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Sudden Death in Infancy. *Str. pyogenes* Type 12 Isolated at Necropsy

Sudden and unexpected death in the first year of life represents an important paediatric and pathological problem. A proportion of deaths can be attributed to asphyxia due to aspirated food or vomit and to other causes, but many are undoubtedly the result of fulminant infections.

Bacteriological examination of post-mortem material is often disappointing, but cultures from the depths of the lung are always a worth-while procedure, and occasionally a pathogenic micro-organism may be recovered. In the present case *Streptococcus pyogenes* type 12 was isolated, and strong circumstantial evidence of the source of infection was obtained by the isolation of an identical type of *Str. pyogenes* from the throat of the infant's nurse.

CASE REPORT

A healthy thriving male child of 5½ months died suddenly in a welfare home without any previous illness. The obstetric history was normal. The birth weight on July 4, 1957, was 7½ lb. (3.4 kg.).

On December 12 a 7-oz. (200-ml.) feed of milk and "farex" was given at 10.30 a.m. and the child was placed in the prone position, resting on his elbows in his cot. At 11.10 a.m. a nurse noticed that "his head looked very pale." He was then lying on his side, and when examined he was in fact dead.

Necropsy was carried out at 8.30 p.m. on the same day; the relevant findings were as follows. The body was that of a well-developed infant with no external abnormalities. Nutrition was excellent and the whole body presented the appearance of an extremely well cared for infant. On handling the body, a little milk feed was discharged from the mouth and nose. The bronchi were examined in continuity with the trachea and the larynx. It was established beyond all question that no aspiration of gastric content had occurred. The only material present in the bronchi or trachea was some frothy oedema fluid, and this compared markedly with the food present in both stomach and oesophagus. The lungs on section were grossly oedematous and fluid could be expressed from them. There were no areas of consolidation.

On microscopy the air spaces showed variable amounts of oedema fluid. Many of the interlobular septa showed very marked oedema with dilated lymphatic channels. Mononuclear cells were prominent in some of the air spaces, but there was no acute inflammatory reaction. Aggregates of lymphoid tissue were prominent throughout the lung substance. It was debatable whether there was a slight increase of mononuclear cells in the submucosa of some of the bronchi and round some of the small venules in the lung substance. Microscopical examination of the larynx and trachea showed a slight prominence of mononuclear cells, including an occasional plasma cell, in the sub-epithelial tissue. Microscopical examination of all the other

organs confirmed the naked-eye impression that they were normal, and there was no evidence of myocarditis or encephalitis.

Bacteriology.—The cultures were obtained by Pasteur pipettes from the depths of the lung after cautery of the pleura. They were then spread direct on to blood-agar plates and incubated for 18 hours at 37° C. The culture showed haemolytic streptococci ++, *Str. viridans* +, and non-haemolytic streptococci +. The haemolytic streptococcus proved to be *Str. pyogenes* type 12 by precipitation and agglutination.

COMMENT

The gross findings at necropsy exclude any possibility of suffocation following aspiration of the feed recently given. The histological findings are of themselves not conclusive, but, in view of the isolation of *Str. pyogenes* type 12 from the lungs in large numbers, they are consistent with a fulminant infection. The isolation of pathogenic micro-organisms, such as *Str. pyogenes*, from the tissues is often of doubtful significance, especially when enriched broths are used which favour the recovery of perhaps only an occasional organism. When, however, large numbers of organisms are recovered on primary isolation it is almost certainly indicative of infection by that organism.

The apparent increase of mononuclear cells in the interstitial tissue of the lung, in the walls of the bronchi, in the air spaces, and in the subepithelial tissue of the trachea and larynx may represent a minimal interstitial reaction in the respiratory tract to some infection, probably of virus origin. The fulminant infection by *Str. pyogenes* may have been facilitated by this. It is doubtful if it alone provoked any response except the non-specific one of pulmonary oedema. Arey and Sotos (1956) have reported two cases of sudden unexpected death in previously healthy infants due to beta-haemolytic streptococcal infections, and Werne and Garrow (1953) have recorded six cases in which they isolated *Streptococcus haemolyticus*. The isolation of *Str. pyogenes* in significant numbers from post-mortem tissues in this type of case would, however, from the literature, appear to be relatively uncommon.

In view of these findings, nose and throat swabs were taken from all staff connected with the home—that is, matron, assistant matron, five nursing assistants, and four domestic staff. *Str. pyogenes* type 12 was isolated from the throat of a nursery assistant who was mainly responsible for the preparation and giving of this infant's feeds. On detailed questioning the nurse admitted to having had a sore throat at the time of the infant's death. Four other members of staff had haemolytic streptococci in their throats, but none of these was group A. Sensitivity tests to the commoner antibiotics were carried out, and both type 12 organisms gave identical results.

The evidence would appear to be strong enough to assume that the nurse was the source of the *Str. pyogenes* type 12 which caused the fatal fulminant infection of the infant. It is suggested that in similar cases detailed bacteriological study of contacts can be usefully made, especially in closed communities.

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