showed a considerable degree of uniformity among staphylococci from babies and staff, but no such uniformity between babies and staff on the one hand and mothers on the other.

The results for mother/baby pairs given in Table VIII are in keeping with the view that few infants are infected from their mothers. The actual proportion infected from this source must be much less even than the 34% of cases in which the two strains infecting mother and child could be the same. Some of these will have been different strains with the same sensitivity patterns, and even if they were identical there remains the likelihood that the mothers were infected from their babies and not vice versa.

The three maternity units W, E, and M were chosen because of the considerable differences between them—the crowded older buildings of hospital W contrasting with the more modern and spacious unit at hospital E and the separate maternity hospital M situated in the country. One would therefore have expected that staphylococcal carriage rates would have been higher in hospital W than in E or M, and that hospital W babies would have acquired more staphylococci from the nursing staff than in hospital E or M. In fact, however, staphylococcal carriage rates were at a similarly high level for the babies of all three units, and the resistance rates against the various drugs were similar for the staphylococci isolated from each of the three hospitals, with the exception of sulphonamide resistance, which occurred significantly more often in hospital M than in hospitals W and E (38.3% as against 20.7% and 22.1% respectively). Another point of similarity between the results from the three units was in respect of the ratio *Staph. pyogenes* sepsis rate/*Staph. pyogenes* carriage rate. Although hospital M showed differences where eye and skin sepsis/carriage ratios were examined individually, the overall ratio of 1/5.8 for hospital M compared with 1/5.5 for hospital E, and 1/4.6 for hospital W. There is thus no evidence in this investigation to show that the nature of the hospital buildings or their proximity or otherwise to other hospital departments had any effect on the spread of staphylococcal infection in the units concerned.

Summary

Over 51% of the members of the nursing, medical, and domestic staff in three Edinburgh maternity units were found to be carrying *Staph. pyogenes* in their anterior nares. Of these staphylococci, 58% were completely resistant to penicillin and nearly 20% were resistant to sulphonamide. Less than 10% were resistant to chloramphenicol, chlortetracycline, and streptomycin.

The staphylococcal carriage rates of the mothers admitted to, and babies delivered in, these units was determined. The mothers' vaginal carriage rate was 3.5% and their nasal carriage rate was 28.7%. Of these, only the vaginal carriage rate rose during an eight-day period.

The babies' eye carriage rate on the fourth day after delivery was 35.3% and the umbilical carriage rate on the eighth day was 40.1%. The corresponding carriage rates for babies born at home were 5% and 8.6%.

As between three different maternity units of different type there was little difference in the mothers, babies, and staff carriage rates.

There was a much higher incidence of penicillin-resistant strains among nurses and babies than among mothers, and among week-old babies born in hospital than among those born at home. Individual hospitals showed little difference in antibiotic-resistance rates.

A relatively high frequency of mild skin and conjunctival sepsis contrasted with a complete absence of serious infection in this series.

The great majority of infants acquired their staphylococci from sources other than their mothers, chiefly from the nursing staff and from other babies. Despite the fact that there was a high carriage rate among the nurses attending babies born at home the carriage rate on these babies remained low.

Where infants carried staphylococci on two different sites (eye and umbilicus), in approximately half the cases the staphylococci had different drug-sensitivity patterns.

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MANAGEMENT AND TREATMENT OF PATIENTS WITH COAL-WORKERS' PNEUMOCONIOSIS

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Coal-workers' pneumoconiosis is an important industrial disease. In 1947 it was estimated that there were about 16,000 certified cases in South Wales and at least an equal number uncertified (Hugh-Jones and Fletcher, 1951). Since then an increasing awareness of the condition and more frequent radiological examinations have led to more cases being revealed in other parts of Great Britain. The number of new cases certified each year in South Wales rose steadily from 44 in 1931 to 5,224 in 1945, but declined to 1,079 in 1953. In the rest of Great Britain the number has been rising steadily, passing the figure for South Wales in 1951, to reach 2,987 by 1953 (Ministry of Fuel and Power, 1954). It is therefore likely that an increasing number of practitioners who have not met the condition before may be asked for advice about it by patients who are or have been miners. Although there is no specific therapy, the reassurance derived from a better understanding of the condition can be a real help, and in the more disabled case treatment of symptoms and complications is both possible and often quite effective.

