Another interesting case of tuberculosis with unusual features may be quoted.

Case 16.—A man aged 46 had had shadowing in the right upper lobe since 1947, with local extension in 1949. This was regarded as probably tuberculosis in spite of repeatedly negative sputum examinations. In 1952 a further reactivation in the right upper lobe occurred, and he also developed severe bronchitis followed by a left spontaneous pneumothorax. This proved difficult to re-expand. There were numerous scattered opacities throughout both lung fields, particularly in the upper zones. It was decided to do a lung biopsy and at the same time identify an air leak. On thoracotomy (January 1, 1957) a large leak and small emphysematous bullae were present in the left upper lobe and apex of the left lower lobe. Both lobes were fibrotic, with numerous hard calcified nodules scattered throughout. Microscopical examination of a biopsy specimen showed lesions strongly suggestive of calcifying chronic miliary tuberculosis. He was put on antituberculous drugs for the first time.

From these illustrative cases it is apparent that much can be expected in the way of providing a definitive diagnosis and a rational basis for therapy, and even where therapy is not possible a radical change in prognostic outlook may result.

As regards the academic value of such a procedure there can be no question that much hitherto inaccessible information may be derived from it, since it enables the pathological histology of various disease processes to be studied during their active phases. It is interesting to note that one observer (Close, 1955) did not hesitate to do two successive biopsies on the same patient in order to observe the effect of treatment. It appears to us that there is a field for a great increase in the use of this valuable procedure, from all points of view, and it is also possible that it should be considered earlier as a diagnostic measure, since it could be carried out in a fitter patient and might be even better tolerated, thus leading to the earlier institution of treatment.

Summary

A series of 26 cases of lung biopsies by thoracotomy is presented. Complications were minimal.

The importance of securing an adequate specimen, including an affected mediastinal lymph node, is emphasized.

The advantages of open lung biopsy over other biopsy procedures are stressed.

The method appeared to be of great value in establishing a histological diagnosis in diffuse pulmonary lesions and rational treatment for various conditions. The histological diagnosis was obtained in 24 out of 26 cases.

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ABO BLOOD GROUPS AND SECRETOR CHARACTER IN RHEUMATIC CARDITIS

BY

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Glynn *et al.* (1956) emphasized that there must be important host factors in rheumatic fever because, though the disease usually follows a streptococcal throat infection, only a small proportion of cases of streptococcal tonsillitis do, in fact, develop the complication. They pointed out that one important variation in the environment of the streptococcus depends on the blood-group secretor status of the host, and this idea led them to investigate the secretor character in patients with rheumatic fever. In 460 schoolchildren, who were used as controls, they estimated an incidence of 22.6% non-secretors of ABH from the results of an anti-Le^a serum and saliva test (most individuals who are non-secretors of ABH secrete large amounts of Le^a), whereas among 450 children with rheumatic fever the estimated non-secretor figure was 28.7% and the difference was significant at the 5% level.

The same authors have recently published further data (Glynn *et al.*, 1959). Using the same salivary anti-Le^a technique, they found a Le^a-positive incidence of 21.2% in 1,129 healthy schoolchildren as compared with 27.5% in 611 cases of rheumatic fever (significant at the 1% level). Similar results were obtained with *Ulex* extract, which tests directly for secretor status by showing the presence or absence of H-substance, this being present in the saliva and other body fluids in secretors of any of the ABO blood-groups. By the *Ulex* method, Glynn *et al.* (1959) found that 22.9% of 669 healthy schoolchildren were non-secretors and the comparable figure in 553 rheumatic fever cases was 28.9% (significant at the 2% level).

Glynn *et al.* (1956) gave details of the ABO blood-group distribution among patients and controls, and,

though not commented on, the former appear to be rather high in B and AB at the expense of group O. In their second paper they did not report the ABO blood groups of their patients, but they have kindly sent us their latest figures and allowed us to use them in our analyses. Again there is no significant difference between patients and controls, but, taken at their face value, their disease group still appears to be rather low in group O.

Material and Methods

We became interested in the problem after reading the paper by Glynn *et al.* (1956). Since then we have tested 228 Merseyside patients known to be suffering from established mitral stenosis, the purpose being to find out whether a high non-secretor rate was also present in this post-rheumatic condition. For the same purpose we also collected a series of 35 children who had been affected with rheumatic carditis.

