REFRESHER COURSE FOR GENERAL PRACTITIONERS

MEDICAL ASPECTS OF AIR TRAVEL—II. MEDICAL FITNESS

BY

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Air travel by invalids has become a daily occurrence. In fact for the majority of them transportation in a modern airliner is the ideal mode of travel for long distances. Though very few are unfit for air travel, some have to be rejected in the interests of other passengers or for flight operational reasons.

Unsuitable Cases

The main types of case unsuitable for air travel in commercial passenger-carrying aircraft are: (1) those suffering from infectious diseases of any kind; (2) those liable to be affected by even a small decrease in the oxygen tension—for example, patients with serious cardiac or respiratory disease, advanced anaemia, or recently irradiated leukaemia; (3) those liable to be severely affected by airsickness and lowered atmospheric pressure—for example, some cases of pregnancy, some diabetics, and cases of active peptic ulceration; (4) acute mental patients and major epileptics; (5) those with skin diseases of a repulsive appearance; (6) those with odoriferous conditions; and (7) women beyond the eighth month of pregnancy.

The general rule is to accept every case if possible, due consideration being given to the interests of the patient and of all others concerned. This at times makes selection an arduous duty, but it is much simplified by applying the formula, "Is the patient infectious, acutely ill, or does he act, look, or smell abnormal?"

Certain cases which might be rejected for public air transport might be acceptable in a privately chartered aircraft, where there would be no offence to other passengers and where the altitude and each stage of flight could be adjusted to suit the patient's condition.

Common Medical Problems

The commoner conditions on which a medical opinion may be sought on the advisability of air travel are as follows:

Anaemia.—Patients with anaemia suffer from anoxia when flying even at an altitude of 8,000 ft. (2,400 metres), especially if their red-cell count is less than 2,500,000 per c.mm. or their haemoglobin content is below 50% (7 g. per 100 ml.). They should therefore be given a transfusion to raise the red-cell count to at least 3,000,000 per c.mm. and the haemoglobin to 60%, preferably to 80%. They should remain at rest throughout the journey and oxygen should be available.

Cardiovascular disease of marked degree is present in about three-quarters of those who are taken ill during flight. The low oxygen tension, even at altitudes between 5,000 and 8,000 ft. (1,500 and 2,400 metres), throws a serious strain on the heart. These patients should travel in a pressurized aircraft and limit their movements to the minimum; oxygen and any special drugs prescribed by their doctor should be available; and the medical department of the airline should be made aware of their condition. Patients with *angina* or *coronary occlusion* should not fly unless they have been free from symptoms for at least three, preferably six, months. Even then the altitude should be limited to 5,000 ft. (1,500 metres). A test of fitness for anginal patients is whether they can walk briskly for about half a mile (0.8 km.) without symptoms. Patients with *valvular disease* should not fly

while the condition is acute, nor when it is chronic if there are signs of congestive failure or pronounced anaemia. Those with *congenital heart disease* can be accepted for flights up to 8,000 ft. (2,400 metres) altitude, in the absence of venoarterial shunt, as evidenced by cyanosis, heart block, or severe hypertension resulting from coarctation of the aorta. Those suffering from *myocardial lesions* are unacceptable if there is marked bradycardia or if they have had diphtheria within six months. Cases of *high blood pressure* can be accepted if there is no pulsus alternans, cardiac or renal asthma, frequent headache, much loss of weight, gross albuminuria, cellular casts in the urine, or optic fundus change. They should be given a sedative before flight to prevent nervous tension worsening their condition, particularly if they have not flown before.

Calculus.—Those with calculus (biliary or urinary) are acceptable, provided they are not suffering from an attack, are given hyoscine before flight to prevent airsickness, and that morphine is available on the aircraft in case of need.

Diabetes.—Only diabetics who are stabilized by diet or insulin and have no obvious cardiovascular disease are acceptable for long-distance air travel, with its rapidly changing clock times and departures at all hours of the night. They must be able to administer insulin to themselves and have their insulin, syringes, and needles (plural) with them. They must be instructed to keep strictly to the clock (G.M.T.) with their injections and meals until they get to their destination, when they can adjust their life to the altered time. They should always have with them a good supply of sugar to take in the event of airsickness, which can quickly lead to hypoglycaemia. The airline medical department should be informed of the dosage of insulin needed, also of the results of the last blood-sugar test and whether the patient is subject to hyperglycaemic or hypoglycaemic attacks. An oxygen set is provided for any diabetic known to be travelling, as they are sensitive to oxygen deficiency.

