



## A New Maneuver in the Resuscitation of Newborn after Caesarian Delivery by the Obstetrician: A Case-Control Study

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### Abstract

**Background:** Many of the newborns who delivered by cesarean section are subjected to transient tachypnea after delivery due to “wet lung syndrome”, so the aim of this study is to improve the respiratory outcome of these newborns.

**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 the baby from uterus during cesarean section through repetitive compression of the chest of the newborn (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 controls (50.8%) were 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 cases in comparison with controls which lasts 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) (hypoeration, 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 [1-4].

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 the newborn 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.

### Methods of Study

#### Participants

The study was implemented on 500 newborn babies (250 cases and 250 controls) 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 ( $\geq 35$  weeks gestational age). Preterm babies are not included in this study because of the bias 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 who 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 through gentle repetitive 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 (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 should be accompanied by suction of fluid from nose and mouth of newborn.

The maneuver is safe and should not takes more than 30 seconds. The pressure of compression should be neither too little nor too severe.



**Figure-1:** illustrates compression on the lateral sides of the chest of newborn by one hand of the obstetrician while the assistant is carrying the newborn.



**Figure-2:** illustrates compression on the lateral sides of the chest of newborn by both hands of the obstetrician while the assistant is carrying the newborn.



**Figure-3:** illustrates carrying of the newborn by one hand of the obstetrician and compression of the chest by the other hand.

This maneuver should be done *before* clamping and cutting of the umbilical cord because the placenta is normally supplies the fetus with oxygen by the umbilical cord throughout gestation including the moments just after delivery before detachment of placenta from uterus, thus, cutting the umbilical cord before adequate evacuation of lung fluid, it means cutting the only way of oxygen before preparing the lung to receive the environmental oxygen. However, This maneuver can also be done after cutting of the umbilical cord by the pediatrician during neonatal resuscitation.

**Note:** The current attitude is to delay clamping of the umbilical cord for at least 1 minute to prevent anemia in the newborn [5].

### 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 underwent this 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

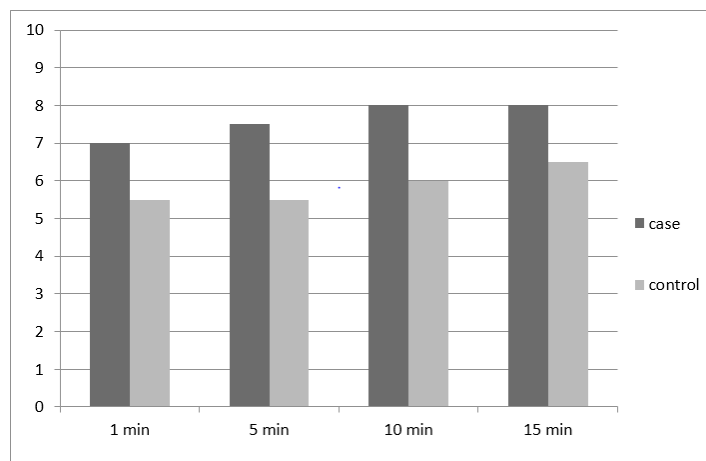
(e.g. ambu bag, nasal cannula/continuous positive airway pressure (CPAP), endotracheal intubation and cardiac compression, or drugs e.g. adrenaline).

The 250 control who did not underwent this maneuver, 123 (49.2%) of them require little or no further resuscitation; whereas significant number of the other 127 (50.8%) were require further resuscitation and interventions (Table 1).

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

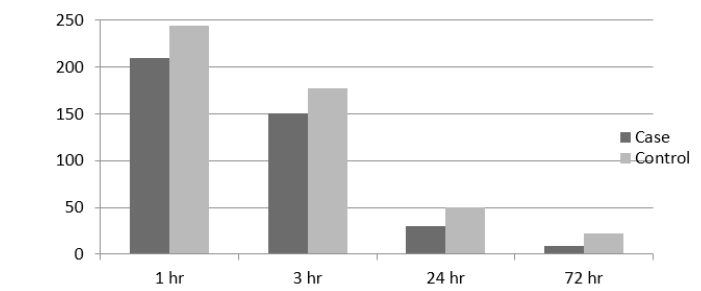
**Table-1:** Illustrates the comparison between case and control according to the need for resuscitation.

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



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

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



**Figure-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 who underwent initial resuscitation by the maneuver (cases) have show improvement in the respiratory outcome in comparison with those who do not underwent 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; 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 obviously that this simple maneuver “*Mohammed’s maneuver*” may change the respiratory outcome of newborns delivered by caesarian section if done properly.

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**Ethical Approval:** This study is approved by Nineveh Health Directorate Training Center & Human Development.

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**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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