attended by local medical and nursing staff, social workers, and local government councillors. The Mayor of Salford, Alderman Frank Cowin, was in the chair. Dr. J. Bierer (Institute of Social Psychiatry, London) described his experience of day hospitals and therapeutic social clubs in the home management of psychotic patients. He had found day hospitals valuable for those who had spent many years in mental hospitals but were now at home, for patients who had undergone prefrontal leucotomy, for those discharged from hospital for after-treatment or unimproved, and at times to help delinquents in their return to society. A number of other speakers contributed to the conference.

Medical Memoranda

Acute Myocardial Infarction following Tetraethylammonium Chloride Therapy

Since Acheson and Moe (1945) drew attention to the autonomic ganglion blocking effect of the tetraethylammonium ion, preparations of this drug have been increasingly used in the investigation and treatment of hypertension and peripheral vascular disease. Lyons *et al.* (1947) confirm the usefulness of the drug in this respect and also record two cases in which intravenous administration dramatically relieved the pain of acute myocardial infarction. Lindgren and Frisk (1948) treated three cases of angina pectoris with tetraethylammonium bromide: this was followed by severe anginal attacks in two cases and by acute myocardial infarction in one. They conclude that the drug should be used with caution in angina pectoris and hypertension with marked arteriosclerosis. Below are reported three cases of occlusive arteriosclerosis of the lower limbs in which tetraethylammonium therapy was followed by acute myocardial infarction.

CASE REPORTS

Case 1.—A man aged 41 was admitted to hospital on October 24, 1948, with a complaint of pain in both calves which came on after walking 50–100 yards (46–92 metres) and which disappeared on rest. He had also suffered from coldness of the feet for some years. No dyspnoea was present, nor did he complain of chest pain. His pulse was 70 a minute and regular, and the vessel wall was not palpable. The heart sounds were good, with no murmurs and a normal x-ray shadow. His blood pressure was 125/85 mm. Hg. Urinary investigation was negative. Both feet were cold and slightly congested, and ankle pulses were absent. His right great toe became increasingly discoloured. Right lumbar ganglionectomy was carried out on March 1, 1949, but no improvement followed. On March 30 the right lower limb was amputated because of spreading gangrene. Tetraethylammonium chloride, 6 ml. (7.5 mg. per kg.) twice daily by intramuscular injection, was started on July 14 and continued for five days. On July 30 6 ml. daily was given. On August 2 he had a sudden attack of pain in the neck and shoulders spreading to the chest, with dyspnoea. An electrocardiogram showed changes compatible with posterior myocardial infarction. X-ray examination revealed consolidation of the bases of both lungs. His blood pressure was 120/70 mm. Hg.

Case 2.—A man aged 71 complained in June, 1949, of pain in his calves after walking 60–70 yards (55–64 metres), with occasional slight breathlessness on exertion and mild precordial pain. These symptoms occurred only on exercise and were relieved by rest. His pulse was 80 a minute and regular; the vessel wall was just palpable. The heart sounds were poor, without murmurs, and his blood pressure was 170/110 mm. Hg. Tetraethylammonium chloride, 2 ml. (3 mg. per kg.), was administered intravenously followed by 5 ml. (7.5 mg. per kg.) by the same route seven days later. Five days after the latter dose the patient suffered a severe attack of dyspnoea, precordial pain radiating to the finger-tips, and he was very restless. During the following two days signs of pericarditis developed and he died on the sixth day from congestive cardiac failure. (As this patient was treated at home no electrocardiographic confirmation exists, but the clinical picture was typical.)

Case 3.—A man aged 49 was admitted to hospital on June 14, 1949, with a complaint of pain in the calves after walking 50 yards (46 metres). This pain disappeared with rest. His feet were cold and congested, and the ankle pulses were absent.

The heart sounds were good, there were no murmurs, and the heart shadow was normal. His pulse was 74 a minute; the vessel wall was not palpable. His blood pressure was 140/85 mm. Hg. Urinary investigations revealed nothing abnormal. On July 31 tetraethylammonium chloride, 6 ml. (8.5 mg. per kg.) twice daily by intramuscular injection, was started. On August 5 he had a sudden attack of dyspnoea, substernal pain radiating to the arms, diminished right respiratory movement, and poor air entry on the right side. X-ray examination showed slight elevation of the diaphragm. His blood pressure was 100/70 mm. Hg. An electrocardiogram showed changes consistent with posterior myocardial infarction.

Although the possibility of coincidence cannot be excluded, it is thought that in these cases tetraethylammonium therapy was at least a contributory cause of the acute cardiac lesions. Great care should be exercised in the use of this drug in any patient showing evidence of arteriosclerosis even in the absence of hypertension or marked cardiac symptoms.

I wish to thank Mr. J. Dunbar, surgeon, Glasgow Royal Infirmary, for permission to publish these cases.

