

## A PROTECTIVE THERAPY FOR MUMPS\*

ALFRED F. HESS, M.D.

NEW YORK

The protection afforded to man against epidemic diseases through the employment of prophylactic antiserum injection is of course best illustrated by the case of diphtheria. It is likewise known that many infections to which animals are subject can be prevented by a similar form of passive immunization. While the number of experimental infections which can be prevented in this manner is not large, it is a notable fact that the blood of animals which have recovered from hog cholera carries a protective principle capable of warding off, for a time, infection with the filterable virus of that disease.

That human blood of one individual can be injected safely into another individual is of course a commonplace. Recent experience with the transfusion of large quantities of blood is convincing in establishing the value and safety of this procedure. Experience has also shown that human blood carrying immunity principles can be employed as therapeutic agents in several infectious diseases in man. Thus McKenzie and Martin<sup>1</sup> employed the blood serum taken from patients who had recovered from epidemic meningitis in the treatment, by intraspinal injection, of similar cases of meningitis. The blood taken from patients who have recovered from scarlet fever has also been employed,<sup>2</sup> and apparently with advantage, in the treatment of severe toxic cases of scarlet fever. Flexner and Lewis<sup>3</sup> have shown that the blood serum derived from monkeys or human beings who have recovered from epidemic poliomyelitis is capable of preventing in monkeys the paralysis which follows the intracerebral injection of the poliomyelitis virus, and Netter<sup>4</sup> has employed the serum taken from recovered human beings for the treatment of patients with acute poliomyelitis by intraspinal injection.

It is obvious, therefore, that the employment of the blood of one individual as a therapeutic agent for another is a method which in

---

\* Received for publication May 17, 1915.

\* From the Research Laboratory, Department of Health, New York.

\* Presented before the Pediatric Section of the Academy of Medicine, April 8, 1915.

1. McKenzie and Martin: *Brit. Med. Jour.*, Oct. 31, 1908, p. 1341.

2. Reiss and Jungman: *Deutsch. Arch. f. klin. Med.*, 1912, cvi, Nos. 1 and 2. Reiss: *Therap. Monatsh.*, 1913, xxvii, No. 6.

3. Flexner, S., and Lewis, P. A.: *Experimental Poliomyelitis in Monkeys*, *Jour. Am. Med. Assn.*, Aug. 20, 1910, p. 662.

4. Netter, E.: *Bull. de l'Acad. d. l'Acad. d. méd.*, 1914, lxxviii, 523.

itself is without danger, and, under certain circumstances, offers advantages to the patient to be secured in no other way. Such small objections to the employment of blood as a therapeutic agent as exist can be obviated by the selection of suitable donors.

In view of these considerations it is interesting to consider what may be accomplished in preventing mumps, or epidemic parotitis, especially in institutions in which a large number of cases arise from time to time. Mumps is still to be ranked among the highly contagious infective diseases of unknown etiology, the specific causative microbic

TABLE 1.—DATA OF DONORS AND OF INJECTED PATIENTS

Donor	Age	Date of Mumps	Donee	Age	Date of Inoculation	No. c.c. Injected
1. S. C.	5½	1/30/15	H. S.	4	2/1/15	6
2. P. F.	4	1/30/15	B. K.	4	2/1/15	6
3. G. D.	4	1/31/15	S. G.	4	2/1/15	8
4. A. S.	5⅓	1/29/15	P. K.	3	2/1/15	6
5. I. R.	4	1/22/15	Y. G.	3½	2/1/15	6
6. J. S.	4	1/22/15	F. G.	3½	2/1/15	8
7. R.	6⅓	1/22/15	E. Z.	2½	2/2/15	7
8. H. H.	5	1/22/15	R. G.	2½	2/2/15	8
9. S. G.	5⅓	1/22/15	M. H.	4	2/2/15	6
10. G.	5	1/23/15	D. E.	3¼	2/2/15	6
11. M.	2½	1/23/15	S. S.	2¼	2/2/15	8
12. R.	4½	1/23/15	H. L.	2	2/4/15	6
13. K.	3½	1/24/15	D. G.	2	2/4/15	6
14. S.	3½	1/25/15	H. I.	3	2/4/15	6
15. M. G.	4	4/ /14	B. Z.	2¼	2/4/15	6
16. D. G.	5	4/ /14	I. S.	1½	2/4/15	8
17. L. S.	5	4/ /14	H. C.	1⅓	2/4/15	6
18. B. K.	6½	3/ /13	S. G.	5½	2/4/15	6
19. J. S.	5½	12/ /12	L. S.	4½	2/4/15	8
20. L. S.	2⅓	12/ /12	L. S.	5½	2/4/15	6

agent not having been discovered. The disease is, however, one in which one attack yields protection that is general and persistent. The question arises, therefore, whether the blood of persons who have recovered from one attack of the disease does not contain immunizing and protective principles which can be employed in the protection of other exposed persons. Since the collection and the injection of the blood, as indicated above, are readily carried out, an effort was made this winter to control by this means an epidemic of mumps prevailing in the Hebrew Infant Asylum, which for the second time in two years was visited by a severe epidemic. The epidemic was well under way when we determined to undertake this prophylactic therapy, as may

be seen from Table 2, which shows the cases as they developed in the various wards, both previous and subsequent to the injections. At the time treatment was begun, about forty cases of mumps had broken out in the institution within the past month, and, as Table 2 shows, new cases were developing almost daily. The conditions surrounding an institution of this kind are peculiarly favorable for judging the effect of prophylactic treatment of the various infectious diseases, as most of the children are admitted during infancy, and we have complete knowledge of the infectious diseases which they have contracted while under our care.

