The return of the blood cell content to normal after splenectomy may be best explained by assuming hypersplenism, and not marrow tuberculosis, to be the cause of the haemocytopenias; hypersplenism may be excluded only if the blood count fails to respond to splenectomy. Although Ball *et al.* (1951) found marrow aplasia by sternal puncture in one of their cases, we obtained a normal marrow picture in our Case 3 with leucopenia, and the marrow was hyperplastic in the thrombocytopenic case of Gouley *et al.* (1949). The last finding is usual in cases of hypersplenism. Marrow tuberculosis is not always associated with a leucopenia, and in Case 1 there was in fact a leukaemoid reaction without anaemia.

The association of leukaemia and tuberculosis is rare, but a leukaemoid blood reaction may occur in the presence of tuberculosis. If the infection causes splenomegaly the simulation of true leukaemia may be perfect, the correct diagnosis being obtained only from a biopsy of the liver or spleen. When the tuberculosis is apparently confined to the abdomen its presence may not even be considered. Similarly, patients suffering from hepato-splenic tuberculosis and polycythaemia vera commonly present with no indication of abdominal tuberculosis. The polycythaemia in such cases was attributed to the splenic tuberculosis by Fitzpatrick and Schwartz (1949) when they reviewed the 36 recorded cases. Splenectomy has not been found to reduce the red blood cell count in these patients, and in Guild and Robson's (1950) case both irradiation of the spleen and its subsequent removal increased the severity of the polycythaemia. The evidence available does not confirm a causal relationship between splenic tuberculosis and polycythaemia.

Atypical abdominal tuberculosis has very rarely been treated with the correct diagnosis previously made. Splenectomy was advised by Winternitz (1912) in order to prevent a spread of the infection from the spleen, but it is improbable that the spleen is the most important focus of the disease, and, in fact, the tuberculosis may progress despite this operation (Frank, 1939). Splenectomy may become necessary, however, to relieve abdominal pressure symptoms or to correct a haemocytopenia.

Streptomycin has been used only twice in the treatment of hepatic or hepato-splenic tuberculosis (Guild and Robson, 1950; Melville, 1951). The results obtained were satisfactory, and at present it seems to be the treatment of choice for this condition.

Summary

Four cases of atypical abdominal tuberculosis are reported. Post-mortem examinations were made in three cases, all of which demonstrated tuberculosis of abdominal lymph nodes, liver, and spleen. Two of these cases also had miliary tuberculosis of the bone marrow.

One patient showed a leukaemoid reaction; another appeared to have suffered from polycythaemia; a third, whose illness was rapidly fatal, had a profound neutropenia and anaemia. The last case presented with thrombocytopenia. The relation of these blood disorders to the abdominal tuberculosis is considered.

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X-RAY APPEARANCES IN ASTHMA

A STUDY OF 200 CASES

BY

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The object of this investigation was to review the x-ray appearances in a series of patients suffering from asthma, together with the clinical findings in the same subjects, in order to find out if x-ray appearances could be correlated with clinical types, and to see in what proportion of cases complications occur.

Previous reviews of radiological findings in asthma—for example, Lapage (1922), Manges and Hawley (1927), Bray (1930)—are remarkable for the wide variety of terms used and for the comparatively few films which were regarded as normal. Little effort was apparently made to recognize emphysema, which we know clinically to be such an important and common complication, and segmental collapse was either not seen or not recognized at all.

Present Series

This series consists of 200 cases of bronchial asthma investigated at an allergy clinic, unselected in any way except that they were divided into two groups, the first consisting of 100 children aged from 14 months to 12 years, the second of 100 adults from 13 to 65 years. Such a division was found convenient, not because I consider that there is any fundamental difference between asthma in childhood and asthma in adult life, but because it is easier to compare films of similar-sized chests, and also because obviously the average duration of the disease will be longer in the older age group.

Table I shows the distribution between the sexes, the family history of allergy, and the average duration of the disease. There is little need to comment on these figures.

TABLE I.—Sex Incidence, Family History, and Average Duration of Disease

	Children 1-12 Years	Adults 13-65 Years
Total No. of cases	100	100
Males	66	50
Females	34	50
Positive family history of allergy	66	58
Negative " " " "	27	26
Family history doubtful or not available	7	16
Average duration of disease	3 yrs. 10 mths.	11 yrs. 10 mths.

which show the usual preponderance of males over females among the children, and the large proportion with a positive family history of allergy (including asthma, hay-fever, chronic urticaria or dermatoses of allergic type, and migraine). They differ in no important respect from the many other similar series which have been published.

