

Current Practice

RESPIRATORY TRACT DISEASE

Influenza and its Complications—I

C. H. STUART-HARRIS,* C.B.E., M.D., F.R.C.P.

The discovery of the influenza and other respiratory viruses which are responsible for the influenza syndrome has done little so far to assist the practitioner in his task of treating those who are ill. It may be comforting to the patient to know that his illness is only one of thousands due to either influenza virus A or B, but it will not alter his treatment. It may be of some value to the practitioner to know that influenza viruses rather than others with a less lethal propensity are circulating in the community. However, a knowledge of the patient and of his previous health or chronic disease is of even greater importance, because complications of either bacterial or virus origin are much more likely in persons with chronic chest or heart disease than in those with previous good health. The family doctor, who alone has the knowledge of the health record of both adults and children in any particular family, thus has an important asset in assessing the probable course of events when this family joins battle with the influenza virus. These articles will attempt to deal primarily with the problem of infection by the latter virus and will mention other virus infections resembling influenza only when indicated.

Uncomplicated Case

After a sudden onset of malaise and shiveriness, the patient with influenza virus infection experiences a rise in temperature and develops a headache and a dry cough. Some blocking of the nose and slight soreness of the throat may point at this stage to an upper respiratory infection, but the degree of illness, the development of anorexia or even vomiting, and the occurrence of limb pains or backache suggest a more general illness. There is little to find on examination beyond a slight facial flush, slight reddening of the conjunctiva, and an injected pharynx without exudate. The fever will last for from two to five days in the average case, and, though cough continues and may even become slightly productive, the other symptoms usually subside rapidly when the temperature is normal. The clinical picture in children is particularly difficult to recognize, but fever and soreness of the throat are usual in those of school age. Muscular pains and headaches are less frequent than in adults. In babies the infection may be no more than a streaming cold.

There is little doubt that the clinician tends to label as influenza the typical febrile case, but many studies, such as, for instance, those of the Medical Research Council Respiratory Virus Working Party,¹ have shown that influenza virus infection may be diagnosed as a common or feverish cold, a sore throat, pharyngitis, tracheitis, or as a case of croup. The family pattern of infection may vary, therefore, in its clinical form in different members, but some at least should exhibit the "typical" picture. A feature which may help in the differentiation of infections with influenza from other virus illnesses is

that influenza virus causes the rapid involvement of one after another member of the family, who may all, therefore, become ill during the same week.

Convalescence, though uneventful in the child and young adult, may be delayed in the middle-aged or elderly by fatigue, by continued coughing, or by tachycardia on slight exertion. It must not be forgotten that the nasopharyngeal epithelium, which undergoes necrosis during the acute stage of illness, is repaired by growth from the basal epithelium, and this process requires several days. The familiar state of post-influenza depression undoubtedly exists, but it is not known whether it is other than a state of convalescent debility in those prone to depression. The opposite stage of excitement or of delusions sometimes occurs during the acute phase of illness, and will be referred to later. During convalescence the respiratory tract remains subject to a risk of bacterial secondary infection, and this may be so even if no abnormal signs have been detected in the chest at an earlier stage. In the one-third of uncomplicated cases of influenza in which rhonchi or patches of rales have been detected during the acute stage, cough and minor expectoration continue during convalescence. Although bronchial biopsies have shown lesions of the epithelium in apparently uncomplicated cases of influenza it is unlikely that these are other than focal. Thus the separation of complicated from uncomplicated cases is somewhat arbitrary, as is bound to be the case in an infection due to a virus with potentiality of attack upon any or every part of the lining respiratory epithelium.

Complicated Cases of Influenza

Chest Complications

Complications of the lower respiratory tract induced by influenza virus and often also by bacterial infection outnumber all others. Nevertheless, there is a considerable variety of illnesses in complicated cases, which range from those with a simple tracheitis or laryngo-tracheo-bronchitis to cases of acute bronchitis, bronchiolitis, or pneumonia, which may be rapidly fatal in those with previous chest disease or in the aged.

Tracheitis and Obstructive Laryngo-tracheitis

Productive cough, substernal soreness, and a hoarse voice indicate that the viral inflammation has affected the mucosa of the larynx and upper trachea. In adults such illnesses are not serious. Occasionally in young schoolchildren an obstructive condition develops in which there is noisy stridulous breathing and cyanosis recalling the croup of infants. Unless the thick mucus causing the obstruction is removed as by a tracheostomy this condition may be life-threatening. The obstructive laryngo-tracheitis of infants with croup is due not so often to

* Professor of Medicine, University of Sheffield.

influenza as to one of the para-influenza viruses. These viruses cause lower respiratory tract illness in children and less often infect adults in whom mild upper respiratory symptoms ensue. Bacteria such as *Haemophilus influenzae* and staphylococci can cause secondary infection both of para-influenzal and of influenzal laryngo-tracheitis, but are not constant concomitants.