Questions about re-employment and compensation are likely to arise. This article therefore includes an

outline of the present compensation arrangements and the scheme which enables a miner who is in receipt of disablement benefit to continue working underground under certain safeguards.

Pathogenesis of Coal-workers' Pneumoconiosis

Coal-workers' pneumoconiosis has two distinct but related forms. The first, simple pneumoconiosis, caused by the gradual accumulation of the fine dust (less than $10\ \mu$ diameter) in the lungs, is recognized radiologically by the characteristic minute opacities (0.5–1 mm.) which are often best seen in the early stages in the right upper and mid-zones. Its radiological severity is classified into three categories (1, 2, and 3) dependent principally on the profusion of the opacities (Cochrane *et al.*, 1951). The condition advances as such only if the miner continues to work in a dusty environment, but it makes the subject liable to the second form of the disease—complicated pneumoconiosis. In South Wales between 1 and 2% of men with simple pneumoconiosis (category 2 or over) develop complicated pneumoconiosis each year. The figure for other areas is not known, but the prevalence of complicated pneumoconiosis is almost certainly lower in most other coal-fields in this country. The condition is recognized radiologically by the appearance of additional larger localized opacities which correspond to the massive fibrosis found pathologically; it progresses whether or not dust exposure is continued, often develops after cessation of exposure to dust, and is much the more disabling form of the disease. The massive fibrosis is believed to be caused by tuberculosis modified by the presence of coal-dust—a hypothesis based on clinical, radiological, and pathological findings. Tubercle bacilli may be isolated from about 40% of cases at necropsy but in less than 10% of cases coming to hospital.

The prevention of serious disability from pneumoconiosis, therefore, depends both on reducing exposure to coal-dust to a level where simple pneumoconiosis does not occur to an appreciable extent during a working life, and on eliminating the risk of infection by tuberculosis. This can be achieved only by energetic measures to detect and treat all infectious cases both in miners and in the community in which they live (Rogan, 1954). By using full-size films and good radiographic technique it is possible to detect an early stage of simple pneumoconiosis (category 1) at which the risk of developing complicated pneumoconiosis is very small. Thus a system of periodic x-ray examinations (Cochrane *et al.*, 1951) could assist in preventing the more disabling form of the disease by detecting those men who were approaching the dangerous stage of the disease.

Coal-workers' pneumoconiosis is different both pathologically and in its natural history from the classical form of silicosis found in men who have worked in dusts containing a high proportion of silica.

Diagnosis

The symptoms of increasing breathlessness on exertion disproportionate to his age, cough, pain in the chest, and lassitude in a man who has worked in the mines for a number of years should raise the suspicion that he may have pneumoconiosis. The only pathognomonic feature is the expectoration of inky black sputum, but this is likely to occur only when complicated pneumoconiosis is well established.

Physical signs in the chest are of little help in establishing the diagnosis, which can be made with certainty only on the basis of the industrial history and the chest radiograph. The striking radiographs of well-established simple pneumoconiosis and the remarkable appearances of complicated pneumoconiosis may surprise physicians not familiar with the condition, and possibly lead to the assumption that patients are more seriously ill than is in fact the case. The typical formation of the opacities of complicated pneumoconiosis by a process of aggregation on a background of simple pneumoconiosis and their slow progression will usually differentiate the condition from carcinoma or tuberculosis. Extensive cavitation in the massive lesions of complicated pneumoconiosis is common but does not prove the existence of overt tuberculosis or even of an especially poor prognosis (Kilpatrick, Heppleston, and Fletcher, 1954).

Relationship of Radiographic Appearances and Age to Disability

Although simple pneumoconiosis is not, on the average, the cause of serious disability when large and unselected groups of miners are studied, there is of course a tendency for the general practitioner to see only those men who are becoming breathless to an extent which interferes with their work. Age is an important factor. Breathlessness of severe degree on account of simple pneumoconiosis is rare under the age of 50. Complicated pneumoconiosis may be a cause of serious disability at a much earlier age, but, even so, it is not infrequent, at least in South Wales, for men in the forties with quite advanced complicated pneumoconiosis to continue work without serious symptoms.