Aetiology

With regard to aetiology we find ourselves on very controversial ground in the present state of our knowledge. The classification adopted is one which is thought likely to be acceptable to a majority of students of asthma. While it is true that often more than one aetiological factor is operative, most cases fall into the broad groups set out in Table II: (a) "extrinsic" allergy—that is, hypersensitivity.

TABLE II.—Aetiology

	Children	Adults
(a) Extrinsic allergy	42	38
(b) Intrinsic allergy	15	17
(c) Combined	40	31
(d) Cause not definitely assigned	3	14

to specific inhaled or ingested allergens, giving rise to excessive antigen-antibody reactions; (b) "intrinsic" allergy, or hypersensitivity to invading micro-organisms or their products in the respiratory tract (this type is sometimes called infective asthma); (c) a combination of extrinsic and intrinsic allergy; (d) a group of cases in which an aetiological diagnosis was not made. Psychogenic factors and peripheral irritation are recognized as being important, but are regarded as being subsidiary or reinforcing. The relationship to endocrine activity is still too obscure to be useful from a classification point of view.

The diagnosis of infective asthma was made on clinical grounds: history, physical examination, pus in sputum or nasal discharge; and specialized rhinological examination. Laboratory help in the form of sputum examinations, blood counts, and sedimentation rates was sought in those cases where it was considered necessary. No single test was found to be reliable enough to make a diagnosis of bacterial allergy without support. The sedimentation rate, though increased when infection is active, gives no help in those cases of asthma caused by infrequent acute respiratory infections, where investigation is carried out in the free interval. Blood eosinophil counts were very variable, sometimes rising to 25% or more, and did not seem to bear any direct relation to the type of case under investigation.

Sinus Radiographs

Sinus radiographs showed, rather unexpectedly, a higher proportion of abnormalities in the children (62%) than in the adults (54%) (Table III). These figures compare closely

TABLE III.—Abnormalities Shown by Sinus Radiography

	Children	Adults
Minor changes (slight mucosal thickening, etc.)	19	18
Marked changes (complete opacity, gross mucosal thickening, etc.)	43	36
No abnormality	38	46

with those of Unger (1945), who analyses nine reports of the incidence of sinus disease in asthma, giving an average of 60.4%, with a 26–82% variation.

It appears to be true that many "normal"—that is, symptom-free—individuals show opacities or mucosal thickening on sinus radiographs; Kern and Schenck (1929) found as many as 72% in 50 non-asthmatic controls. If we are to accept the work of Grove and Cooke (1933), these changes, which only in acute exacerbations become suppurative, are always caused by an infection which, in certain subjects, could at least theoretically lead to bacterial sensitization with resultant asthma. There is still, however, considerable lack of uniformity of opinion on the significance of these findings, and until there is more certainty I have tended to adopt a conservative attitude, and an abnormal sinus radio-

graph without other clinical evidence of infection has not been deemed sufficient to place the case in the infective groups.

Chest Radiographs

From the point of view of radiological appearances the cases seemed to fall naturally into the groups shown in Tables IV and V. A large number appeared to be within normal limits; others were normal apart from varying degrees of emphysema; another group, including some of the emphysematous ones, had markedly increased hilar shadows, with or without calcification; while a much smaller group had other important abnormalities.

Minor abnormalities, such as congenital malformations of the ribs, small diaphragmatic adhesions, small calcified

TABLE IV.—Chest Radiographs in 100 Children

	No. of Cases	Infective	Non-infective	Average Duration
No abnormality	57	24	33	2 yrs. 11 mths.
Emphysema only	22	16	6	5 yrs. 9 mths.
Emphysema plus increased hilar shadows	6	5	1	
Increased hilar shadows	11	7	4	
Other important abnormality (4 cases):				
Segmental collapse	4	3	1	

TABLE V.—Chest Radiographs in 100 Adults

	No. of Cases	Infective	Non-infective	Average Duration
No abnormality	30	9	21	9 yrs. 6 mths.
Emphysema only	35	14	21	12 yrs. 1 mth.
Emphysema plus increased hilar shadows	11	8	3	
Increased hilar shadows	14	10	4	
Other important abnormality (10 cases):				
Segmental collapse	4	2	2	
Pulmonary tuberculosis	3	3	0	
Miscellaneous	3	3	0	

lesions in the lung fields, and so on, were not taken into account, nor were the enlarged heart shadows of the occasional adult with coincidental hypertension.

For the purpose of comparing the x-ray findings with clinical types it was found most convenient to divide the latter quite simply into infective and non-infective cases. The infective group consisted of those with "intrinsic" allergy (b) and the "combined" type (c) in Table II; the non-infective comprised the other two types, (a) and (d) in Table II.

