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Influence of Sulfapyridine Therapy on Plasma Lipids in Pneumonia.*

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In the preceding paper[1] evidence has been presented to indicate that specific serum therapy is able to prevent the rather marked changes in the serum lipids which occur in pneumonia. The introduction of chemotherapy with its satisfactory clinical response brings up the question as to whether the more or less specific action of sulfapyridine in pneumococcal pneumonia has the same influence on the plasma lipids. Serum therapy and drug therapy both cause a rather prompt drop in temperature so that the patient is usually free of fever in 12 to 48 hours. However investigators have felt that the normal temperature which follows the administration of sulfapyridine does not necessarily indicate a complete recovery from the pneumonia. Just how the plasma lipids behave in cases receiving chemotherapy should therefore be of special interest.

This paper deals with a study including 5 children with pneumonia. The patients were between 6 and 9 years of age, all ill with lobar pneumonia due to the pneumococcus, Type I. They received sulfapyridine and since there were no hard and fast rules with regard to the amount of drug to be employed the dosage schedule recommended by Barnett and his co-workers[2] was at that time considered to be most satisfactory. The sulfapyridine was administered orally, 0.6 g being given every 4 hours throughout the 24 hours of a day. This group of selected patients did not have any vomiting prohibiting the retention of the drug. The first sample of blood was collected just before the sulfapyridine administration was started. Each child then had been ill for only one or 2 days and the fever was high, ranging between 40.2° and 40.8°C. The second sample was drawn about 24 hours after the temperature had dropped to normal. The third and fourth blood samples were obtained on the fourth and seventh days of convalescence, respectively. The drug was discontinued on the fourth day of normal temperature just after the third

* This work was supported by a grant from the Mead Johnson and Company and the Medical Research Fund of the University of Minnesota.

1 Stoesser, A. V., PROC. SOC. EXP. BIOL. AND MED., 1940, **43**, 168.

2 Barnett, H. L., Hartmann, A. F., Perley, A. M., and Ruhoff, M. B., *J. A. M. A.*, 1939, **112**, 518.

sample had been collected. As in the previous communication,[1] the subjects of this study received a thorough examination including a roentgenogram of the lungs, each time a sample of blood was drawn. Bloor's methods[3, 4, 5] were followed to determine the various cholesterol fractions. The total fatty acid and phospholipid values were obtained by the microgravimetric method of Wilson and Hansen.[6,7] Yasuda's modification[8] was employed to determine the iodine absorption of the serum fatty acids.

The results are summarized in Table I.

The infections in the 5 subjects resembled each other fairly closely. The lobar pneumonia was confined to the lower lobes of the lungs. The total cholesterol and esters were significantly lower than normal on the day the sulfapyridine was started. The response to this form of therapy was clinically quite satisfactory. In cases 2 and

TABLE I.
Plasma Lipids of Pneumonia Before, During, and After Administration of Sulfapyridine.

Case No.	Total cholesterol				Cholesterol esters				Free cholesterol			
	Mg per 100 cc serum											
	A	B	C	D	A	B	C	D	A	B	C	D
1. M.L.	126	135	124	238	85	76	73	160	41	59	51	78
2. G.M.	131	109	153	263	78	52	95	178	53	57	58	85
3. J.V.	101	110	122	214	43	55	71	137	58	55	51	77
4. E.T.	131	138	165	209	83	75	105	146	48	63	60	63
5. B.S.	142	107	121	227	94	68	69	169	58	39	52	58
Avg	126	119	137	230	76	65	82	158	51	54	54	72

	Total fatty acids				Iodine number				Phospholipids				Iodine number*			
	Mg per 100 cc serum															
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
1. M.L.	360	280	435	514	93	88	88	95	103	72	103	138	104	108	110	120
2. G.M.	279	259	172	403	97	90	95	98	71	94	93	115	129	126	121	110
3. J.V.	214	286	298	329	81	87	95	98	72	122	121	159	105	76	77	149
4. E.T.	303	284	306	466	89	88	96	87	71	121	67	112	93	95	104	99
5. B.S.	276	307	249	367	104	98	93	100	81	94	68	72	122	106	97	118
Avg	286	283	292	415	92	90	93	95	79	99	90	119	110	102	101	119

* Iodine number of the phospholipid fatty acids.
A—Blood sample collected before sulfapyridine was started.
B—Blood sample collected after 24 hours of normal temperature.
C—Blood sample collected on 4th day of convalescent period.
D—Blood sample collected on 7th day of convalescent period.

3 Bloor, W. R., *J. Biol. Chem.*, 1916, **24**, 227.

4 Bloor, W. R., and Knudson, Arthur, *J. Biol. Chem.*, 1916, **27**, 107.

5 Bloor, W. R., personal communication to the author.

6 Wilson, W. R., and Hansen, A. E., *J. Biol. Chem.*, 1936, **112**, 457.

7 Hansen, A. E., PROC. SOC. EXP. BIOL. AND MED., 1939, **40**, 376.

8 Yasuda, M., *J. Biol. Chem.*, 1931-32, **94**, 401.

3 the temperature fell slowly to within the normal range over a period of 2 days while in the remaining 3 patients there was a precipitous drop to normal in 12 to 36 hours. After one day of no fever, the second blood sample was obtained and the cholesterol values were found to have changed very little. On the fourth day of convalescence when the third sample of blood was collected there was some indication of a slight rise in the cholesterol. The observation is most interesting in view of the fact that the roentgenograms showed some extension of the pneumonia at the time the second blood sample was drawn and only a small amount of resolution on the fourth day of the convalescent period. However, following this, the pneumonic process began to resolve rapidly and on the seventh day of convalesence the lungs were clear in cases 1, 3, and 4. The other 2 patients still had incomplete resolution. The total cholesterol and esters had returned to the normal values.

The total fatty acids and phospholipid values were lower than the average figure during the period of the illness before the administration of the sulfapyridine. Although the introduction of drug therapy was followed by a good clinical response, the total fatty acids were slow in rising to higher levels. There was a slight rise and then another drop in the phospholipids and recovery from the low values was retarded. The iodine numbers of the total fatty acids and phospholipid fatty acids were not markedly depressed during the height of the disease. They apparently had little time to fall to the low levels observed during the last stages of the febrile period when the disease is allowed to take its natural course.[9] The sulfapyridine treatment definitely shortened the period of fever in each instance.

The drop in temperature is considered to be due to the direct action of the drug. It is not the natural crisis of the pneumococcal pneumonia and Wood and Long[10] have shown that the type-specific antibodies usually do not appear in the blood of these patients until several days later at the time when the natural crisis of an untreated case of pneumonia occurs. This is also the time when the plasma lipids first show signs of returning to normal levels. The question therefore arises as to whether the changes in the serum lipids are related to processes of immunity. Further investigations are in progress.

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9 Stoesser, A. V., PROC. SOC. EXP. BIOL. AND MED., 1937, **36**, 723.

10 Wood, W. B., and Long, P. H., *Ann. Int. Med.*, 1939, **13**, 612.