Summary and Conclusion

1. Analyses of 1,370 specimens of stools from Europeans resident in Calcutta are recorded.
2. The incidence of dysenteric condition—amoebic and bacillary—is noted.
3. Possible sources of infection are discussed; the probable disseminators seemed to be carriers among the Indian menial staff.
4. Although among the Indian population there is a definite seasonal correlation with the disease, this was not found to be so in the case of the Calcutta Europeans.
5. The association of Charcot-Leyden crystals with amoebiasis could not be found to extend far.

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PREVENTION OF MEASLES IN A CHILDREN'S HOSPITAL

BY

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Measles should no longer be considered a "minor" infection. It is a major illness causing a considerable mortality and a much greater morbidity among young children affected by it.

The occurrence of measles in a children's ward is a catastrophe, as children already ill are exposed to the risk of a second serious illness which they may not be able to overcome. Moreover, such an occurrence dislocates the work of the ward and impairs the utility of the hospital. Every effort should therefore be made to prevent the entry of measles into a children's hospital and to check its spread once it has appeared. These objects can best be attained by the system of nursing children in cubicles, as by this means it is possible to avoid one child infecting another. In the absence of cubicles the problem which all too often presents itself is how to prevent the disease from spreading among, or alternatively to modify its virulence in, the children already exposed. In the light of our present knowledge the only measures available are the passive immunization of contacts by one of the following substances: (a) serum from patients convalescing from measles; (b) serum from adults who have had measles; (c) an immune substance (immune

globulin) obtained from the placenta of women who have had measles. Another method sometimes used is to inject whole blood taken from the parents.

During the past winter a considerable number of cases of measles arose in the wards of Alder Hey and Olive Mount Hospitals, with the result that it was necessary to immunize many contacts. The substances used for the purpose were: (1) serum from adults who have had measles, and (2) immune globulin from placental extract in varying doses. All susceptible contacts were given an immunizing dose as soon as a case of measles was diagnosed in the ward. In practice this meant on the appearance of the rash and therefore possibly on the third or fourth day of exposure. The results are tabulated below.

Table showing Results of Immunization with Adult Human Serum and Immune Globulin

Substance used for Immunization	Number Developing Measles in :			Total Number Developing Measles	Total Number Immunized	Remarks
	11-14 Days	15-21 Days	Over 21 Days			
Adult human serum, 15 c.cm.	12	13	8 (a)	33	124	(a) 6 cases developed 21-26 days after immunization; 2 later than this
Placental extract, 10 c.cm.	8	10	2 (b)	20	84	(b) 1 case 26 days after immunization; 1 case 33 days ditto
Placental extract, 6 c.cm.	6	4	9 (c)	19	33	(c) 6 cases developed measles 21-25 days after immunization; 3 cases later than this
Placental extract, 4 c.cm.	12	10	6 (d)	28 (e)	48	(d) 3 cases 21-25 days; 3 cases later than this (e) 12 cases not modified

In assessing the results no attempt has been made to work out a percentage of immunity, as in my opinion this tends to convey an impression which may err on the optimistic side. For example, one may immunize 100 children and of these only twenty may contract the disease; it is impossible in hospital practice to say with certainty that any or all of the remaining eighty children were actually infected. It is, however, reasonable to assume that *on the average* the risk of infection is the same in any one hospital, and it is on this basis that comparison should be made.

It will be seen from the above table that the best results were obtained from the use of a 15 c.cm. dose of adult human serum or 10 c.cm. of immune globulin. Smaller doses of immune globulin did not give the same degree of protection, and of the forty-eight children receiving 4 c.cm. of that substance twelve did not obtain sufficient immunity to modify the course of the disease. It must be stated here, however, that no complications or sequelae occurred in these twelve children.

One effect of passive immunization against measles by this method is the prolongation of the incubation period. This is important when quarantining such immunized contacts, because one should wait for at least twenty-one days before admitting other susceptible children into the ward. In considering the cases which developed measles after a period of twenty-one days following the immunization it should be borne in mind that some of these were exposed a second time through contact with children developing a modified form of the disease. We therefore

must face the fact that a child may not be protected against measles even if he has been immunized twelve to fourteen days previous to exposure to infection.

As it was thought that the age of the children might have some influence on the results obtained these results were classified as follows:

Age	Number Immunized	Number Developing Measles
0-1 year	44	14
1-2 years	88	28
2-3 "	52	27
3-4 "	33	12
4-5 "	19	8
5-6 "	14	7
Over 6 "	39	4

Consideration of this table would suggest that the dosage of human serum or immune globulin should not be influenced by age, and that children between 1 and 5 years require a full immunizing dose.