The term "pneumoconiosis" covers a wide range of conditions, from the man with the earliest detectable category of simple pneumoconiosis to the one with the whole lung destroyed by massive fibrosis. The miner is likely to be more familiar with the effects produced by the latter and may therefore be under a serious misapprehension about the gravity of his condition. An explanation to men with simple pneumoconiosis, who form the majority, that their lungs show evidence of dust accumulation but that it may cause them no more disability than the pigmented coal scars on their hands, often puts their condition in a new perspective. Coal-workers' pneumoconiosis at any stage is a slowly changing condition, and even quite seriously disabled men with complicated pneumoconiosis may be able to look forward to a number of years of useful life provided they find a job within their capacity.

In explaining the condition to men with category 1 simple pneumoconiosis we avoid using the word "pneumoconiosis." We think it is more helpful to tell the man that it is possible to guess by looking at his radiograph that he has worked in the mines and that some of the dust he has breathed has stayed in his lungs. This category can be diagnosed with reasonable certainty only on films of excellent technique. At this stage the miner is not liable to attack by complicated pneumoconiosis, and there is even some evidence that men with this category are less liable to develop infectious tuberculosis than miners with normal films (Cochrane, 1954). They can therefore hardly be said to have a "disease" on the radiological evidence. The earliest x-ray indication of dust retention in the lungs therefore occurs before the prognosis is adversely affected.

To men with category 2 and over, even if there are no symptoms, we think it is wise to explain the position

fully. If nothing is said about their chest radiograph, they will assume that it is normal, but at any time they may be diagnosed as having pneumoconiosis as a result of attending a mass miniature radiography unit or if they apply to the pneumoconiosis panel. A misunderstanding may then arise. The other reason for a full explanation is that under the Industrial Injuries Act any miner with diagnosable disease is eligible for some compensation even though his disability may be very slight.

It may be argued that to encourage a man with minimal disability to apply for compensation may have a bad psychological effect. In our experience this very rarely occurs if the position is fully explained.

Compensation

The various schemes for providing compensation for coal-miners with pneumoconiosis have gradually widened the circle of those eligible. Compensation for silicosis arising in coal-miners was started in 1928, but applied only to those who had worked in specified jobs. The Workmen's Compensation Act (W.C.A.) of 1943 extended the provisions to cover all types of job and forms of pneumoconiosis. Under this scheme the miner certified as having pneumoconiosis was awarded compensation, the amount of which depended on the degree of disability, assessed as either partial or total. He could either claim a weekly benefit or commute his claim for a lump sum. Miners receiving payments under this scheme (including those who commuted their claims) are not in general eligible for benefit under the present National Insurance Industrial Injuries Act (I.I.A.), 1946, which came into force on July 5, 1948, and applies to all miners employed then and since. Under this scheme a miner diagnosed as having pneumoconiosis is eligible for a disablement benefit, which is additional to the sickness benefit obtained under the National Insurance Acts.

In 1951 special arrangements were made to enable certain miners who had been suspended under the W.C.A. but who did not have overt tuberculosis to return to the mines. Those who return come under the I.I.A.

In considering a claim a pneumoconiosis panel* of the Ministry of National Insurance proceeds in two stages. A diagnosis is made first, based on the radiographs and industrial history, and if pneumoconiosis is diagnosed the second stage, assessment of disability, follows. Disability is expressed on a percentage basis and can be as low as 1%, but the payments are graded in steps of 10%. In reaching a decision on the percentage assessment, all the circumstances are taken into account, and, where necessary, pre-existing causes of disability or those unrelated to pneumoconiosis are offset to reach a fair estimate of the loss of faculty caused by pneumoconiosis. The disablement benefit starts at 6s. 9d. weekly for those of 1% to 10% (inclusive), and rises to 67s. 6d. for 100%.

The miner may also be entitled to supplementary weekly benefits which are (1) a special hardship allowance (27s. 6d.); (2) an unemployability supplement (40s.) (with additions for married men, and those with children); and (3) a constant attendance allowance (up to 60s.).† His basic disablement pension is supplemented by about one-third under the Colliery Workers' Supplementary Scheme—a contributory pension scheme supported jointly by the National Coal Board and the colliery workers.

