PLACE OF ROUTINE EXAMINATIONS IN PROMOTION OF HEALTH AMONG INDUSTRIAL EXECUTIVES*

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Although occupational medicine has been well recognized and well implemented in industry in the United States for a number of years, it is only during the past eight to ten years that the executive health phase of this programme has been stressed to any great extent. That industrial medicine has progressed rather rapidly during the past several years in the United States is shown by its recognition as a specialty under the American Board of Preventive Medicine, other subspecialties under this board being public health and aviation medicine.

Industrial Medical Programme

Management has recognized the value of a medical programme in industry, including an executive health programme. Ruffin (1957) has stated that "the health, wellbeing and morale of the men and women are among the most precious assets that we have in industry," and, in general, industry has accepted its measure of responsibility for the health and safety of its employees. Health maintenance programmes are of primary benefit to the employee, but they play their full share in keeping down the competitive costs, reducing operating expenses, and increasing efficiency. According to Proudfit (1957), the accumulated experience of companies that have fostered modern industrial medical programmes has made it plain that an investment in health is good business and that any manager who is required to operate without needed medical service or with expensive unsolved health problems in his employees knows it is bad business not to have available good medical counsel and service. He refers to a report furnished by the American Management Association in which it is concluded that, from data furnished by a number of industries with medical departments, there is a consistent profit of \$3.50 to \$5 for each dollar spent in the medical department.

Irvin (1952), as the result of comments obtained from a questionnaire submitted to executives who had undergone a periodic health check, concluded that health maintenance of key personnel was a sound financial investment and that the executive was very appreciative of the annual check-up on his physical status. Trickett (1952), in a survey of industry having executive health programmes in the San Francisco area, found that as a rule such a programme was of value. However, his study revealed that health problems of management employees were often overlooked, which seemed amazing, since direct or indirect financial loss can result from inadequate performance and also since executives are often careless of their own health.

There is considerable variance of opinions on whether or not the death rate among executives is greater than in similar age groups of individuals not occupying executive positions. However, we do know that disease incidence and trends have changed remarkably in the past several decades. There is less tuberculosis, and cases of communicable disease and pneumonia are fewer. The infant mortality is less and longevity is greatly extended. With increasing age there is less resistance to disease and consequently an increase in the number of degenerative diseases, with heart disease and malignancies being responsible for a large percentage of deaths in the older age groups. Since the executive is usually in the older age group he is more prone to

acquire one of the degenerative diseases and therefore should be included in the health maintenance programme. Executive ability represents great worth to any industry, the potential value of the executive being variously estimated to be between \$50,000 and \$250,000, depending on how far down or up he is categorized on the management scale. The sudden death of or a serious disabling disease in a top executive has in some cases proved to be almost disastrous because of lack of continuity of management.

Objectives of a Health Programme

The objectives of an executive health programme are to provide health maintenance for the purpose of improving health, increasing efficiency, and prolonging life, protecting the company's investment, and ensuring continuity of management.

There are several guiding principles that are generally accepted. First, the programme must have the wholehearted support of management, since without such support it will fail. Second, it must be decided which groups are to be examined; in other words, will only the top executive groups be included in the programme or will it extend to the lower management groups down to and including the foremen? Third, how often will the periodic examination be given? This depends upon the number of personnel and equipment available and the economic cost. An annual examination is desirable if it can be accomplished within the provisions stated. An annual periodic examination after the age of 40 or 45, with a biennial examination up to that age, might be advisable. Fourth, should the examination be done by the company medical department or should the executive be referred to an outside hospital or clinic? There are arguments on both sides. It is generally believed that an examination by the company medical department is the better of the two plans, since it is more convenient, the medical director of the company is more familiar with the working conditions, follow-up medical procedures are easier to implement, and it is usually more economical. Fifth, the findings should be treated as confidential between the examinee and the examining physician. Sixth, those cases requiring definite medical care should be referred to outside physicians.

