Medical Memoranda

Delayed Recovery after Cardiac Arrest

Although recovery after cardiac arrest is not uncommon, it seems that usually the resuscitated patient recovers rapidly. A case is here reported in which the prognosis for many days after restoration of cardiac function seemed hopeless, and yet the patient recovered during the next 10 weeks and returned to normality one year after the incident.

CASE REPORT

A 3-year-old girl was admitted to hospital on July 26, 1960, with a tuberculous lesion of the fourth and fifth dorsal vertebral bodies and a primary tuberculous complex of the right lung. She was immobilized on a frame and was given antituberculous chemotherapy. The spinal lesion was associated with a tense paravertebral abscess. There were no signs of cord or root involvement.

During the next three months she had a persistent moist cough. Unusual sensitivity of the upper respiratory tract was suggested by the fact that at the end of August she had three acute episodes of spasm in each of which she became deeply cyanosed and unconscious, and was thought to be about to die. She was examined at this time by a chest physician, who thought that these episodes were probably laryngeal spasm due to temporary obstruction by lung mucus. It was decided that the paravertebral abscess should be decompressed by costo-transversectomy.

On October 12 anaesthesia, using free flow nitrous oxide, oxygen, and trichlorethylene, was induced without difficulty. Intubation was carried out with considerable difficulty; several times during this procedure the child became cyanosed owing to laryngeal spasm.

At 11.10 a.m., with the child prone, the operation was started. Twenty minutes later, as the periosteum was being raised from the rib, the anaesthetist observed that the carotid pulse was no longer palpable. The child was turned on to her back, and as no heart sounds were heard the chest was immediately opened and cardiac massage started. There was an interval of between three and four minutes between the observation that carotid pulsation had ceased and the start of cardiac massage.

After massage for 20 minutes the first spontaneous contractions of the heart were noted. After a total of 30 minutes' massage the heart beat became strong and independent. The chest was then closed.

Forty-five minutes later temporary respiratory obstruction occurred and the patient became cyanosed. Cardiac arrest followed and direct cardiac massage was again required, the heart immediately recovering a strong independent beat. The chest was closed.

Two hours and forty minutes after the first episode of cardiac arrest her dilated pupils gave the first minimal response to a bright light. There was also a minimal spontaneous movement of the limbs.

During the next week her condition improved very slowly until by the ninth day a good pupillary light reflex had returned. Although she showed some awareness of her surroundings she did not seem to be able to see anything and she did not blink on visual fright. Tube-feeding was necessary throughout this time.

On the eleventh day she started to take fluids by mouth and was given a light diet. The next day she spoke for the first time and said "yes" and "no" and asked for her mother. There was, however, still considerable doubt whether she could yet see anything. On the sixteenth day vision was established, as she identified a familiar object.

Her progress was now steady and encouraging, and by Christmas she seemed normal.

In September, 1961, a psychiatric assessment was made during which the patient co-operated well. Testing with Terman-Merrill Form L indicated that she was 18 months retarded. This and some errors on vocabulary and object-naming tests were thought to be mildly suggestive of brain damage. However, it must be noted that she comes from a slow-witted family. Her father being especially affected. The teacher in charge of infant schooling has remarked that on admission she was obviously retarded, being able to say only a very few simple words and unable to identify simple pictures on cards. It is the teacher's opinion that the child has made normal educational progress, considering her initial retardation, during the 15 months she has been in hospital, though she is still thought to be about one year retarded in comparison with children in the ward of her own age.

An electroencephalogram on March 24, 1961, showed that slow activity was marked, but it was not definitely outside the wide range of normal variation for a child of her age. A further examination in September showed more stability and was regarded as within normal limits for her age.

At no time during the post-operative period did the axillary body temperature rise above 100° F. (37.8° C.), and from the sixth day onward it was always within normal limits. On no occasion since operation has there been any further attack of laryngeal spasm, and the pre-operative persistent moist cough has never returned.

In October x-ray examination showed that the spinal lesion was healing well and that the associated abscess had completely reabsorbed, indicating that in her case operation need not have been undertaken.

COMMENT

There are now many reports and reviews of the problem of cardiac arrest. Stephenson, Reid, and Hinton (1953) found in their review of 1,200 cases that no less than 21% occurred in the first decade of life, and unexpectedly they reported no difference of survival rate in the different age-groups. A delay of more than four minutes before cardiac massage was started appeared to be critical, as after four minutes only 6% survived. They found that the vasovagal reflex was important in 156 out of 624 cases with reliable clinical data, and pointed out the possibility of reflex hypersensitivity.

Snyder, Snyder, and Chaffin (1953) have reviewed 66 cases of cardiac arrest in infants and children. They thought that anoxia or the vasovagal reflex was responsible for the arrest in the majority of cases.

In the present case, because of the pre-operative attacks of laryngeal spasm and the difficulty during intubation, it appears that the reflexes were indeed hypersensitive. Possibly, in addition, the tense abscess displaced the arch of aorta, leading to some irritation of the vagus or recurrent laryngeal nerves. Anoxia was certainly a factor, as was evident when the heart stopped beating.

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