While making this investigation it was noticed that the rate of infection tended to be higher in those wards which contained a greater number of children between the ages of 1 and 5 years, although these small children were separated so far as possible and confined to bed in order to avoid intimate contact. It was also noticed that the secondary cases were not always those nearest to the original case. To my mind this suggests that in hospital practice droplet infection is not the sole means by which the infective material is carried from one patient to another, but that the nurses' hands may also be an important medium of conveyance.

A further point of interest to those connected with children's hospitals may lie in the fact that it was not necessary to shut a ward which had become infected with measles. The procedure followed was to remove the case of measles, immunize all susceptible contacts, and use the ward for admission of all cases (preferably older children) who had had the disease previous to admission. Another method employed when more than one ward was infected was to concentrate susceptible and immunized contacts in a single ward, thus freeing the others for "clean" cases. A third procedure found to be of advantage was to transfer to vacant beds in the infected ward those older children in other wards who had had measles. By these means beds were vacated in clean wards and the hospital could be used to its fullest capacity.

Summary and Conclusion

1. From an analysis of different methods of passively immunizing susceptible contacts against measles it is found that the best results are obtained by using the larger doses of immune globulin.
 2. Fifteen cubic centimetres of human adult serum and 10 c.cm. of immune globulin gave approximately the same results.
 3. Four cubic centimetres of immune globulin did not modify the disease in some cases.
 4. Young children require as large a dose as older children (perhaps larger).
 5. Some suggestions are made for the judicious use of beds in infected wards so that the work of the hospital as a whole may not be seriously dislocated.
 6. It is suggested that in hospital practice infective material may be conveyed from patient to patient by means other than direct droplet infection.
- Finally, no reactions were noted following the injection of immune globulin or human serum.

Clinical Memoranda

Tetanus Supervening on Middle-Ear Disease

The following case appears to afford a parallel to that reported in the *Journal* of February 19 by Captain F. V. Stonham, I.M.S. In his case there was evidence of the introduction of a potentially tetanus-infected medium—namely, dried scum from a stream or dirty powdered cuttlefish—into the discharging meatus. In this case there is no such evidence, but there is direct evidence of an acute exacerbation of chronic otitis media within the incubation period of tetanus, suggesting strongly that the middle ear was the open wound through which accidental infection gained entrance.

CASE REPORT

An actress, aged 22, touring small provincial towns in a family troupe, had a history of chronic intermittent discharge from the left ear since childhood. About January 20, 1938—fourteen days before admission to hospital—her left ear became painful and tender. Relief was experienced when a purulent discharge occurred a day or two later. With instillations of hydrogen peroxide the discharge diminished considerably. On January 31 her jaw became stiff, and her dentist, suspecting an impacted molar, removed two molar teeth on the left side. As trismus did not lessen she was referred to Mr. C. J. Macauley, surgeon to this hospital, as a case of tetanus or possibly left-sided parotid abscess.

At 1 a.m. on February 3 she was admitted to this hospital. Temperature 100.6° F., pulse 80, respirations 20. No history of wound or abrasion during the previous three months. Patient lay rather rigidly on her back, but was able to sit up with a little help. Trismus did not allow of the teeth being separated more than half an inch. Neck rigidity present. Spinal, abdominal, and limb muscles showed some hypertonicity not amounting to rigidity. Tendon reflexes were exaggerated. There were no abnormal eye signs. Palpation of the left mastoid region caused the patient to wince with pain. Tympanic perforation and slight purulent discharge noted.

Consultation with Mr. P. Dempsey, otologist to the hospital, confirmed the diagnosis of acute suppurative otitis media, and ruled out mastoid involvement or intracranial spread. Trismus and general rigidity increased during the following day, risus sardonicus was noted, and swallowing became somewhat difficult.

Treatment consisted in administration of serum to a total of 140,000 units by the intramuscular route over the first four days. Sodium luminal, 3 grains in 1 c.cm., was used twice or thrice daily to prevent spasm, relax rigidity, and secure sleep. The disease ran a relatively mild course and showed definite improvement, until on February 8 signs of bronchopneumonia appeared. The case was transferred to the care of Dr. E. T. Freeman, but despite treatment, which included the free use of an oxygen tent, death supervened on February 12, nine days after admission, from bronchopneumonia and cardiac failure.

COMMENTARY

A case of tetanus is reported in which the occurrence of an exacerbation of otitis media during the probable period of infection was a definite feature. In the absence of any other obvious route of infection that of the middle ear must be considered as a probable one. Efforts to establish something more than mere coincidence in this combination may well explain some of the "idiopathic" cases of tetanus.

I beg to thank Mr. C. J. Macauley for his permission to publish this note.

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