Before discussing the routine examination, it is felt that a few words would be appropriate on the preplacement examination. In airline operation the preplacement examination for the pilot is very thorough, very exacting, and very selective. The examination is conducted not only on the basis of the applicant's present condition but also on the pilot's potential physical and mental condition twenty to thirty years in the future. On this basis a fair percentage of pilots are disqualified physically because of one or several minor defects which may in the future prove to be detrimental to his health. The disqualification rate of pilot applicants varies between 10 and 15%. On the other hand, the examination of the ground employee, including the potential executive, is not as exacting, since the condition of many of these individuals is acceptable for ground duty but not for pilot duty.

After the initial examination for employment, subsequent routine or periodic examinations are for the purpose of conserving or maintaining health. The main intent of this examination is to disclose disease processes in their incipency so that corrective action can be taken. The principles of preventive medicine are first involved in the preplacement examination and continued during the periodic and special examinations.

Periodic Physical Examination

What should the routine physical examination include? Once again the extent of the examination depends upon the time available, the number of personnel, and the amount of available equipment in the medical department. However, a good periodic examination should include the following: a good history, thorough physical examination, including

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some procedures which often are overlooked, such as an ocular tension determination, an examination of the fundi, palpation of the peripheral blood vessels, rectal examination, and a detailed vision examination; laboratory studies, including urinalysis, haemoglobin estimation, sedimentation rate, blood sugar if over 40 years of age; x-ray picture of the lungs; and an electrocardiographic tracing if over 40 years of age. Other laboratory procedures, such as serum cholesterol and non-protein nitrogen estimations and a glucose-tolerance test, should be requested if and when deemed necessary. Unless definitely indicated it is not believed that routine diagnostic x-ray procedures such as gastro-intestinal series, barium enemas, or cholecystographies should be done. Likewise, routine serological tests have now been discarded by many.

It is generally conceded that the routine periodic examination is of very definite value. Roberts (1958), in a review of the literature, found that 37.1% of 16,715 individuals examined had significant disease. He also reported that in a tabulation of the results of "routine" laboratory examinations 2.5% of 425,005 cases were abnormal for sugar, 3.2% of 45,961 cases were abnormal for albumin, and 11.91% of 15,619 subjects examined electrocardiographically had abnormal tracings. Franco (1950) found that 149 of 307 executives examined had major medical defects. Cardiovascular conditions accounted for 36% of the defects, and obesity was diagnosed in 25%. Thompson and Staack (1956) found that, in a study of 600 executives, diseases of the arteries and heart made up the largest percentage of newly discovered diseases. These consisted mainly of hypertension and arteriosclerotic heart disease, which occurred in approximately 25% of the cases examined. Hartman (1952), in the proctoscopic examination of executives over 45 years of age at the Mayo Clinic, found that 13% had rectal polyps without symptoms, some of which had undergone adenocarcinomatous changes. In a series of 2,000 cases regardless of age or symptoms he reported that the incidence of rectal polyps was 8%.

During the three and a half months from January 1 to April 15, 1958, a statistical analysis was conducted of 120 periodic examinations in the management group in our company. These cases were taken consecutively. Of the 120 examination, 60 were in the top pilot group aged 35 or older, and 60 were in the management group aged 35 or older. The average age of the pilot group was 40.3 years and of the management group 41.4 years. In the pilot group 38 physical defects were found, eight of which were considered of sufficient significance to warrant follow-up corrective action. In 28 of the 60 pilots examined no abnormalities were found. In the management group there were 78 physical defects, 33 of which were classified as significant, no abnormalities having been found in seven cases. In other words, significant defects were found in approximately 50% of the management group as compared with approximately 13% in the pilot group. There are several reasons for the difference in findings in the two groups—namely, those in the pilot group are specially selected from a physical and health standpoint, a health maintenance programme for this group has existed for many years, and, lastly, as a group they are a great deal more "health conscious" than those not engaged in pilot activities.

