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The Therapeutic Value of Pneumococcus Type VII (Cooper) Serum.*

JESSE G. M. BULLOWA.

From the Littauer Pneumonia Research Fund of New York University and the Medical Service, Harlem Hospital.

Georgia Cooper[1] and her coworkers, working with cultures from pneumonia patients at Harlem Hospital and Bellevue Hospital, segregated Type VII from the miscellaneous group. During the past 3 years 121 patients invaded with Type VII pneumococcus have been observed at Harlem Hospital. During this period 1407 patients were admitted to the adult Pneumonia Series. The incidence of Type VII was 7.5%. The mortality among 85 cases treated without serum was 25.9%.

Serum has been employed on 17 adult patients and 2 children. It was administered for the most part until agglutinins were demonstrable by the whole blood stained slide technique. The cases were chosen when serum was available by the chance of their alternate admission to the hospital. One patient, to whom serum was administered on what was thought to be the 23rd or 24th day of her disease, came in on the 20th day of her illness, with the history of a chill and pain in the side at the onset. She was obese, had an aortic insufficiency, and had had dypsnea on effort for 2 years. She died of exhaustion. All the other patients recovered. One of those who received serum and recovered, suffered from a bacteremia which was apparently increasing prior to serum administration.

The cases are insufficient in number to establish the curative value, but they furnish suggestive evidence that adequate doses of Type VII antipneumococcic serum may have therapeutic value in patients suffering from Type VII pneumococcus pneumonia. Observation of the cases led me to believe that it was beneficial.

The lots of serum, the method of production and refinement and reactions are shown in Table I:

* Through the generosity of the Littauer Pneumonia Research Fund of New York University, and the Altman Foundation, serum was prepared under the direction of Dr. William H. Park at the Municipal Serum Farm, Otisville, N. Y., and was refined in New York by Banzhaf, and in Boston by Felton. Other serum was generously supplied by the Lederle Laboratories, Inc., where it had been produced under the direction of Mr. Stanley D. Beard, and refined by Mr. Joseph H. Greene.

1 Cooper, *J. Exp. Med.*, 1929, **49**, 461.

TABLE I.

No.	Preparation Made by	Units per cc.	Intravenous Doses	Patients	Chills	Other Reactions
1	Dept. of Health Prep. 937-1-A	Type 7 800 8 80	5	2	1 (slight)	
2	Dept. of Health Prep. 2	7 800 8 80	2	2	2 (severe)	
3	Dept. of Health Prep. 3	7 800± 8 80	11	3	4 (moder.)	
4	Dept. of Health Prep. 5, Lot 708	7 800± 8 80	9	1	0	4 doses caused sweating
5	Dept. of Health Serum refined by Felton. Polyvalent I and II	7 800 8 80	45	9	0	Dyspnea relieved with adrenalin
6	Dept. of Health Prep. 936-1-B		9	4	8 (moder.)	
7	Lederle 21-H-2	4 150 5 1000 7 750 8 500	10	3	0	One dose: cyanosis, dyspnea.
8	Lederle 21-H-6	4 300 5 750 7 1500 8 500	1	1	1 (moder.) (Same patient given 21-H-12 without reaction)	Very severe cyanosis, sweating and dyspnea
9	Lederle 21-H-8	4 750 5 500 7 2000 8 500	28	4	0 (Doses as large as 40 cc.)	Two doses: cyanosis and dizziness
10	Lederle 21-H-12	4 250 5 750 7 5000 8 500	4	3	0	One dose caused dyspnea and patient complained of feeling upset

Method of Refinement was as follows:

No. 1. 8 mos. immunization of horse 184. Diluted one-half saturation with 33 1/3 $(NH_4)_2SO_4$. Filtered. Ppt. washed and saturated with NaCl. Filtrate washed and brought up to 52% saturation with $(NH_4)_2SO_4$. Dialyzed 4 days.

No. 2. Horse 291. 7 mos. on 5 types. 8 mos. on 2 types. Heat killed antigen. Plasma dialyzed and then diluted with 3 volumes of H_2O. pH changed to 5.1. Antibody precipitated at pH 5.9.

No. 3. Prepared same as Prep. 2 except antibody precipitated at pH 6.8.

No. 4. Horses 282-241. Heat killed antigen. Serum dialyzed. pH changed to 5.1 and acid ppt. destroyed. Antibody precipitated at pH 6.8.

No. 5. Serum from same horses as No. 4. Sod. sulphate prep. Elimination of acid fraction and the total water insoluble protein.

No. 6. Diluted one-half 50 cc. N/HCl. Saturated to 6% with saturation $(NH_4)_2SO_4$ and saturated NaCl. Filtrate brought to 33% saturation. Filtered and dialyzed.

No. 7. Formolized antigen. Immunization 12 mos. Serum diluted with H_2O and ppt. with 45% $(NH_4)_2SO_4$. Dialyzed. Ppt. acidified. Acid soluble fraction precipitated and dissolved with 1.5% NaCl.

No. 8. Chilled to 1.5°C. Ppt. with 20% alc. Filtered at 5°C. Ppt. dissolved. Acid soluble fraction dissolved and diluted with distilled water.

No. 9. Re-refined 21-H-6 (No. 8).

No. 10. Formolized antigen, 15% alc. Chilled. Diluted and acidified. Acid soluble fraction neutralized and diluted. Cloudy—therefore re-refined.