TABLE 2.—OCCURRENCE OF MUMPS IN WARDS BEFORE AND AFTER INJECTIONS

Date	Ward No.				
	4	6	10	11	12
Jan. 22	1	6	1	1	0
Jan. 24	0	0	0	0	1
Jan. 25	1	0	0	0	0
Jan. 26	2	3	0	0	0
Jan. 28	0	0	0	0	1
Jan. 29	0	0	1	0	0
Jan. 30	2	1	0	0	1
Jan. 31	0	1	0	2	1
Feb. 8	0	1	1	1	0
Feb. 10	0	0	1	1	0
Feb. 11	1	0	0	2	4
Feb. 14	2	1	0	1	4
Feb. 15	3	0	0	0	1
Feb. 17	2	0	0	0	1
Feb. 20	3	0	0	0	0
Feb. 22	2	0	2	1	0
Feb. 23	0	0	0	1	0
Feb. 25	0	1	3	1	0
Mar. 2	0	0	0	2	2
Mar. 3	0	1	0	1	1
Mar. 4	1	0	0	0	0
Mar. 7	0	0	0	0	0
Mar. 18	0	0	0	0	0

\* Horizontal lines indicate period when injections were begun in the different wards.

Twenty children were given protective injections. They were, for the most part, children who had entered the institution before the age of one year. Naturally, none were injected who had had mumps in the course of the epidemic of the winter of 1912-13 and who had acquired immunity in this way. The ages of these children, as well as of the donors, and the amount of blood injected, may be seen in Table 1.

Whole blood was used and was injected at once intramuscularly.<sup>5</sup> The donors form three groups: The first includes children, four in number, who were just recovering from mumps; the second comprises ten children who had recovered from the disease about ten days previously; there is a third group, composed of six children who had had mumps one or two years before. It should be added that the results of the treatment in the last group cannot be considered convincing, in that three (15, 16 and 17) must be entirely left out of consideration, as they did not happen to come in contact with active cases of the disease, and because the other three (18, 19 and 20) had been in the institution

TABLE 3.—INCIDENCE OF MUMPS AMONG INJECTED AND NONINJECTED CHILDREN

Ward No.	Total Census	No. of Susceptibles	Inoculated Cases	Date Transferred to Ward	No. Cases Developing Mumps Subsequently		Remarks
					Not Inoculated	Inoculated	
4	25	22	3 (Nos. 1, 12, 14)	2/15/15	11	0	Nine cases of mumps removed from this within previous three weeks.
6	30	19	1 (No. 13)	2/11/15	8	0	Twelve cases removed.
10	30	27	1 (No. 20)	2/15/15	5	0	Four cases were removed from this ward within previous three weeks.
11	34	32	2 (Nos. 18, 19)	2/15/15	7	0	Six cases were removed within previous three weeks.
12	34	34	10 (Nos. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11)	2/12/15	13	0	Ten cases were removed within previous three weeks.

but six weeks, so that we did not possess first-hand knowledge as to their susceptibility to mumps. As was to be expected from the experience of others, there were no disagreeable manifestations following the injections—neither a rise of temperature nor local reaction. The epidemic was so widespread that only three of the children under treatment did not come into contact with the disease. There are therefore seventeen who must be regarded as having been not only susceptible,

5. The blood was aspirated in the usual way and immediately injected into the patient. The procedure required so short a time that there was no need of adding any anticoagulant, and there was no disturbance due to premature clotting.

but also exposed to mumps. It is therefore striking to note that among these seventeen, none contracted the disease. That the injections were effective in bringing about this result may be seen from a glance at Table 3, which shows that in the wards where the children were not protected by injection, fully one-third, or even one-half, came down with the disease.

Our results hardly seem to require extended comment. We may add, however, that by means of these injections we were able, in a large measure, to check the epidemic. It would seem that preventive treatment of this kind could well be carried out in institutions for children, and that this simple procedure might likewise be resorted to in the home where one or more children are exposed to infection. Our experience seems to indicate that the blood may, with advantage, be obtained from the donor even before the parotid swelling has disappeared, and that it possesses protective principles at this early stage. As is well known, the incubation period of mumps is long, about eighteen days, so that it is possible to resort to protective injection some days following exposure. It is naturally impossible to state the duration of immunity acquired in this way; but it seems reasonable to believe that it well outlasts the usual danger period of infection. This type of therapy probably can be resorted to in connection with epidemics of other infectious diseases, for example, measles, in which one attack confers a marked immunity.

16 West Eighty-Sixth Street.