Examination Findings

Year in and year out the significant conditions most often disclosed, about which we can take positive and definitive measures, are certain metabolic diseases, including obesity, cardiovascular conditions, and gastro-intestinal conditions including peptic ulcers and parasitic infestations.

Obesity is a common finding, and at times it is difficult to convince the individual that weight reduction is indicated. This is particularly true if no other abnormal findings are disclosed. To reduce, the executive must be properly motivated, be convinced of the potential ill effects of overweight and have the will-power to remain on a low-calorie diet.

In those cases where obesity is associated with diabetes or beginning hypertension little or no difficulty is encountered.

Other diseases that have been disclosed are thyroid conditions which are very obvious, and the employees in whom such a condition has been found have been very grateful for the information after corrective action has been taken. Diabetes mellitus is also a relatively common finding. In the original examination of the pilot and executive groups a postprandial urinalysis and blood sugar test is made. It is believed that this procedure is superior to the fasting urinalysis and blood sugar test in recognizing the early or latent diabetic. Applicants are not accepted as pilots if they have diabetes or if they show diabetic tendencies. Postprandial blood sugar tests are made on the pilot group after the age of 35 and on the management group after the age of 40. Prevention of diabetes in the older age group is closely related to the prevention of obesity, control of overweight being particularly important if there is a familial history of diabetes. The close observation of the occasional individual who has a slight glycosuria is also important, since it is believed that transient or alimentary glycosuria is often the precursor of diabetes. It is also a well-recognized fact that the well-controlled diabetic is less apt to develop the early degenerative changes that occur in the uncontrolled diabetic.

In cardiovascular diseases the potential hypertensive individual is seen fairly often, usually associated with obesity. Occasional cases of angina are also disclosed. Electrocardiograms are taken of the pilot and executive applicants so as to have a baseline electrocardiogram for future reference. In the routine physical examination, electrocardiograms are taken annually in the pilot group at 35 years of age and in the executive group at 40. Very infrequently cases of recent coronary thrombosis have been disclosed by the use of the electrocardiogram. Other abnormalities have been found, such as bundle-branch blocks, A-V blocks, etc. Although serious coronary disease may exist with a normal electrocardiogram, depression of RST and T waves in leads I and II and the chest leads may be suggestive of this condition.

In the routine periodic examination it is very rare that hidden asymptomatic malignancy is disclosed. However, those cases in which malignant or pre-cancerous growths can be seen may be picked up and corrective action taken. These include those with lesions involving the skin, nasopharynx, and oral cavity. Although sigmoidoscopy after the age of 45 would be desirable, because of certain limitations we have not been able to include this in our routine examinations.

Certain gastro-intestinal diseases, such as peptic ulcer, have been suspected in a number of cases from the history, and referral has led to corrective action with relief of symptoms. Closely associated with this is the occasional case of cholecystitis and cholelithiasis. Parasitic disease has been a relatively frequent finding consequent upon operation in the tropics.

Mental Stress and Strain

No paper on executive health is complete without some mention of the mental stress and strain which the average executive undergoes in carrying on his duties. In this connexion there is an excellent pamphlet by C. G. Roberts (1951) which states: "The ever-increasing intricacy of industrial techniques accompanied by an equally rapid advance in the complexity of social, governmental, commercial and industrial organizations seems now to be taxing the highest levels of man's mental ability to the full." He writes in considerable detail about the nature of mental skill and the responsibility as related to the executive, the cause of stress with its resultant breakdown in some executives, and the solution.

An important phase of the periodic examination is the conference or discussion with the examinee with a view to obtaining any history of previous or intercurrent diseases and informing him of any defects found during the examination. Of particular importance is a discussion relative to

any stress or strain which he is undergoing, informing him of the importance of the annual vacation, of leaving his work and worries in the office, of hobbies and outside interests, and, finally, of relaxation.

Conclusion

The employee is one of the most valuable assets in any company, and of the employees the management group or executives are particularly valuable because of their training, motivation, and high degree of technical and administrative skill. A health maintenance scheme for the executive is an essential part of any industrial medical programme. Its main object is the detection of disease in its incipency in order that corrective action may be taken so as to maintain him in good health and increase his longevity and efficiency.