Thyrotoxicosis.—Patients with hyperthyroidism are not adversely affected by air travel unless there is fear of flying, in which case sedatives should be prescribed. Those with auricular fibrillation should not fly.

Gastro-intestinal Conditions.—Those with active *peptic ulceration* should be warned against air travel, owing to the danger of gaseous distension causing a haemorrhage or perforation. Patients whose ulcers have perforated or bled should not travel by air within two months of the event, and then only at an altitude not greater than 8,000 ft. (2,400 metres). Before each day's flight all peptic ulcer patients should be given hyoscine to prevent airsickness and to lessen peristalsis, and carminatives to counteract flatulence; they should follow their dietetic regime. After simple *abdominal operations*, such as appendectomy or herniotomy, patients should not travel within ten days of the operation; after major procedures like gastrectomy or gut resections they should not travel for six weeks. Those with *hernias* should not travel by air unless the hernia is fully controlled by a truss or belt, as the hernia may become incarcerated as a result of distension of the gut. Patients with *liver abscess* are generally not acceptable owing to the liability of the abscess, if large, to burst. Those with *hepatic cirrhosis* should be rejected if there is evidence of congestive failure, haemorrhage, ascites, or hydrothorax.

Mental Disorder and Epilepsy.—Mental and epileptic patients are not normally accepted, but they may be in special instances when sedated and accompanied by a doctor or nurse. It is most important that they should not have alcohol, either just before or during the flight, or at stops *en route*, and the captain of the aircraft should be so informed.

Nephritis.—Nephritics are acceptable, provided there is no severe degree of anaemia, marked albuminuria, ascites, or hydrothorax, nor gross change of the optic fundi, and that the blood urea is not more than 100 mg. per 100 ml.

Respiratory Disorders.—Patients with respiratory disease require careful assessment before an air journey. Breathlessness on exertion is a good guide to their fitness or otherwise. If acceptable they should be instructed to move about as little as possible while in the air, and oxygen should be available for immediate use. *Asthmatics* must be considered individually. The condition of milder cases may be improved by flying, but those who suffer from severe attacks, especially if there is a cardiac or renal basis, should not travel by air, as an asthmatic attack is very disturbing to other passengers. In addition, inquiry should be made about any allergy to pyrethrum, as this is an ingredient of all insecticides used in aircraft. *Bronchitic and emphysematous* patients and those with fibrosis or neoplasm of the lung must be assessed according to the amount of lung tissue involved, the degree of dyspnoea, and whether there is offensive sputum, any cardiac lesion, or anaemia. Those who have had *lobectomies* or *pneumonectomies* should not travel within three months of operation, and even then the flight should not be longer than five hours at a maximum altitude of 5,000 ft. (1,500 metres). Those with *acute pneumonia* should not normally be accepted within a month of onset, as they are already anoxic in some degree, depending on the extent of lung involved. If such a case is carried, oxygen should be administered continuously from leaving the ground, for if anoxia develops it will be irreversible. Patients with active *pulmonary tuberculosis* are unacceptable, unless their sputum is free from tubercle bacilli and any cavity is controlled by collapse therapy. They should not, however, travel within a week of a refill, as the expansion of the air in the pleural cavity may tear adhesions and so cause haemorrhage and spread of infection. The lung must be at least three-quarters expanded in cases in which the mediastinum is fixed. Pneumoperitoneal refill cases should not have more than 2,000 ml. of air introduced, and there should be an interval of at least seven days between refill and flight.

The Extremes of Age and Pregnancy

Babies and young children travel by air as well as do adults, except that children get excited and move around a lot and tire themselves, with the result that they are more prone to airsickness; their highly sensitive labyrinths doubtless play a part in this. To prevent otitic barotrauma mothers should be told to give the baby a dummy or a feed during descent and to give the older children sweets to suck (see last week's Refresher Course article). There is privacy in the ladies' toilet on aircraft and in the rest-rooms at most airports, so babies can be breast-fed. If the baby is bottle-fed the mother should be advised to take with her an adequate supply of dried milk, bottles, and teats, though these can be supplied by the airline if due notice is given. Should it be decided to change over from breast-feeding to bottle-feeding for the journey, the change should be made gradually for a week or so beforehand. Bottles and teats can be cleaned and sterilized on board, and the stewardess will help look after the baby's wants. The mother should carry a good dusting powder and some calamine lotion for the baby's use in hot climates to prevent the development of heat rashes and prickly heat.

