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A new maneuver in the resuscitation of newborn after caesarian delivery by the obstetrician: A case-control study

Mohammed Hamid Mohammed Al-sabawi
CAB Ped, Department of Neonatology and Pediatrics, Ibn-Sena Teaching Hospital, Al-Rasheedia, Mosul, Nineveh, Iraq

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Abstract
Background: Most of newborns who are delivered by cesarean section are subjected to transient tachypnea after delivery, so the aim of this study is to improve the respiratory outcome of these newborns that are usually complained from "wet lung syndrome".
Method: This case-control study was implemented on 500 newborn babies (250 cases and 250 controls) in 3 obstetric hospitals in Mosul city over 5 years. The maneuver is implemented by the obstetrician just after extrication of baby from uterus through compression of the chest of newborn delivered by caesarian section to simulate the squeezing effect provided during the normal vaginal delivery in order to evacuate lung fluids as much as possible.
Results: The majority of cases (78.4%) has been received little or no further resuscitation; whereas significant number of control (50.8%) was require further resuscitation and interventions (i.e. beyond the routine care).
The average of Apgar scores during resuscitation of cases has showed a clear improvement in comparison with control group.
The duration of transient tachypnea is also significantly decreased among those newborns cases which mostly ranged from few to several hours in comparison with those controls which last longer.
Conclusions: This maneuver *"Mohammed's maneuver"* may be effective in improving the respiratory outcome of newborns delivered by caesarian section.

Keywords: new maneuver, mohammed's maneuver, resuscitation of newborn, wet lung syndrome, transient tachypnea of newborn

Introduction

Transient tachypnea is most common after term cesarean delivery. It is characterized by the early onset of tachypnea, sometimes with retractions, or expiratory grunting and, occasionally, cyanosis that is relieved by minimal oxygen supplementation (<40%). Most infants recover rapidly, usually within 3 days. The chest generally sounds clear without crackles or wheeze, and the chest radiograph shows prominent pulmonary vascular markings, fluid in the intralobar fissures, overaeration, flat diaphragms, and, rarely, small pleural effusions. Transient tachypnea is frequently a diagnosis of exclusion; the distinctive features of transient tachypnea are rapid recovery of the infant and the absence of radiographic findings for Respiratory Distress Syndrome (RDS) (hypoaeration, diffuse reticulogranular pattern, air bronchograms) and other lung disorders. The syndrome is believed to be secondary to slow absorption of fetal lung fluid, resulting in decreased pulmonary compliance and tidal volume and increased dead space. In severe cases, retained fetal lung fluid may interfere with the normal postnatal fall in pulmonary vascular resistance, resulting in persistent pulmonary hypertension; a mild surfactant deficiency may be present. Treatment is mainly supportive [1, 2, 3, 4].

Newborns who are delivered by normal vaginal delivery are subjected to compression of the chest by birth canal and maternal pelvis leading to evacuation of most of lung fluids outside the body through mouth and nose; whereas newborns delivered by caesarian section are usually deprived from this squeezing phenomenon, therefore, they are more susceptible for retaining of lung fluid after delivery leading to (Wet Lung Syndrome) causing Transient Tachypnea of Newborn.

Therefore, the idea is simple; the researcher suggests a maneuver through artificial compression of the chest of newborns delivered by caesarian section to simulate the squeezing effect of the normal vaginal delivery in order to evacuate the lung fluid as much as possible.

Aim of study

This study is designed to improve the respiratory outcome of the newborn delivered by caesarian section and to decrease the incidence and duration of transient tachypnea among these newborns due to wet lung syndrome.

Methods of study

Participants

The study was implemented on 500 newborn babies (250 cases and 250 control) delivered by caesarian section in 3 obstetric hospitals in Mosul city (Al-Batool teaching hospital, Al-Khansa teaching hospital, and Nineveh private hospital).

Duration of study was about 5 years (started in 2010 and stopped after ISIS invasion to Mosul city in 2014, then resumed during 2018).

All newborns included in this study were term and near term babies (≥35 weeks gestational age). Preterm babies are not included in this study because of the bios in the results of study because they usually complain from respiratory distress syndrome due to surfactant deficiency rather than

wet lung syndrome.