Whereas under the W.C.A. a miner was debarred from returning underground and suffered a reduction of his weekly benefit according to subsequent wages if he obtained a job, under the I.I.A. his benefit is a life pension and is unaffected by his subsequent earnings, and he may if he wishes continue working underground. Most assessments are provisional

*There are ten panels at present, situated in Bristol, Cardiff, Edinburgh, Glasgow, London, Manchester, Newcastle-upon-Tyne, Sheffield, Stoke-on-Trent, and Swansea.

†The rates are those which will come into effect in May, 1955, under the National Insurance Act, 1954.

and miners are recalled for reassessment after a variable period, usually not exceeding three years. A miner who has tuberculosis or pneumoconiosis accompanied by overt tuberculosis may be compulsorily suspended. If the tuberculosis is active he will be given an assessment of 100%.

By a recent amendment of the regulations miners who have not worked in the mines since 1948 and who are not receiving payment under the W.C.A. may now apply for a certificate of partial or total disablement and if certified they may be eligible for supplementary benefits under the I.I.A.

In our experience the commonest misunderstandings which arise in the working of this scheme are as follows:

(1) Miners and others may have only a hazy idea of the meaning of the percentage assessments. Is it the amount of dust in the lungs? Is it a measure of the dust conditions in which the man may safely continue working underground? Is it the amount he is disabled? Therefore, it is hardly surprising that the man, to say nothing of his doctor, may have difficulty in appreciating the meaning of a 1% assessment. It is important that the miner should realize that the assessment is based on disability and that the x-ray film is used solely for establishing the diagnosis.

(2) The need to differentiate between the effects of more than one disease on disability may cause misunderstanding, and is perhaps commonest in men with, for example, hypertension or angina of effort, who may be totally disabled, but eligible only for, say, 40% assessment on account of pneumoconiosis. This problem also arises when a miner who has been assessed at a high percentage of disability in life dies of some cause quite unrelated to pneumoconiosis. A death claim may then be made by the widow and may be turned down. In some of these instances a discussion between the practitioner and the doctor at the pneumoconiosis panel might help to explain the situation to the relatives and avoid the perpetuation of a grievance.

(3) No precise level of radiographic abnormality for diagnosis of pneumoconiosis is laid down in the Act. Even if it were it has been well established (Fletcher and Oldham, 1949) that there is appreciable observer variability in reading films for pneumoconiosis, and thus a film near the borderline might be accepted as showing pneumoconiosis on one occasion and rejected on another. We have been impressed by how readily miners accept this idea of the inevitable uncertainty of reading some films. If a man is rejected at the first application he may apply again within three months, when the new film will be seen by two members of the panel who did not see the first film. To avoid advising men to go to the board when there is a high probability of their being rejected it seems in the best interests of all that consultants and practitioners seeing much of this disease should discover from the members of the local panel by informal discussion what level of abnormality is required for diagnosis. Variations in radiographic technique are an important factor in increasing disagreement in diagnosis. The use of automatic exposure controllers in the x-ray sets would help to reduce but would not eliminate this variation, as it is also due to variations in development technique.

(4) When a miner is recalled for reassessment of disability his benefit may be reduced. As most miners know that pneumoconiosis is not a condition which improves, this reduction may cause a real sense of grievance. In our experience downward assessments have usually resulted from the extreme difficulty of setting uniform standards of disability assessment when the I.I.A. first started. An explanation of this difficulty and of the possibility that assessment may have been made at the time of an acute chest infection is generally accepted by the miner as reasonable. A man may appeal (but in the case of a provisional assessment not normally under two years) and the case then goes to a tribunal.

Advice on Employment

Well-informed advice on problems of employment is of first importance to the miner with pneumoconiosis and is

often of greater value to him than anything else doctors can offer him. The opportunities open to him are now far better than they were under the W.C.A., and the figures for South Wales show the striking change since 1949. In that year there were 4,550 miners with pneumoconiosis unemployed on the Disabled Register; now there are 650.

The largest single factor has been the change of regulation which allows a miner to continue working underground. With the man's approval the pneumoconiosis medical panel informs the colliery manager of its findings, and provision is made to place the man in a job where conditions are "approved." The aim is, of course, to achieve these conditions for all places underground, and many more coal-faces are now "approved" than when the I.I.A. came into force.