Elderly people travel well by air if they are free from organic disease. Those over the age of 65 should be advised to have a medical examination before undertaking a long

flight for the first time, to ensure that they are not suffering from any marked degree of anaemia or cardiovascular disease or from incontinence of urine or faeces. They should be instructed not to move about in the aircraft more than is necessary, and to attend to their toilet so far as possible while on the ground. If the airline is told that an elderly person is travelling, arrangements are made to allot a seat near the toilet and oxygen is provided in case of need.

Pregnant women should undergo a medical examination and obtain advice before undertaking a journey by air. The doctor consulted should know the proposed flight plan, its expected duration, and the maximum altitude likely to be attained. Weather conditions are a minor problem now that most long-distance flights are made in pressurized aircraft which usually fly above the weather. The difficulties of attending to a confinement or an abortion while in flight will be appreciated, so the question of the date of expected delivery and the possibility of abortion must be carefully assessed. If there is evidence of threatened or repeated abortion, eclampsia, or severe morning sickness or travel-sickness, an air passage is inadvisable. Long-distance flights without night stops may be fatiguing, and it may be desirable to break the journey for a day or so *en route*. International airlines accept pregnant women up to the end of the eighth month, provided they are in good health and that oxygen is available for emergency. When it is known that a passenger is pregnant, she is given an anti-airsickness tablet before flight and she is allotted a seat facing backwards if available, so as to avoid any tension from the retaining belt at take-offs and landings. In addition, the captain and chief steward are informed, so that the maximum consideration can be given to her comfort.

Medical Arrangements made by the Airline

In the case of invalids the medical department of the airline sends to the patient's doctor or to the hospital concerned a special form ("medical certificate of fitness for air travel"). This raises a number of questions about the patient's medical condition, and the information given assists the medical department in assessing fitness for travel and in making arrangements for the patient's care, comfort, and treatment at the airport of departure, on the aircraft, and at the airport of arrival.

If the case is acceptable the medical department issues a "medical requirements certificate" to those concerned, to ensure that proper arrangements are made for the patient all along the route and that enough information is available to the captain of the aircraft or to any doctor who may have to be called in. The patient's doctor is told about these arrangements, and is asked to make sure that the patient has all the drugs needed for the journey and fully understands his instructions, which should be written clearly. The drugs and instructions may be given to the patient or passed to the chief steward for custody.

Medical Emergencies in Flight

If there is no doctor or trained nurse on the aircraft and an invalid's condition worsens during flight, or an ordinary passenger becomes ill to a degree beyond the skill and resources of the steward or stewardess (all of whom have had training in first aid as applied to aviation), the practice is for the captain of the aircraft to radio to the nearest port of call. He can then give details of the patient's condition and ask for medical advice on treatment during the flight or for special facilities to be ready on arrival.

Every airliner carries first-aid kit for emergency use, but considerations of weight and space demand strict limitation to really essential items. The commoner items included are bandages and dressings, analgesics, anti-burn creams, antiseptics, cardiac stimulants, laxatives, narcotics, and sedatives. In addition, the stewardess of each aircraft is provided with a medical hold-all which contains all items (other than dangerous drugs) that have been found necessary for day-

to-day treatment of minor conditions of illness. It is impracticable, however, to cater for everyone's whim and fancy, as to do so would convert the aircraft into a flying chemist's shop, so again only essentials are provided. Passengers, invalid or otherwise, are expected to bring with them their own particular medicaments.

A special oxygen set is provided, on the doctor's orders, for any invalid or elderly person who might be in need of it. It is fitted with masks to fit babies, young children, and adults. A stretcher cot, designed to facilitate loading on and off the aircraft and to give the comfort of a bed while travelling, is provided for those needing more than an ordinary stretcher. It is shorter than the standard stretcher and fits more easily across the seats of an aircraft.

Statistics

It is impossible to estimate the real number of invalids who travel by air, as usually only those who are severely disabled or anxious reveal their condition to the airlines. Certainly the number of known invalids travelling long distances has increased rapidly during the past three years, though they form only about 0.3% of the total number of passengers. For instance, in the B.O.A.C. some 900 known invalids are now accepted yearly, approximately half being for one-stage flights of under five hours and the others for long-haul flights of six hours to two days or more. In the past six years, when over a million passengers have been transported an average of 3,000 miles (4,830 km.) each, there has been only one case of natural death while in flight among these known invalid passengers, and one among all other passengers. There have, however, been two or three deaths yearly within 48 hours of completing an air journey among passengers who had not revealed their disability. The primary cause of such deaths was cardiovascular disease in the majority of cases.

