CLOSED-CHEST CARDIAC MASSAGE IN A STILLBORN

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SINCE THE PUBLICATION by Kouwenhoven, Jude, and Knickerbocker,¹ numerous reports in the literature have attested to the value of closed chest cardiac massage as a resuscitative procedure. Instances of its use in the resuscitation of the newborn appear to be unrecorded except in one paper. Wallgren and Okmian² applied it unsuccessfully in two infants when cardiac arrest supervened during exchange transfusion. Both babies responded, however, to thoracotomy and direct cardiac massage.

In the following case closed chest cardiac massage was applied with success in a stillborn.

CASE HISTORY

The mother was a 41-year-old gravida 3, para 3, whose last pregnancy had been 9½ years before. The present pregnancy had been uneventful and she was admitted at term, in labour. The first stage was difficult and lasted 8 hours and 12 minutes. At 8:20 p.m. her membranes ruptured, and the foetal heart rate was then recorded at 140. She was prepared for delivery and at 9:00 p.m. the attending physician discovered a prolapsed umbilical cord, with pulsations absent. As her cervix was rapidly dilating and only a rim remained, it was decided to wait for full dilatation and to deliver by forceps. The patient was given nitrous oxide, oxygen, Trilene[®] anaesthesia, and the baby was finally delivered at 9:13 p.m.

The infant (7 lb. 13 oz.) was stillborn, but immediate resuscitation was commenced. The trachea was intubated and the lungs ventilated with oxygen, by means of a Goddard-Bennett-Lovelace resuscitator. Auscultation and palpation at this stage revealed no heart beat, so external cardiac massage was initiated. After approximately 30 seconds a slow heart beat was felt and ventilation with oxygen restarted. The heart rate gradually increased over the next 10 minutes. After a further 10 minutes a very slow, gasping respiration appeared, and it progressed to adequate spontaneous respiration over the next 20 minutes. At this time the cardiac rate was 120 per minute. The infant was extubated, placed in an incubator, and sent to the premature nursery.

SUBSEQUENT PROGRESS

On admission to the nursery, the baby was strikingly pale, the skin was cold, the cry weak, and the temperature 100.2°. Respirations had become grunting and shallow, and some mild rigidity was apparent. The paediatric consultation report, however, states in part: "baby in shock, no twitching or spasm present,"

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although the nurse's notes maintain that rigidity was present for 24 hours. Fontanelle tension was normal.

Within an hour the respirations had lost their grunting character and were 70 per minute. Chloromycetin Succinate® and S.R. Penicillin® were given.

The first three feeds of glucose were vomited but the fourth was retained, and 24 hours after birth the baby was started on formula feeding. Improvement continued and the infant was discharged from hospital in 7 days with the mother.

No subsequent problem was experienced and at the time of writing the baby is $4\frac{1}{2}$ months old and weighs $14\frac{1}{2}$ lbs.

DISCUSSION

Closed chest cardiac massage is particularly easy in a neonate. The thoracic cage is elastic and easily compressed. The right hand should be placed behind the lower left thorax and the left hand anteriorly. The heart can then be massaged between the two.

The incidence of prolapse of the cord has been variously estimated as 1:900,³ 1:250,⁴ 1:233.⁵ Rhodes⁶ has estimated that 1,750 babies die annually in England and Wales from this cause. This amounts to 1 in every 16 stillbirths. Is it not possible that some of these could be salvaged by improved resuscitative measures?

In reporting experiences with open chest cardiac massage in newborns, Sutherland and Epple⁷ report three failures following prolapse of the cord and conclude that in such instances future success is unlikely. This may well be true of open chest cardiac massage with its associated trauma, etc. Closed chest cardiac massage, on the other hand, is simple, non-traumatic, and time-saving, which may mean the difference between life and death. Undoubtedly, in the case just reported, cardiac arrest must have occurred very shortly before birth; hence the success. It must always be remembered that absence of pulsations in the cord does not necessarily mean the foetus is dead, as the heart still may be beating.⁶ Resuscitative measures including closed chest cardiac massage are always worth while, particularly in view of a recent report⁵ that tentatively concludes that permanent cerebral damage is a less common sequel in foetal survivors of prolapsed cord than was formerly feared.

The obvious objection to closed or open chest cardiac massage in a stillborn is the danger of permanent anoxic sequelae. However, the increased tolerance of the foetus to anoxia should be borne in mind,⁸ and resuscitation resorted to where the death of the foetus was known to have occurred shortly before birth. Reilly and Melville,⁸ in reporting a case of successful resuscitation of a stillborn by open chest cardiac massage, have demonstrated that permanent anoxic damage is not a necessary concomitant of this form of therapy.

As cardiac massage in neonates becomes more generally adopted, the results may be more enlightening, and the indications for this procedure more scientific. In the light of present knowledge it would appear that closed chest cardiac massage is the initial treatment of choice, followed by the open chest method should failure result.

SUMMARY

Closed chest cardiac massage in a stillborn has proved successful. In cases of prolapsed cord, when it is difficult to tell when cardiac arrest occurs, the possibility of successful resuscitation by this method should be borne in mind.

RÉSUMÉ

Nous avons présenté un cas de naissance d'un prématuré à la suite du prolapsus du cordon ombilical. Immédiatement, nous avons intubé l'enfant et l'avons ventilé avec de l'oxygène. Etant donné que l'auscultation a confirmé l'arrêt cardiaque, nous avons pratiqué le massage cardiaque externe et, en 30 secondes, le rythme cardiaque est apparu. Au bout de 40 minutes, des respirations spontanées apparaissaient. En ce moment, le bébé a 4½ mois et pèse 14½ livres. On ne décèle pas de séquelles d'anoxie.

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