Our control for the blood-group data is the group of individuals in Table I of Clarke *et al.* (1955) plus those in Table III of Clarke *et al.* (1959). The control for the secretor comparisons is from Table I of Clarke *et al.* (1959). This has been used rather than the data in Table III of the same paper, as the numbers are larger and the secretor character is independent of the ABO blood groups.

The salivary secretor character was assessed by means of the agglutination-inhibition technique, and for patients of blood group O we used an extract of *Ulex* (for details see Clarke *et al.*, 1956). The ABO blood-grouping had usually been done by the thoracic surgical unit at Broadgreen Hospital, Liverpool, from which most of the cases of mitral stenosis were obtained, and sometimes this finding was used. Most of the groupings were, however, done by us using precipitin tubes and anti-A and anti-B sera. In a certain number we also Lewis-grouped the red cells.

Results

Table I gives our basic data, the cases being subdivided to show secretor status, ABO blood group, and sex. We also differentiated between those who gave a previous history of rheumatic fever or chorea and those whose case-notes contained no record of rheumatic fever. All the 35 children in whom the carditis was or had been active are included with the mitral stenosis patients who are known to have a history of rheumatic fever.

There is no heterogeneity in the ABO blood group and secretor/non-secretor frequencies, either between

males and females with a history of rheumatic fever, or between males and females with no history of rheumatic fever. There is also no heterogeneity between these two disease groups with the sexes combined in respect of blood-group and secretor frequencies. Consequently in the final comparisons with controls (Tables II and III), the sexes and the disease groups have been combined.

ABO Blood Groups.—Table II shows the numbers and percentages of the different blood groups in our disease and control series. The Taplow rheumatic fever

TABLE II.—Numbers and Percentages of the Different Blood Groups in Disease and Control Series

Blood Group	Liverpool Data				Taplow Data			
	Rheumatic Carditis		Control		Rheumatic Fever		Control	
	No.	%	No.	%	No.	%	No.	%
O	105	39.9	7,842	48.8	255	41.9	6,775	45.0
A	116	44.1	6,294	39.2	256	42.0	6,456	42.9
B	36	13.7	1,519	9.5	64	10.5	1,311	8.7
AB	6	2.3	402	2.5	34	5.6	504	3.4
Total	263	100.0	16,057	100.0	609	100.0	15,046	100.0

Statistical Analysis

	Relative Incidence of Disease in Not-O People	d. of f. = 1	P	95% Fiducial Limits
Liverpool	1.44	8.15	<0.01	
Taplow	1.14	2.36	>0.1	
Combined	1.22	8.15	<0.01	1.40-1.06
Heterogeneity	—	2.36	>0.1	

TABLE III.—Numbers and Percentages of Non-secretors in Disease and Control Series

Non-sec.	Liverpool Data				Taplow Data			
	263 Rheumatic Carditis		851 Controls		553 Rheumatic Fever		669 Controls	
	No.	%	No.	%	No.	%	No.	%
Non-sec.	73	27.8	207	24.3	160	28.9	153	22.9

Statistical Analysis

	Relative Incidence of Disease in Non-secretors	d. of f. = 1	P	95% Fiducial Limits
Liverpool	1.20	1.26	>0.2	
Taplow	1.37	5.82	<0.02	
Combined	1.30	6.63	<0.02	1.58-1.06
Heterogeneity	—	0.45	>0.3	

TABLE I.—Basic Data of a Series of 263 Cases of Rheumatic Carditis

Blood Group	Total Series		History of Rheumatic Fever or Chorea		No Record of Rheumatic Fever	
	Sec.	Non-sec.	Sec.	Non-sec.	Sec.	Non-sec.
Males (64)						
O	20	8	14	2	6	6
A	18	6	10	2	8	4
B	5	4	3	3	2	1
AB	3	—	2	—	1	—
	46	18	29	7	17	11
Females (199)						
O	58	19	26	9	32	10
A	62	30	25	15	37	15
B	21	6	10	1	11	5
AB	3	—	1	—	2	—
	144	55	62	25	82	30
Total	190	73	91	32	99	41

series in the same table is from a personal communication from Dr. L. E. Glynn, and its control is from Table IV of Glynn *et al.* (1956). It will be seen that there is the same trend in the result of the two investigations—namely, a lower percentage of group O in the disease series than in the controls. We have therefore analysed the data comparing the incidence of the disease in group O people and those not group O, using the method of Woolf (1955). The statistical analysis shows that on combining the results from the two investigations there is no heterogeneity between them and there is a significantly increased incidence of the disease in those who are not group O.