Emphysema

It is important, from the point of view of prognosis, to distinguish between irreversible chronic "hypertrophic" pulmonary emphysema and pulmonary distension due to an asthmatic attack. In order to do this it may be necessary to repeat the physical and x-ray examination, and the measurement of vital capacity, at a time when the patient is "at his best"; this has been done in some cases in the series under review. Considerable help in the diagnosis can be obtained by taking films in full inspiration and full expiration and comparing the difference in translucency, density of the broncho-vascular markings, height of the diaphragm, etc., in the two films. Comparison between a film taken in expiration with that of a normal control of similar age and build has also been of assistance in some cases. In spite of these devices, however, there is probably a margin of error, especially in the case of the children, where scope for examination is of necessity somewhat limited.

Tables IV and V show that emphysema, as we would expect, was found in a greater number of adults than children (46 to 28). In both children and adults the average

FIG. 1.

FIG. 2.

FIG. 1.—Segmental collapse, middle lobe, in girl aged 11. FIG. 2.—Segmental collapse, middle lobe, in man aged 36.

duration of the disease was longer in those with emphysema. In the adults the distribution of emphysema between infective and non-infective cases was about equal (22 to 24), but in the children the infective type largely predominated (21 to 7). This might be interpreted as indicating either that infective asthma is more severe in children or that the chronic cough, which many of the infective cases have, produces that added strain on the alveolar walls which determines the onset of emphysema. In the case of adults, the element of chronicity alone seems to be of importance.

Increased Hilar Shadows

It is assumed that, for all practical purposes, these indicate enlarged tracheo-bronchial glands, which again argues past or present lung infection. Some of these were undoubtedly due to a primary tuberculous infection in early childhood, others to acute or chronic non-tuberculous bronchial or pulmonary infection. It is therefore not surprising to find that in this group the infective cases largely predominate (30 infective to 12 non-infective in the whole series).

Bronchiectasis

This has not been taken into account here. Without doing routine bronchograms it would obviously be impossible to say what number had developed this complication, and bronchograms have been done in only a small number of cases. Of the whole 200, including those with phthisis, only nine had any haemoptysis, and this was usually slight, while clubbing of the fingers was seen in only two. Bullen (1933) found bronchiectasis in 7.75% of asthmatics, and Chapman and Hoskins (1941) state that when it occurs it is usually of the cylindrical type. Only one of our bronchograms showed definite saccular bronchiectasis, and my impression is that permanent bronchiectasis of clinical significance is not a common complication of asthma.

"Thymic" Asthma

Pressure on the trachea by an enlarged thymus is sometimes given as a cause of asthma—like dyspnoea in infants and young children. A lookout was kept for any radiological evidence of enlarged thymus, but it did not appear. It must be uncommon, and hardly a force to be reckoned with from the point of view of differential diagnosis.

Segmental Collapse

This was seen in eight cases (four children and four adults). Among the children it affected the middle lobe in three cases and the left lower lobe in one case. The latter took over a month to re-expand, whereas in

the others re-expansion was rapid. In one case there was complete disappearance of the typical wedge-shaped shadow in a film taken 24 hours later (see Fig. 1). Of the four adults with segmental collapse the middle lobe was affected in three cases, and the lower part of the left upper lobe in the other. In all cases re-expansion was rapid (see Fig. 2).

It should be emphasized that all these patients were investigated as out-patients, and that none was acutely ill at the time. Except for the child with left lower lobe collapse, I do not think that it would have been possible to diagnose the condition without radiographs. The severity of the patient's asthma seemed to bear no relation to the presence of collapse. One man, who had been gravely ill with acute asthma as an in-patient, had a clear x-ray film when in hospital. When referred for investigation 10 days later as an out-patient, much improved, another x-ray film showed an area of collapse, which completely disappeared within the next week, without any noticeable change in his physical condition.

It seems probable that collapse, due presumably to the blocking of a smaller or larger tube by a mucous plug, is commoner in asthma than is generally realized, though all degrees of it, up to massive collapse of a whole lung, have been described by various writers—for example, Clarke (1930), Maxwell (1937), Friedman and Molony (1939).

Pulmonary Tuberculosis

There has been much speculation in the past about a possible relationship between pulmonary tuberculosis and asthma, but most of the available evidence suggests that the former occurs no more frequently in asthmatics than in the population as a whole. In the series under review no cases of active pulmonary tuberculosis were found among the children, but three adults, aged 29, 35, and 65 years, had the disease. All of these were asthmatics of long standing; two had positive family histories of allergy, and all had tubercle bacilli in the sputa. The incidence of 1.5% of phthisis in this series is probably higher than that in the total population, but the numbers involved are too small for any conclusion to be drawn from this.

Miscellaneous Abnormalities

Three cases come under this heading. The first was a woman of 60, with a lifelong history of asthma, whose radiograph showed part of her stomach to be above the

FIG. 3.

FIG. 4.