Acute Bronchitis and Bronchiolitis

The patient with acute bronchitis develops wheezing, dyspnoea, and loud rhonchi in the chest during the febrile stage of influenza. Such a condition is commoner in those with previous chest disease such as asthma or chronic bronchitis than in previously healthy persons. Bronchiolitis is a complication of a more serious character in which fever continues beyond the fourth day, and there is dyspnoea accompanied by pellets of mucoid or mucopurulent sputum. Bubbling fine rales and areas of reduced breath sounds are common at the bases in such patients, but the chest film is either clear or shows only minor miliary mottling. Such cases can occur in previously healthy adults but are commoner in those with rheumatic valvular heart disease, ischaemic heart disease, chronic bronchitis, and bronchiectasis. The most constant bacterial accompaniment of the influenza virus in the sputum is *H. influenzae*, though pneumococci may also occur. Usually such cases of bronchiolitis which fall short of pneumonia recover satisfactorily after a week or less of illness, but in those with serious chronic chest or heart disease the illness may be much graver and may be fatal. Probably a significant number of the deaths from influenza in aged persons are due to this form of chest complication.

Pneumonia Complicating Influenza

Influenzal pneumonia is usually regarded as a complication which begins soon after the onset of influenza, and such cases of "synchronous" pneumonia certainly include the most seriously ill patients. The other main variety is essentially "post-influenzal" pneumonia, which begins a day or two to a month or more after the end of the pyrexial attack. It is possible to dispose of this latter variety briefly. There is sharp pleuritic pain and dyspnoea at the onset of the pneumonic process. Cough, which usually dates from the influenzal illness, becomes worse and is productive of viscid mucopurulent or even rusty sputum. The clinical picture hardly differs from that of non-influenzal pneumonia save in the occurrence of an undue degree of dyspnoea and illness; the physical signs and radiograph of the chest are those of a dense lobar or scattered bronchopneumonic consolidation. Such post-influenzal pneumonia is more often due to the pneumococcus than to other organisms, and a normal response to treatment with antibiotics can be expected.

Influenzal pneumonia of the synchronous variety is usually signalled by increasing dyspnoea soon after the onset of influenza and by a productive cough with viscid blood-streaked or frankly bloody sputum. Pleuritic pain is extremely variable, and, though pain of some degree is usual, the occurrence is much less definite than in non-influenzal pneumonia. In some cases tachypnoea is very striking, the respiratory rate being 40 to 60 per minute, and in such patients tachycardia of 140 or

more is usual and out of proportion to the moderate elevation of the temperature—102–103° F. (38.9–39.4° C.). The patient with influenzal pneumonia is restless, anxious, and cyanosed; he coughs frequently and often complains of headache and substernal pain. Sleep is disturbed and there may be delirium. In some cases sputum may not be raised in spite of the numerous fine and coarse rales in the chest.

Physical signs in the chest consist largely of abundant rales with areas of reduced breath sounds, or sometimes of definite bronchial breathing. Percussion dullness may be well-defined or indefinite, and x-ray films usually show a mottled picture of bronchopneumonic consolidation, less extensive than the auscultatory signs or degree of illness suggest. There are few abnormal signs in the cardiovascular system, but the blood-pressure may be lower than normal, thus suggesting peripheral circulatory collapse. Sometimes pericardial or pleuropericardial friction rubs are heard.

When the prognosis is favourable, as in pneumococcal cases, treatment by antibiotics brings about a gradual reduction of fever and tachycardia; tachypnoea diminishes and the signs in the chest lessen. On the other hand, and particularly in cases where *Staphylococcus pyogenes* infection co-exists with influenza virus as a cause of the pneumonia, the patient may progress to a state of grave circulatory collapse with abundant bubbling rales in the chest and cough which is ineffective in raising sputum. Unless an airway can be obtained by the aspiration of tracheal secretions, cyanosis due to anoxia of the arterial blood deepens and may not be relieved by administration of oxygen. This grave picture of influenza-staphylococcal pneumonia is fortunately uncommon, but its recognition at an early stage is extremely important because effective chemotherapy is required urgently. The staphylococci concerned may be resistant or sensitive to penicillin, the exact findings varying in different localities. Failure to achieve a satisfactory therapeutic response may be due to antibiotic resistance, to circulatory failure, or to the overwhelming toxic character of the infection in someone with existing chronic lung or heart disease. Unfortunately, rapidly fatal staphylococcal pneumonia still occurs in previously healthy persons as well as in those with chronic diseases. Indeed during the first Asian virus epidemic of 1957 cases of influenzal pneumonia due to virus alone or to virus plus staphylococci or pneumococci occurred as often in previously healthy as in chronically ill persons. Furthermore, a significant number of the lungs from fatal cases of Asian influenzal pneumonia in 1957 were found to contain no pathogenic organisms at necropsy, so that a true influenza virus pneumonia exists which may be fatal. This latter condition appears to be relatively more common in those with valvular heart disease than in previously well persons.

In patients who recover from the acute illness of severe influenzal pneumonia, sequelae such as pneumothorax, lung abscess, or empyema are relatively common. In any case there is no rapid resolution of the pneumonic process, so that the patient remains ill and prostrated with occasional spikes of temperature for two or more weeks. Bronchiectasis appears to be a late sequel of surviving cases of staphylococcal pneumonia.

(This article will be concluded next week with a discussion of the non-respiratory complications and the treatment of influenza.)