The pneumoconiosis panel offers the miner advice on re-employment both at the time of his boarding and by letter. In 1953 75% of letters advised the men to continue in the industry under "approved" dust conditions; 12% recommended work on the surface in dust-free conditions, and about 6% advised leaving or remaining outside the industry; suspension on account of tuberculosis occurred in 2%. Thus a majority are advised to stay in the industry. By the end of 1953, of the 8,200 miners referred for employment under "approved" conditions in the mines, only a little over one-tenth rejected the advice. In over 80% arrangements were made for working in "approved" conditions (Ministry of Fuel and Power, 1954). These figures, however, do not show how many men had to move from better-paid jobs on the coal-face to other parts of the mine in order to work in "approved" conditions. At present the proportion who leave the coal-face varies considerably in different areas.

In the case of the moderately disabled man the combined effect of his disability and a wish to work out of the dust will often lead to his accepting a less strenuous and less remunerative job off the coal-face. The more difficult case is that of the younger man with heavy family financial commitments and only slight disability. If "approved" conditions can be ensured only by leaving the coal-face he may be unwilling to do this, as his small disablement benefit does not compensate for the large reduction in his weekly earnings. In these cases help may be obtained from the area or divisional medical officer of the Coal Board, who will know or can find out more about the dust conditions. Rapid improvements are now being made in the dust conditions, and in many instances face conditions which were recently not "approved" are now within these limits. In cases where difficulty is experienced in bringing one particular face within "approved" conditions the medical officer may be able to arrange employment on another face which is "approved" at the same pit, or in an adjacent one. In general it is usually to the man's financial advantage and not further damaging to his health to stay in the mine, provided conditions are approved and the job is within his physical capacity. However, each case needs individual assessment, taking into account age, disability, financial and other commitments, x-ray category, and past and present conditions in the mine.

The case for recommending a change of job to one outside mining is strongest in the young man who has shown in serial films rapid progression of simple pneumoconiosis towards category 2, particularly if he is unmarried and there is a reasonable chance of his getting good employment elsewhere. These cases are, however, unlikely to be detected except where periodic x-ray examinations are made. It may also be wise to advise a young man with complicated pneumoconiosis which has shown rapid radiological progression but with little disability to look for another job while he is still young and to get, if possible, one which he can expect to continue even if he becomes short of breath. Those men who are on the Disabled Register at the Labour Exchange can get help in finding a job by discussion with the disablement resettlement officer. A meeting of the almoner, doctor, and D.R.O. can assist the latter to select the most suitable type of employment. It also brings a more personal interest in the man's re-employment.

The commonest and the most difficult cases are the miners of 50 and over, both with and without pneumoconiosis, who have become moderately or severely disabled. The mining industry at present provides employment for many of these men, but there comes a time when they are unable to get to and from the mine and are frequently off work with exacerbations of their chronic chest infections. A few are able to get jobs as caretakers and live near their place of work, but many others are unable to get any work within their capacity, and they fall out of employment at a relatively young age. The men in this group who have normal chest films or pneumoconiosis of a category less than that accepted for diagnosis under the Act, and who have spent many years working underground, not unnaturally sometimes feel they have been treated harshly in not being eligible for compensation. It seems reasonable to explain to them that their disability is not caused by a recognizable form of pneumoconiosis and that they might have developed equally severe breathlessness in any other occupation. It is not yet possible to state whether or not after excluding men with pneumoconiosis there is among miners and ex-miners an unduly high proportion with respiratory disability.

Treatment

Many of the miners seeking advice on account of breathlessness find their symptoms worst in the mornings, in cold weather, and also during bouts of chest infection, especially in the winter months. Alleviation of the distress at these times depends primarily on controlling bronchospasm and chest infection.

Bronchospasm

Bronchospasm is frequently precipitated by sudden changes of temperature—for example, going upstairs to a cold bedroom or bed. We have been impressed by the amount of relief men claim they receive from the equable temperature of the hospital ward without any specific therapy. Some men have gained appreciable relief by moving their bed to a warmer downstairs room and avoiding so far as possible any sudden changes of temperature.

