and vomiting in a proportion of the subjects. However, in the anaesthetized patient the situation is different. Schmidt (1950) and Wechsler *et al.* (1951) have shown that under light thiopentone narcosis cerebral metabolism is reduced by almost 40%, so that the relatively slight reduction of cerebral oxygen supply caused by hypotension is more than compensated by the greatly reduced cerebral oxygen demand. For this reason cerebral oxygenation would not appear to be jeopardized by the technique of controlled vascular hypotension, when combined with general anaesthesia, in either normotensive or hypotensive patients, provided anoxaemic anoxia is avoided.

Since this investigation was carried out observations made on the livers of anaesthetized patients suggest that the earlier recommendations for theoretically safe levels of controlled vascular hypotension are optimistic (Griffiths and Gillies, 1948). It has been found that anoxic reactions appear in the liver when the systolic pressure falls below 60 mm. Hg (Bromage, 1952b). For this reason the systolic pressure should never be allowed to fall below 60 mm. Hg except for very brief periods, and falls to the danger level should be corrected promptly by the administration of a pressor drug.

Summary

The sensitization to vasopressor drugs, arising from the blockade of central vascular control, has been studied in man by the use of general anaesthesia and high extradural spinal block.

It has been shown that a drug known to produce tolerance in moderate doses and even reversal of effect in large doses can be used effectively in the induced hypotensive state in repeated doses small enough to avoid the production of tolerance.

It is suggested that herein lies a valid method for comparing pressor drugs directly in man without the necessity for employing large series of cases. Such a comparison is illustrated by the pressor effects of the enantiomorphous isomers of methyl amphetamine.

I am indebted to Dr. W. A. R. Thomson for originally suggesting this investigation to me, and for his help in preparing this report. Supplies of D- and L-methyl amphetamine were kindly provided by Boots Pure Drug Company, Ltd.

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The waiting-lists for hearing-aids under the National Health Service are being steadily broken down, Miss Hornsby-Smith, Parliamentary Secretary to the Ministry of Health, stated at the annual meeting of the National Institute for the Deaf in London on July 4. She said: "I am glad to say that for some months past we have been able to supply the 48 distribution centres with all the aids they can handle, and more. There have, I know, been delays, but the shortage is now reduced to one of handling capacity and not supply. Some people have the strange idea that you can hand a deaf aid over the counter, as you would hand out a wireless set, but the fitting of a hearing-aid is a skilled and individual process, as there is immense diversity between the needs of the patients."

KARTAGENER'S SYNDROME

BY

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Although isolated cases had been reported by Siewert (1904), Oeri (1909), and Guenther (1923), Kartagener (1933a) was the first to call attention to the association of bronchiectasis and sinus maldevelopment with transposition of the viscera. He described four cases illustrating the triad. Later he reported seven further cases (Kartagener, 1933b; Kartagener and Horlacher, 1935) and since then the syndrome has been associated with his name. So far 82 cases have been reported in the literature, some of them having occurred in twins and siblings. These hereditary and familial tendencies of the syndrome were first noted by Guenther (1923), who reported the triad in two sisters among four siblings, and later emphasized by Kartagener and Horlacher (1935), Adams and Churchill (1937), Lopez (1944), Trogersen (1947), and Bergstrom *et al.* (1950). The cases described below occurred in two sisters with a strong family history of weak chest, and, although isolated cases have been reported, this, so far as I know, is the first time the syndrome has been observed in members of one family in this country. The father suffers from chronic bronchitis, and one brother, who could not be traced, is known to have a weak chest and when young was told that his heart was on the wrong side.

Case 1

A married woman aged 29 gave a history of recurrent upper respiratory tract infection followed at times by bronchitis for many years. Lately her cough had been much more troublesome and she brought up foul-smelling sputum, sometimes copiously. She had had pneumonia twice, and in 1940 a polyp had been removed from her nose.

Examination showed that she was a small woman of low mental grade, with short limbs and small hands and feet. There was no clubbing. She had dextrocardia, and the liver dullness was on the left side. Her lungs showed diffuse bilateral rales and rhonchi. The central nervous system was normal. A plain x-ray film of the chest was suggestive of bilateral bronchiectasis. An x-ray film of the sinuses showed that both the frontal sinuses were much smaller than normal. There was no evidence of infection. Situs inversus totalis was confirmed by barium meal. Unfortunately, the patient's husband objected to further investigations, and so neither E.N.T. examination nor bronchography was carried out.

Case 2

A married woman (sister of Case 1) aged 41 had always had a weak chest and had been subject to recurrent attacks of sore throat, nasal colds, and anosmia all her life. She had an attack of pleurisy at the age of 16, and in spite of the chronic chest trouble had been able to lead a normal life until recently, when her cough became more troublesome and the sputum more copious; the latter was blood-stained on two occasions. She also gave a history of increasing dyspnoea and swelling of the ankles in recent months. She had one normal healthy son.