FIG. 3.—Thoracic stomach. Woman aged 60. Lateral film. FIG. 4.—Dense opacity, left lower lobe. One of several opacities recurring in different situations.

diaphragm. There was an ulcer on this portion, from which she later had a large haematemesis. This condition had, of course, no relation to her asthma, but the case serves to illustrate how important coincidental conditions sometimes come to light in the course of a routine investigation (see Fig. 3).

The other two cases, both young adults with incessant asthma since infancy, showed recurrent evanescent shadows in different situations on their chest radiographs during a follow-up period of over four years. One patient subsequently twice developed pulmonary abscesses, which she spontaneously evacuated, and material sucked from the infected area through a bronchoscope grew a *Streptococcus viridans*. The other patient also at one time developed a small abscess cavity with a fluid level, which quickly disappeared spontaneously. In neither case did the blood eosinophils ever exceed 6% (see Fig. 4).

Transitory opacities seen in the chest radiographs of asthmatics, such as occurred in the last two cases, have been described by many authors—for example, Peshkin (1927) and Sédillot (1934). There has been considerable speculation about their nature, particularly whether they are caused by localized areas of infection or by eosinophilic infiltration. The character of these two cases suggests that infection is the cause in some of them.

Summary and Conclusions

A review of the radiological findings in 200 cases of asthma, 100 children and 100 adults, is presented, and an attempt made to correlate the x-ray appearances with clinical findings. The series consists of typical cases of asthma, seen as out-patients only.

Sinus radiographs show changes in over half the cases, there being a higher proportion with marked abnormality in the children than in the adults.

Chest radiographs, disregarding minor abnormalities, fall into five groups: normal, emphysema, emphysema and increased hilar shadows, increased hilar shadows, and other important abnormality. The last group includes cases of pulmonary tuberculosis, segmental collapse, and recurrent transient shadows believed to be due to localized areas of infection.

In attempting to distinguish between irreversible emphysema and pulmonary distension due to the bronchiolar obstruction of asthma, the value of radiographs taken in full inspiration and full expiration, and of comparing one taken in expiration with a normal control, is stressed.

Emphysema is the commonest complication, and is judged to be present in 28 children and 46 adults. The evidence suggests that both chronicity and infection are important factors in its development.

Enlarged hilar shadows are present in a higher proportion of the infective than of the non-infective cases. Segmental collapse, with subsequent satisfactory re-expansion, is present in 4%, and is seen in both infective and non-infective types. Active pulmonary tuberculosis is found in 1.5%.

In conclusion it should be pointed out that the chest radiograph in uncomplicated asthma is normal, but that a great deal of help can be obtained from radiography in the diagnosis of complications, in the elucidation of the aetiology, and in the discovery of coincidental conditions.

I should like to express my thanks to Drs. C. N. Pulvertaft and R. A. Ashwin, consultant radiologists to the County and City General Hospitals, York, whose co-operation and assistance with the radiological diagnosis have made this investigation possible.

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THE TREATMENT OF RECENT TRANSCERVICAL FRACTURES OF FEMUR

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Much has been written on this subject during the past 20 years, and our only excuse for adding to the literature is that we have evolved a simple method of treating these injuries, the results of which seem to compare favourably with those of any other method so far described.

It is now generally agreed that the treatment of choice in transcervical fractures of the femur, particularly those of the adduction type, is some form of nailing operation, with or without a bone graft according to the nature and age of the fracture; and our treatment is based on the internal fixation operation originally described by Smith-Petersen *et al.* in 1931. During the past four years rather more than 100 such operations have been carried out, and we wish to describe the management and the results in a consecutive series of 100 cases in which the end-result is clear. The number of patients involved was 98, two of them having the second hip nailed a few months after the first. The great majority of them were women, the injury being much less common in men.

Selection and Management of Cases

Abduction fractures with impaction are excluded from this series, it being unnecessary to operate on most of them. Apart from these, all the cases admitted with adduction fractures of the femoral neck have been included, and were subjected to operation unless they were moribund or were suffering from advanced senile mental changes. Indeed, several cases from a neighbouring mental hospital have been successfully treated.

Unlike Bankart (1942), who advocated that few patients over the age of 80 should be operated upon, we have not made age alone a bar to operation. The average age in this series was 73, and the range extended from 44 to 93, 60% of them being in the age group 71-85.

On admission all patients are subjected to a full clinical examination and radiographs are taken of the injured hip to determine the nature of the fracture. The patient is then put to bed and a simple form of skin traction is applied to the injured leg by means of extension strapping applied below the knee. The usual weight employed is 9 lb. (4 kg.), which is connected to the strapping by means of a cord passing over a pulley attached to the lower bed-rail. This simple form of traction does not immobilize the