Intervention

The 250 cases of newborns delivered by caesarian section are subjected to the maneuver during the critical period which begins just after extrication of baby from uterus till the first breath of air.

The maneuver is conducted by the obstetrician to the newborn just after extrication from uterus through gentle compression of the chest to evacuate lung fluids as much as possible in order to simulate the squeezing effect of chest provided by birth canal during the normal vaginal delivery.

This *"Mohammed's maneuver"* is done by upside-down position of the baby then gentle compression on the lateral sides of the chest of newborn for several times either by one or both hands of the obstetrician while the assistant is carrying the newborn (see Figure 1 and Figure 2) or by carrying of the newborn by one hand of the obstetrician and compression of the chest by the other hand (Figure 3). This maneuver is preferably accompanied by suction of fluid from nose and mouth of newborn. This maneuver is safe and should not takes >30 seconds.

The pressure of compression should be neither too little nor too severe.

Note: This maneuver should be done BEFORE clamping and cutting of the umbilical cord because the current attitude is to delay clamping of the umbilical cord for at least 1 minute to prevent anemia in the newborn; as well as the placenta is normally supplies the fetus with oxygen through umbilical cord throughout gestation including the moments just after delivery before detachment of placenta from uterus.

Therefore, if we cut the umbilical cord before adequate evacuation of lung fluid, it means we cut the only way of oxygen before preparing the lung to receive the environmental oxygen. However, it can also be done after cutting of the umbilical cord by the pediatrician during resuscitation.

Statistical methods

The statistical methods used to compare the 2 groups of newborns (250 cases & 250 control) are expressed as simple numbers and percentages with illustration by table and diagrams.

Results

The 250 cases who undergo this new maneuver, 196 (78.4%) of them have been received little or no further resuscitation (i.e. routine care e.g. suction, and minimal oxygen therapy); the other 54 (21.6%) cases were require further resuscitation and interventions (e.g. ambu bag, nasal cannula/ continuous positive airway pressure (CPAP), endotracheal intubation and cardiac compression, or drugs e.g. adrenaline).

The 250 control who didn't undergo this maneuver, 123 (49.2%) babies require little or no further resuscitation; whereas the other 127 (50.8%) babies were require further resuscitation and interventions (see Table 1).

Clinical observations for Apgar scores (1-10) have been estimated for both groups (cases and controls) in 1, 5, 10, and 15 minutes (see Figure 4).

The duration of transient tachypnea has also been estimated for both groups in the first 3 days of life (see Figure 5).

Table 1: Illustrates the comparison between case and control according to the need for resuscitation.

Parameter	Cases	Control
Routine care	196 (78.4%)	123 (49.2%)
Ambu bag	31 (12.4%)	84 (33.6%)
Nasal cannula/CPAP	16 (6%)	33 (13.2%)
Endotracheal intubation and Cardiac compression	4 (2%)	6 (2.4%)
Drugs e.g. adrenaline	3 (1.2%)	4 (1.6%)
Total	250	250

Fig 1: Compression on the lateral sides of the chest of newborn by one hand of the obstetrician while the assistant is carrying the newborn.

Fig 2: Compression on the lateral sides of the chest of newborn by both hands of the obstetrician while the assistant is carrying the newborn.

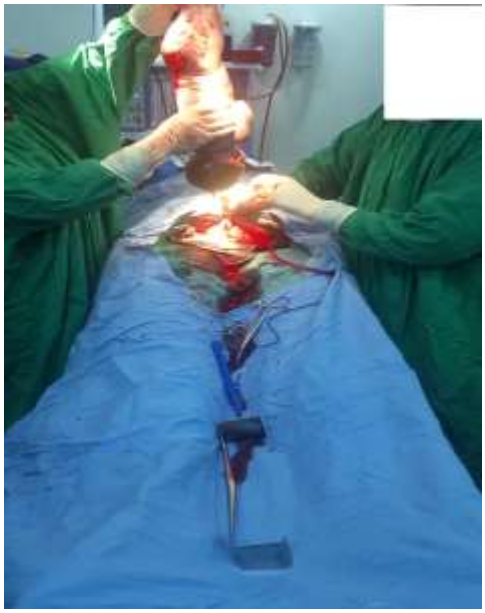

Fig 3: Carrying of the newborn by one hand of the obstetrician and compression of the chest by the other hand.