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EFFECT OF PREDNISOLONE ON ANAEMIA ASSOCIATED WITH MACROGLOBULINAEMIA

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In spite of numerous case reports, the pathogenesis of macroglobulinaemia remains obscure. The diversity of clinical features in patients with this abnormality (Waldenström, 1952; Wilde and Hitzelberger, 1954; Long *et al.*, 1955; Ferriman and Anderson, 1956; Mackay *et al.*, 1956, 1957; Jim and Steinkamp, 1956; Martin and Close, 1957; Wanner and Siebenmann, 1957; Kappeler *et al.*, 1957) suggests that it does not itself constitute a disease entity, though it appears in many cases to be associated with neoplastic disease of reticulo-endothelial tissue. In most cases therapeutic measures have not affected the macroglobulinaemia and have failed to shed light on the nature of the anomaly. In view of this, we record the findings in an elderly woman with unexplained anaemia and macroglobulinaemia who has shown marked improvement, in respect both of her anaemia and of her macroglobulinaemia, while being treated with prednisolone.

Case Report

The patient, now aged 73, has attended the Royal Perth Hospital periodically for the past 15 years. Hospital records show that in 1943 and again in 1945 the haemoglobin value

of her blood varied between 8 and 9 g./100 ml. No further haematological investigations had been undertaken at those times.

In 1955 she was investigated for anaemia. The clinical history was not informative. She did not suffer from a bleeding tendency. Apart from pallor, clinical examination revealed no abnormality. The liver and spleen were not palpable and the lymph nodes were not enlarged. Anaemia

FIG. 1.—Paper electrophoresis of serum. A, Before prednisolone therapy (October, 1956). B, On cessation of prednisolone (June, 1957). The strips have been aligned with the albumin bands to the left.

was of normochromic normocytic type with a haemoglobin value varying between 7.1 and 8.6 g./100 ml. The erythrocyte sedimentation rate was elevated, lying in the range 74 to 155 mm. fall in one hour (Westergren). The total serum proteins as determined by the alkaline biuret reagent of Weichselbaum (1946) were 9.2 g./100 ml. Salt fractionation with 26.9% sodium sulphate solution gave values of 2 g./100 ml. for albumin and 7.2 g./100 ml. for globulin. Paper electrophoresis of serum (Flynn and de Mayo, 1951), using azocarmine B as a protein stain, showed a discrete band of abnormal protein in the γ -globulin region similar to that shown at A in Fig. 1. Bence Jones proteinuria was not present. Examination of sternal marrow and radiological examination of the skeleton failed to reveal any further abnormality, so that a provisional diagnosis of myelomatosis was not sustained. After unsuccessful therapy with a variety of haematinics the patient was treated with blood transfusions.

In 1956 an enlarged lymph node was noted in the left axilla. Further investigations showed that the abnormal serum protein was macroglobulin. It did not migrate from the point of insertion when electrophoresis was carried out in starch gel (Silberman, 1957). On examination in the ultracentrifuge* the serum was found to contain an abnormal component constituting 23% of the total protein (total protein 7.3 g./100 ml.), with a sedimentation constant of 15.3 S. There was also a small amount of a faster sedimenting protein (Fig. 2, A). In addition the serum gave a positive result with the Sia test, although this is not exclusive to macroglobulinaemia.

At this time the haemoglobin value of the blood was 9.1 g./100 ml. and the haematocrit 29%. The reticulocyte

FIG. 2.—Ultracentrifuge pattern of serum. A, Before prednisolone therapy (October, 1956). B, On cessation of prednisolone (June, 1957). Arrows indicate the major macroglobulin component.

*Spinco model-E ultracentrifuge; rotor An-A; centrifugal force, number $\times$ gravity = 182,000; serum dilution of 1+4 in 0.2 M NaCl solution; pH = 7.0; temperature of rotor, 20° C.