On examination she was seen to be a small woman of low mental grade with adenoid facies, short limbs, and small hands and feet. There was moderate finger-clubbing. She had dextrocardia, and the liver dullness was on the left side. The lungs showed diffuse bilateral rales and rhonchi. The central nervous system was normal. Situs

inversus totalis was confirmed by barium meal and electrocardiographic examination. Sputum examination revealed a mixture of *Micrococcus catarrhalis* and streptococci. A blood count was normal, and the blood Wassermann reaction and Kahn test were negative. A plain x-ray film of the chest was suggestive of bilateral bronchiectasis, and the bronchogram was interpreted as follows: "The stem of the posterior bronchus of the right upper lobe shows dilatation, but the rest of the division is normal. The right lower lobe is grossly contracted and lingula is bronchiectatic. The inferior division shows cylindrical bronchiectasis, but the superior division is filled only in the proximal part. The left upper lobe is normal, but the left middle and lower lobes show a mild degree of cylindrical bronchiectasis."

The patient was seen by Mr. H. J. M. Stratton, who reports: "Nasal mucosa is pale and watery, with polypoidal fringes on both middle turbinates consistent with vasomotor rhinitis. Pharynx is healthy except for post-nasal thick mucus. X-ray film of sinuses shows infection of antra and absence of frontal and sphenoidal sinuses and ethmoids. X-ray film of mastoids shows no development of mastoid air cells."

Discussion

Small frontal sinuses, or their entire absence, have long been regarded as a part of Kartagener's triad, but emphasis has recently been laid on other associated congenital abnormalities of the nasal sinuses. These features are well illustrated by my two cases. The first case shows the triad, whilst the second shows congenital abnormality of the paranasal sinuses to an extent which has been seen in only one previous case (Andrews, 1949). That case was later reviewed by Banham (1950), who points out that, as at birth the maxillary and mastoid antra are well-formed cavities and the frontal and sphenoidal sinuses and ethmoid air cells are underdeveloped, it would be interesting to know if this lack of development of the upper respiratory tract was always present in these cases, especially as previous writers have merely recorded absent or small frontal sinuses.

Coincidental occurrence of bronchiectasis, situs inversus, and congenital anomalies of the nasal sinuses is regarded as evidence of maldevelopment. In discussing the incidence of situs inversus totalis Adams and Churchill (1937) have shown that two types of people are affected by this maldevelopment—normal persons known as mutants, and those in whom the abnormality is associated with other congenital defects, known as monsters. They therefore classify sufferers from the syndrome as minor monstrosities. Both the above patients, besides showing the triad, were of small stature, with short limbs and small hands and feet, and were also of low mental grade, and I think can rightly be called minor monsters.

Another interesting feature of the syndrome lies in the possibility that a congenital defect of the bronchial wall is a primary cause of bronchiectasis. Infection of the upper respiratory tract and bronchial obstruction are usually regarded as important factors in the causation of bronchiectasis, but not all cases of bronchiectasis show evidence of both or even one of them. Moreover, Olsen (1943) has reported four cases of dextrocardia with bronchiectasis without sinus infection, and the very existence of this syndrome supports the theory that the weakness in the walls of the bronchioles is the primary factor in affecting their dilatation, perhaps aided by chronic infection. Farber (1943), in discussing the aetiology of cystic disease of the pancreas, postulated that there may be a constitutional defect of secretion in various glands throughout the body, and it is therefore suggested by Cohen *et al.* (1950) that bronchiectasis may be caused by inspissated tracheo-bronchial secretion, producing atelectasis and infection. Both my patients had chronic sinus infection, which must therefore be regarded as an important factor in the aetiology of bronchiectasis; but in cases without a history of upper

respiratory infection or bronchial obstruction congenital weakness in the walls of the bronchioles must play a leading part in their dilatation.

Summary

Two cases of Kartagener's syndrome in members of one family have been observed for the first time in this country. They are here reported, and comments are offered on the extent of maldevelopment and on the aetiology of bronchiectasis.

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Medical Memoranda

Intolerance to Hexamethonium Bromide

Recent studies of the action of the hexamethonium and pentamethonium group of drugs on the gastro-intestinal tract and blood pressure will probably lead to their widespread use. It is therefore important that any idiosyncrasy or untoward action should be known, and with this object in view the following case is recorded.

CASE REPORT

A box-spring maker aged 53 had suffered from a duodenal ulcer for 25 years, otherwise his health had been good except for an attack of Bright's disease at the age of 7.

On January 28, 1951, he paid a routine visit to his doctor, who prescribed hexamethonium bromide for the relief of his ulcer pain, there being no history suggestive of pyloric stenosis. On the first day of treatment he took 0.25 g. before breakfast and lunch, and the following day increased each dose to 0.5 g., a total dose of 1.5 g. of the drug being given over two days. That afternoon, while watching a football match, he felt faint, vomited, and collapsed. After two to three minutes he recovered consciousness and felt very weak, but managed to walk home. He went to bed after further vomiting and slept. The next morning he felt better, but on arriving at work he again felt faint and collapsed: he lay down for a while and was finally taken home and put to bed. He continued to vomit throughout the day, and towards evening developed severe cramp-like pain in the calf muscles, which he described as "causing his legs to draw up." His doctor was called and he was admitted to hospital the following day.

On admission he was conscious and able to give a history, very lethargic and pale, but not cyanosed. His temperature was 98° F. (36.7° C.), pulse 94 and regular, blood pressure 65/49 (lying). It was impossible to take the blood pressure sitting up, as that position caused the patient to faint. No other abnormalities were found in the cardiovascular, respiratory, or alimentary system. Both pupils were dilated and did not react to light or accommodation; the central nervous system was otherwise normal.

It was considered that his condition was due to hexamethonium bromide. He was given 5 min. (0.3 ml.) of