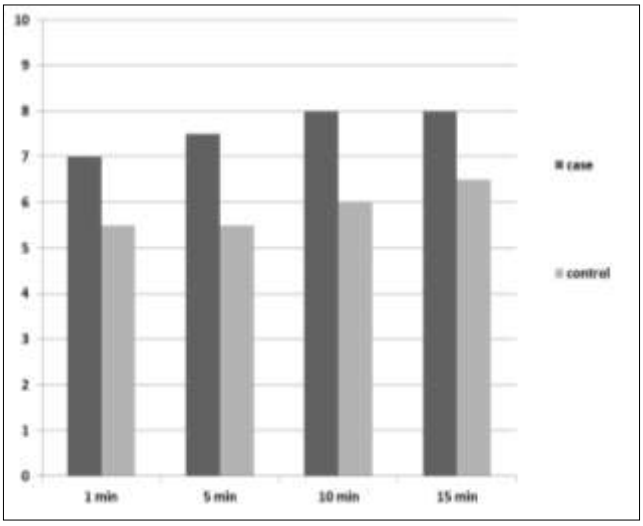

Fig 4: A diagram illustrates a comparison between case and control according to the average of Apgar scores during resuscitation

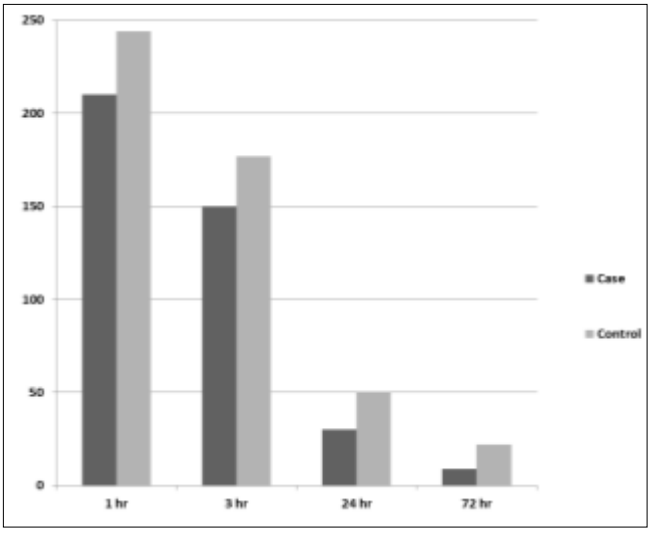

Fig 5: A diagram illustrates a comparison between case and control according to the duration of transient tachypnea of newborn

Discussion

There is a clear difference between newborns delivered by caesarian section that undergo initial resuscitation by the maneuver (cases) that show improvement in the respiratory outcome in comparison with those who do not undergo this maneuver (control) in relation to the need for further resuscitation (Table 1).

The average of Apgar scores during resuscitation of cases has also showed a clear improvement in comparison with control group (Figure 4).

The duration of transient tachypnea is significantly decreased among those newborns cases which mostly ranged from few to several hours in comparison with those controls which lasts longer (Figure 5).

The problem of this study is that those newborns with congenital malformations of chest, lungs, or heart may not benefit from this maneuver.

The technique of this maneuver is also important that it should be done with repetitive gentle compression of both sides of the chest (see supplemental video); too little compression is of no benefit in squeezing the lungs from fluids; whereas too much compression may theoretically cause fracture of the ribs and cardiac arrhythmias.

Conclusion

It is clearly obvious that this simple maneuver *"Mohammed's maneuver"* may change the respiratory outcome of newborns delivered by caesarian section if done properly.

Acknowledgement

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Conflict of interests

The author declares that they have no competing interests.

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Ethical approval

This study is approved by Nineveh Health Directorate Training Center & Human Development.

Clinical Trial Registration number

ISRCTN52035970. URL: https://doi.org/10.1186/ISRCTN52035970

Informed consent

The newborn in the pictures is my son, so there is no need to take permission for publication, but I get the consent from other parents for the rest of newborns before this maneuver was done.

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