Most passengers who have needed medical attention during flight (about 90 a year) have not been known invalids at the time of embarkation, the ratio being 12% known to 88% unknown. Most of these episodes have occurred in flights of six hours or more.

Conclusion

It is desirable for all invalids who intend to undertake a long air journey to consult their doctors, so that appropriate advice may be given and suitable arrangements made for their own good. It is unfair for them to expose the airlines and fellow travellers to delays *en route* and the unpleasantness of alarming episodes. Experience shows that even severely ill patients can safely travel long distances by air in pressurized aircraft, provided they are selected carefully and proper provision is made for their care and comfort.

Next Refresher Course Article.—"Convulsions in Childhood," by Dr. Bernard Schlesinger.

The seventh report of the Joint Committee, Order of St. John and the British Red Cross Society, discloses a sound financial position. A sum of nearly £10,000 was spent on relief services for prisoners of war in North Korean hands. The provision of library services in hospitals continues with good effect and increasing demand. Five bungalows given by the Pilgrim Trust and five provided by the Bernhard Baron Trust have been completed at the Settlement for Paraplegics, Garston, near Watford. A further grant has been made by the committee for the construction of eight more bungalows. With the assistance of the Royal Colleges of Nursing and Midwives and the Queen's Institute of District Nursing, the award of scholarships to nurses for postgraduate courses was continued, 27 awards being made during the year. Assistance has been given to 85,000 ex-Service men and women who required help in circumstances arising from their disablement.

PULMONARY TUBERCULOSIS IN CEYLON

BY

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Early in 1951 the Governor-General of Ceylon, Lord Soulbury, realizing how serious was the extent of pulmonary tuberculosis in that country, suggested to the Ceylon Government that advice on the problem should be sought from the British Isles.

It was thought that the first move should be the setting up of a thoracic surgical unit at Welisara Chest Hospital, near Colombo. Under the Technical Co-operation Scheme of the Colombo Plan an invitation was addressed to me by the Government of Ceylon to establish the unit. Arrangements for my visit were made by the Commonwealth Relations Office.

On my arrival in Ceylon it was at once clear that the then gross shortage of nurses and the absence of radiographic, pathological, and other services at Welisara Chest Hospital ruled out the immediate possibility of the formation of such a unit there. I accordingly suggested to the Prime Minister that the opportunity might be taken for me to carry out a general review of the thoracic services of the island, with special reference to tuberculosis, and also that I should set up the first thoracic unit at Colombo's teaching hospital instead of at Welisara.

First Thoracic Unit

Thanks to the ready co-operation of the Ceylon Government and the university and hospital authorities, I was quickly able to establish a thoracic unit at the General Hospital, Colombo, equipped with all modern facilities, and I performed a considerable number of thoracic operations there. Since that time the unit has been functioning very satisfactorily, first in the charge of a Scandinavian team, and, at present, under Mr. Abbey Smith, thoracic surgeon to the Warwick Group of Hospitals, with a team comprising an anaesthetist (Dr. L. O. Mountford), a surgical registrar, a ward sister, and a physiotherapist. Mr. A. T. S. Paul and another surgeon from Ceylon are now working with the team, and are expected to take over the unit after further training. The present team is to remain for six months, and it is hoped that the Commonwealth Relations Office will persuade the Treasury to finance a further first-class British team there before the unit is finally handed over. The formation of other units is planned.

Results of the Survey

Once the Colombo unit had been established the wider issues of thoracic services in general were carefully studied in relation to economic and other matters, and at the invitation of the Prime Minister the findings were reported in a White Paper.*

The conclusions and recommendations were the result of an island-wide survey. It was estimated that there were some 200,000 patients with active pulmonary tuberculosis out of a total population of 7.5 millions. At the time of the survey about 3,000 beds were allocated for these cases. The problems studied were, and still are, very serious indeed. The gross overcrowding in hospitals, with as many patients lying on the floor as upon the hard beds, the pathetic lack of nurses so that it was not unusual to find more than 100 patients in all stages of tuberculosis in the charge of one heroic nurse, the lack of rest and of any real treatment for tuberculosis, and the poor state in general of radiographic and pathological facilities, as well as many other matters of equal gravity, could not fail to demand notice. These diffi-