Adrenaline is less dramatic in its effect in most of these men than in a typical asthmatic but is of real use given by injection or inhalation at the time of acute attacks. Many men also find that adrenaline and atropine compound spray (B.P.C.) administered through a hand spray is effective enough to make it worthwhile carrying the spray in their pocket. A hand spray can be prescribed under the National Health Service. In some men a lack of understanding of how to use the spray properly and how to keep it in working order prevents their getting the maximum benefit from this form of therapy. In our experience the more complex and usually more expensive proprietary inhalants rarely give materially greater benefit than the simple B.P.C. preparation.

Of the many other bronchodilator drugs recommended we have found isoprenaline sulphate (*isopropylnoradrenaline*), ephedrine, aminophylline, hyperduric adrenaline, and occasionally khellin most generally useful. It may take a while to find the dose and timing of the drug or combination of drugs which provide the greatest relief with the minimum side-effects. Patients who respond well to adrenaline or hyperduric adrenaline may be taught to give the injections themselves. They gain considerable benefit physically and psychologically from knowing that they have a powerful remedy at hand when in need. In a very severe attack of bronchospasm, aminophylline (0.25 g.) intravenously has in our experience been the most useful agent and is often dramatically effective, if rather short-lived in effect. The occasional severe case which has failed to respond to other forms of treatment may benefit from cortisone. Atropine is occasionally of use in those with profuse watery expectoration.

Acute Pulmonary Infections

These are a very common cause of increased breathlessness and bronchospasm in winter. The severity of the infection may not be obvious from the temperature chart or the

physical signs in the chest, but the sputum, at least after the first two or three days, will usually show a change of character, becoming more yellow or often black if the miner has complicated pneumoconiosis. Penicillin in large doses—two mega units of combined procaine and crystalline daily—combined with streptomycin, 1–2 g. daily, is usually effective, the sputum changing rapidly in character and the dyspnoea and bronchospasm becoming less severe even if no antispasmodic treatment is given at the same time. Because repeated attacks of chest infection are common in this disease we have avoided using chloramphenicol, while chlor-tetracycline ("aureomycin") and oxytetracycline ("terramycin") have been reserved for those cases which fail to respond to penicillin or streptomycin. A full account of the value of different antibiotics in acute chest infections has been given by Stuart-Harris (1953).

When the chemotherapy is stopped the sputum often rapidly reverts to its previous condition, but the bronchospasm and dyspnoea do not usually return, at least for a while, to their previous severity. The benefit seems greatest when chemotherapy has been continued for some period after the patient has apparently improved.

If recurrent chest infections could be prevented much distress and incapacity would be avoided, but no beneficial effect was detected in a trial of the prophylactic value of sulphonamides (Kilpatrick and Oldham, 1954). However, it is our impression that if patients are treated really effectively from the onset with sufficiently large doses of effective antibiotics, the period in bed and of convalescence is considerably reduced. Much may be gained, therefore, by encouraging those who can readily detect the onset of their attacks to seek treatment at the *earliest* stage.

In men with less obvious infection it is difficult to assess how much this contributes to their breathlessness, and it is therefore worth trying a period of intensive therapy for a week to ten days.

Cough and Sputum

It is usual for dyspnoea to precede cough in men with pneumoconiosis, but in the later stages cough may be very troublesome, particularly early in the morning. When there is much mucoid or purulent sputum, postural drainage, even in the absence of proved bronchiectasis, is of considerable value. If before going to sleep they empty their lungs so far as is possible by lying over the edge of the bed, some men can get a reasonable night's rest. The early-morning cup of tea or glass of hot water to which has been added the simple sodium chloride compound mixture (*N.F.*) may help to relieve the morning period of acute distress. Full doses of syrup of codeine phosphate are of use in treating an unproductive and irritating cough.

Expectoration of jet black or nearly black sputum indicates necrosis in the centres of the areas of massive fibrosis. The condition is likely to cause alarm but is not of serious import, as it seems to have little effect on the prognosis and certainly does not prove the onset of overt tuberculosis. Reassurance and a precautionary examination of the sputum for tubercle bacilli is all that is required. Small haemoptyses are as common as black sputum in men with complicated pneumoconiosis, and again do not necessarily indicate the presence of tuberculosis. Severe haemoptyses are rare. The presence of frankly malodorous sputum is also rare, and suggests some other underlying disease such as bronchiectasis or lung abscess.