Secretor Character.—Table III shows the numbers and the percentages of non-secretors in the disease and control series from Liverpool and Taplow. The Taplow rheumatic fever series and its control consist of the ulex-

tested individuals from Table IV of Glynn *et al.* (1959). The Liverpool series is not significantly different from its control with regard to the incidence of non-secretors but does show a non-significant excess of them. The statistical analysis shows that on combining the results from the two investigations there is no heterogeneity between them, and there is a significantly increased incidence of the disease in those who are non-secretors.

Discussion

It will be seen that in the Liverpool results there is a significant association between the disease and the ABO blood groups, whereas the excess of non-secretors, though present, is not significant. The converse is the case with the Taplow investigation; but there is no heterogeneity between the two series, and the combined result is significant for both characters. Even so, the levels of significance do not approach those needed before such an association can be regarded as well founded, because of the difficulty of getting adequate control series. Thus the need for large numbers in this field of research is again emphasized, and it is to be hoped that the data presented in this paper will be augmented by workers elsewhere. Should this result in convincing proof of these associations with rheumatic fever, it would be the first demonstration of an association between blood groups and a bacterial disease since the finding of Struthers (1951) in pneumonia in infancy. In addition, further data would enable a definite conclusion to be drawn about an interesting feature (though one not significant with present numbers) of both the Liverpool and Taplow series. This is that the percentage of non-secretors is particularly high in the patients of groups A and B (Liverpool group O=25.7% and group A=31%; Taplow, group O=25.5% and group A=30.1%).

If the reactions of the haemolytic streptococcus are affected materially by the secretor status of the host, it might be possible to demonstrate differences in virulence or growth rate depending on the amount of water-soluble blood-group substances present in the culture media. This investigation is now being carried out. Finally, it would be interesting to know whether or not the blood-group and secretor differences present in rheumatic fever are also present in series of patients with uncomplicated streptococcal throat infections and in those who develop acute nephritis.

Summary

Data are presented of a series of 263 Liverpool patients suffering from rheumatic carditis. They show a significant reduction in the incidence of blood group O and a non-significant increase in non-secretors compared with controls. There is no heterogeneity between our results and those from Taplow (Glynn, 1959, personal communication) in where there is a significant excess of non-secretors and a non-significant deficiency of group O. On combining the results of the two investigations there is a significantly increased incidence of the disease both in those who are not group O and in those who are non-secretors.

The levels of significance are suggestive of there being a relationship between rheumatic fever and the ABO blood-group antigens, but the collection of further data is indicated, not only of rheumatic fever but also of uncomplicated streptococcal throat infections and acute nephritis.

We are indebted to Dr. L. E. Glynn for supplying us with the blood-group data of his series and for his permission to use them in this paper. We are also grateful to the consultants of the thoracic surgical unit at Broadgreen Hospital, to Dr. E. N. Chamberlain, and to Dr. S. Cope for giving us access to their patients; and to Dr. J. Wyn Edwards, who collected blood and saliva from some patients in the earlier part of the investigation. Our thanks are due to our senior technician, Mr. W. T. A. Donohoe, for carrying out much of the serological work, and to our research assistant, Miss Sheila M. Manning, who has been invaluable in collecting the greater part of the material and in carrying out all the secretarial work. The research has been made possible with the aid of grants from the Medical Research Committee of the United Liverpool Hospitals under the chairmanship of Lord Cohen of Birkenhead, the Nuffield Foundation, and the Medical Research Council.

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PRACTICAL DIETS FOR LOWERING SERUM LIPIDS

A LONG-TERM STUDY ON OUT-PATIENTS WITH ISCHAEMIC HEART DISEASE

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The effects of dietary fats on blood lipids have aroused considerable interest in recent years in view of the probable relationship to coronary heart disease. Morrison (1955), in a controlled study of patients with myocardial infarction, reported that life could be prolonged by taking a low-fat diet; the serum cholesterol, total lipids, and neutral fat were all reduced. Lyon *et al.* (1956), with a larger series, showed similar effects on survival accompanied by a lowering of low-density lipoproteins. A fall in blood lipids can also be produced by the isocaloric replacement of saturated fats by unsaturated oils (Kinsell *et al.*, 1952; Ahrens *et al.*, 1954, 1957; Bronte-Stewart *et al.*, 1956), but there have been few studies showing that a regimen containing unsaturated fats can be used by patients in their home surroundings and may be effective over long periods (Groen *et al.*, 1952; Malmros and Wigand, 1957).