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Sudden Death after Spontaneous Pneumothorax

Death in cases of spontaneous pneumothorax occurring in otherwise healthy persons is a rare event. A search of the literature has revealed no case similar to the one recorded below.

In this general medical charge (50 beds) of the Royal Infirmary, Edinburgh, from November, 1941, to January, 1950, there have been 12 cases of spontaneous pneumothorax with only one death. Of these 12 cases nine occurred in otherwise healthy males, two were associated with active pulmonary tuberculosis, and one case was of pyopneumothorax, a sequel to lobar pneumonia. One case developed a haemopneumothorax and there was an additional case of haemopneumothorax due to fractured ribs, both of these recovered. Pneumothorax also occurred in a case of bronchial neoplasm following bronchoscopy.

CASE REPORT

A railway engine driver aged 30 was admitted to the Royal Infirmary, Edinburgh, under the charge of Dr. T. R. R. Todd. He gave a history that in the morning of the previous day he experienced a sudden severe pain over the left lower chest, radiating to the left shoulder and associated with increasing dyspnoea. The episode occurred while painting his house. He went to bed, but his symptoms persisted and he vomited in the evening. His doctor thought he had a gross pleural effusion. Symptoms persisted unchanged overnight and he was admitted to hospital the next day.

He gave no previous history of serious illness and had served for 6½ years in the Army, being demobilized early in 1946 in Medical Grade I. His relatives stated that he had had a mild dry morning cough for the past few months and thought he had become thinner about the face recently. Several weeks previously he had complained of slight pain off and on in the left mid-zone of the chest anteriorly but had not sought medical advice. There was no family history suggestive of tuberculosis.

On admission he was seen to be well nourished, pale but not anaemic, perspiring, anxious, and dyspnoeic. His temperature was 97.8° F. (36.5° C.); his pulse was 102 a minute and regular but of poor volume. Both pulses were synchronous. His

blood pressure was 118/78. His respiratory rate was 28 a minute and rather shallow. The chest showed markedly diminished movement on the left side with some displacement of the trachea to the right. The percussion note was hyper-resonant all over the left lung and the breath sounds were absent on that side, being vesicular over the right lung with no accompaniments. Vocal resonance and fremitus were diminished to absent on the left side. The coin sign was present over the left chest.

The apex beat was not palpable, the left border of the heart was percussed just to the left of the sternum, the right border being percussible 2 in. (5 cm.) to the right of the midline. The heart sounds were closed in all areas and not unduly soft. No abnormality was detected elsewhere.

A diagnosis of spontaneous pneumothorax was made, and in view of the displacement of the mediastinum, the previous severe dyspnoea, and the dullness of the left chest detected by his own doctor on the previous day, though not confirmed by us, it was thought that a degree of tension had been present.

Air aspiration was considered, but as he seemed to be improving this was temporarily postponed. During the evening he became more comfortable (temperature 96.4° F. (35.8° C.), pulse 84, respirations 28), and, although still dyspnoeic, he slept most of the time. About 9 p.m. he turned over quietly on to his left side and died within two minutes, apparently from cardiac failure. The percussion note over the right lung had not altered.

Post-mortem examination was unfortunately refused. It was thought that a sudden mediastinal swing had occurred with possibly torsion of the great vessels at the base of the heart.

COMMENT

In this case the evidence does not suggest underlying pulmonary disease. From the falling pulse rate and the patient's appearance haemopneumothorax was not thought to be present. There was no evidence of bilateral pneumothorax, and, as no alteration of the percussion note was detected over the right lung immediately after death, this is not thought to have occurred as a sudden terminal event. On similar grounds mediastinal emphysema was excluded.

As already mentioned, from the severity of the symptoms and the clinical findings before admission tension pneumothorax was diagnosed; but in view of the general improvement, the falling pulse rate, and the maintenance of blood pressure it was thought that the tension had diminished and was decreasing further on admission. For this reason air aspiration was not performed, because of the risk of reopening the valvular fistula in the lung. In reviewing the case it is possible that had this been done his life might have been saved.

The other point arising out of this case is that it is advisable in nursing such cases to keep them in the orthopnoeic position and to prevent them turning on to the affected side.

In the absence of a post-mortem examination the possibility of tuberculosis cannot be excluded, but the history and findings do not suggest this. Certainly there was no clinically detectable lesion on the right side.

I wish to thank Dr. T. R. R. Todd for permission to publish this case and also for helpful criticism and advice.

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Caldecote Hall, at Nuneaton, Warwickshire, announces that it is still open for patients. Since the resident medical superintendent, Dr. A. E. Carver, died three months ago there has been an impression that the Hall is closed. In fact a fully qualified nursing sister is in charge and the Hall is being regularly visited by a medical man until a resident medical superintendent is appointed.