Pain in the Chest

Pain in the chest is a common symptom, but its cause is often obscure. Localized intercostal pain and tenderness may be the principal complaints, which can usually be ameliorated by local radiant heat. The pains are often transient, disappearing in a few weeks or months whatever the treatment. Pleural friction is a fairly frequent physical sign but is often unassociated with pain. However, when persistent pain is also present local injury, such as a cough fracture of the rib, may be suspected. A more central pain or feeling of constriction may arise from cardiac ischaemia

or possibly pulmonary hypertension, both of which are common in men over the age of 55 with pneumoconiosis. Amyl-nitrite may be of therapeutic and diagnostic value. A marked coincidental increase of pain and breathlessness may be caused by a partial pneumothorax, which may be very difficult to diagnose without a chest film because of the extensive fibrosis and emphysema already present. Reassurance, and an explanation only, may cure the pain of a young man who has recently been told he has pneumoconiosis.

Breathing and General Exercises

During convalescence from an episode of chest infection general and breathing exercises are of help in re-establishing confidence by demonstrating to the man that he is capable of more activity than he supposed. To men who have lived an over-restricted existence since the diagnosis of their condition, exercises are of real benefit in getting back to a more normal life. Objective physiological evidence of improvement by breathing exercises is difficult to detect in pneumoconiosis, but many men claim improvement. Success depends more upon the enthusiasm and skill of the physiotherapist than in the particular set of exercises used.

Complications

Tuberculosis

Men with complicated pneumoconiosis who develop a positive sputum usually react poorly to chemotherapy and rarely survive more than two years (Kilpatrick, Heppleston, and Fletcher, 1954). As the lesions are almost always bilateral and extensive, surgery is of very limited use. It is possible that with initial treatment with streptomycin and P.A.S., followed by intermittent therapy over many years with P.A.S. and isoniazid, the outlook may be better. Young men with advancing complicated pneumoconiosis but a persistently negative sputum are a very difficult therapeutic problem. There is little evidence that antituberculous chemotherapy has any effect (Miall *et al.*, 1954), but long-term therapy over a number of years with isoniazid and P.A.S. while allowing them to continue working seems at present the most logical procedure. There are really no pointers to suggest that these men benefit in health by enforced idleness if they wish to work. As a protection to others, regular sputum examination is desirable.

Cor Pulmonale

In the terminal stages of complicated pneumoconiosis cor pulmonale is common and is often precipitated by an attack of chest infection. Rest in bed, an equable temperature, and large doses of antibiotics will often produce a dramatic improvement in the course of a few days. Mercurial diuretics, digitalis, and a salt-poor diet are beneficial, particularly where there is much oedema. In cases with a marked cyanosis and a very low urine output, aminophylline and oxygen have a useful potentiating effect on the mercurial diuretics.

After a period in bed and when their cardiac failure has been controlled, we encourage patients to be up and about as much as possible. There is usually greater risk of their becoming unnecessarily bedridden than of overexerting themselves.

Oxygen therapy has considerable use in this condition. Men with very severe and limited respiratory reserve get benefit both by relief of the cyanosis and by reduction of pulmonary ventilation. In our experience of these cases oxygen therapy rarely causes sufficient carbon dioxide retention to produce narcosis, so that it can usually be given without risk. Only in very severe and usually terminal attacks of cor pulmonale may it be necessary to use oxygen with caution. Some of the most disabled men also gain benefit from oxygen when up and about. The marked increase in their exercise ability while breathing oxygen suggests that a portable oxygen set might be of real value to them. For the present they can obtain the ordinary oxygen cylinder and mask for use in their homes under the

National Health Service. By taking oxygen after temporary exertion beyond their real capacity, such as going upstairs, they can shorten the period of acute respiratory distress. The cylinder is also useful for operating the nebulizer for the relief of bronchospasm.

Summary

Coal-workers' pneumoconiosis has two forms: simple pneumoconiosis, which is rarely a cause of severe disability except in elderly men; and complicated pneumoconiosis, which may cause severe disability after the age of about 35 and is a modified form of tuberculosis.

Under the present regulations men with either form are eligible for compensation. The number of new cases being certified annually in areas other than South Wales is increasing. The benefit paid is determined by the severity of disability and not by the degree of abnormality of the chest film. Miners receiving compensation may continue to work underground under dust-approved conditions if they wish.

Advice on the nature of the disease, compensation, and re-employment is of special importance in the management of these cases, as misunderstandings are apt to arise. These are discussed in some detail. There is need for more exchange of information between the doctors with whom a miner with pneumoconiosis is likely to consult.

Treatment of the acute pulmonary infections, bronchospasm, and cor pulmonale, and some of the principal symptoms in these cases, is briefly described.

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In his annual report for 1954 Dr. J. F. WARIN, the principal school medical officer of the City of Oxford, describes the steps that are being taken to prevent food-poisoning at school canteens. About 200 people are employed in the school canteens in Oxford, and a full medical examination and a chest radiograph have been a condition of employment for the administrative staff for some time. There is a higher labour turn-over among the manual workers in the canteens, and before they are employed they are asked detailed questions about any intestinal illnesses they may have had in the past. If there are reasons for doubts about a prospective employee's freedom from transmissible disease, then a full medical examination is arranged and blood and stool specimens are sent to the laboratory. Manual workers have a chest radiograph as a condition of employment. Posters illustrating the prevention of food-poisoning are on display in the school canteens, and it is intended that members of the chief sanitary inspector's staff will give talks to canteen workers on this important subject. When selected groups of the population in Oxford were offered examination at the miniature camera unit last summer canteen workers were included. The response to this offer was 100%. No case of active tuberculosis was detected.

HAEMATEMESIS

WITH SPECIAL REFERENCE TO PEPTIC ULCER

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Haematemesis (including melaena) is one of the common emergencies met with in hospital practice. The most usual cause of the condition is chronic peptic ulcer, which is on the increase. At the present time the population is becoming increasingly loaded with middle-aged and elderly people, who are both more liable to suffer from chronic peptic ulcer and less able to survive blood loss than are young adults. For these reasons, the methods used in treatment must be kept under continuous review. We have therefore examined the experience of the Radcliffe Infirmary during a recent five-year period (1948–52 inclusive) and compared it with the findings of a similar study made for the previous decade (1938–47) by Lewin and Truelove (1949).

Data

The sources of data of this study are the in-patient notes of the Radcliffe Infirmary, which is the only general hospital taking in emergencies from the City of Oxford and a considerable rural area surrounding it. Hence the patients can reasonably be regarded as an unbiased sample. Case notes of all patients (other than children) presenting as emergencies because of haematemesis or melaena during the five-year period 1948–52 have been examined. Trivial cases in which there was no evidence of serious bleeding have been excluded.

In considering the fatal cases we have adopted the criteria of Avery Jones (1952) in excluding only those deaths due to unrelated diseases or to elective operation after recovery from the bleeding. We have included all other cases with serious complications, among them (1) patients who have haematemesis or melaena following a perforated peptic ulcer, a group excluded by Avery Jones (1947) because of their special nature; and (2) patients who were already in hospital because of a serious disease which terminated in severe gastrointestinal bleeding, sometimes diagnosed only at necropsy.

Results

During the five-year period of 1948–52 there were 540 emergency cases of haematemesis and melaena, compared with 305 during the previous ten years. During the five years under consideration the annual rate of admission for haematemesis and melaena increased steadily from 87 in 1948 to 142 in 1952, a change related to the increasing frequency of peptic ulcer. The cause of the bleeding was classified under the following headings: (1) chronic peptic ulcer (377), (2) acute peptic ulcer (84), (3) oesophageal varices (23), (4) carcinoma of the stomach (20), and (5) other causes (36). The criteria used were the same as those used previously by Lewin and Truelove (1949).

The miscellaneous collection of cases which we have grouped together under "other causes" were as follows: hereditary telangiectasia, 5 (4 admissions were of one patient); hiatus hernia, 5; unknown, 26. Of the unknown group, there was evidence later of a gastric or duodenal ulcer