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Annals of Reproductive Medicine and Treatment

Research Article

Nahid & Zahra Head Lifting Maneuver As a Novel Technique for Resolving Shoulder Dystocia

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Abstract

Shoulder dystocia (SD) represents an obstetric emergency that has potential devastating effects on the neonate and mother. SD remains a serious challenge to delivery teams. We introduced a novel technique called "Nahid & Zahra head lifting maneuver" for resolving SD. With this SD delivery technique lifting of the fetus's head is done by an assistant, while is standing opposite the mother's face upon the delivery bed and bending forward. Simultaneously two other assistants for exerting Mc Robert's and Rubin maneuvers and one obstetrician for posterior arm delivery are needed in this procedure. With head, lifting maneuver the space inferior the fetus's head and body is widening and can easily be used by the delivery provider for quickly fetal posterior arm delivery, and faster resolving SD.

This technique has been successfully applied to 16 cases of SD with no apparent complications to date. Age ranges of mothers were 31-42 years. Pregnancy ages were 37-43 weeks. Gravidity of mothers were 5-8, and 13 of them were diabetic (8 were diabetes Mellitus and 5 Gestational diabetes). This procedure is very fast and takes only 40-45 second.

Nahid & Zahra head lifting maneuver is a simple, effective and time saving method for resolving SD. If our observations are confirmed in larger series, it could become a part of the routine procedure for resolving SD.

ABBREVIATIONS

SD: Shoulder Dystocia; PA: Posterior Arm

INTRODUCTION

Shoulder dystocia (SD) represents an obstetric emergency that has potentially devastating effects on the neonate and mother. SD can be defined as failure of the shoulders to traverse spontaneously from the pelvis after delivery of the fetal head and additional obstetric maneuvers are needed to enable delivery of the shoulders [1]. In other words, the interval between fetal head and body delivery in SD is more than 60 seconds [2].

SD can be one of the most frightening emergencies in the delivery room. It is a subjective clinical diagnosis and should be suspected when the fetal head retracts into the perineum (turtle sign) after expulsion due to reverse traction from the shoulders being impacted at the pelvic inlet [3].

SD occurs in 0.2-3% of all vaginal deliveries [4-6]. Hansen and Chauhan reported that the rate of SD is about 1.4% of all

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Submitted: 25 October 2018

Accepted: 27 November 2018

Published: 29 November 2018

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ISSN: 2573-1092

OPEN ACCESS

Keywords

- Shoulder dystocia
- Delivery maneuvers
- Macrosomia
- Fetal Complication
- Maternal Complication
- Posterior arm delivery

deliveries and 0.7% of vaginal births [7]. It is an uncommon and unpredictable emergency event. Therefore, the obstetrician must be well-prepared to recognize a SD immediately and act quickly through an orderly sequence of steps systematically to affect delivery in a timely manner. The goal of management is to prevent fetal asphyxia, traumatic injuries and permanent obstetrical palsy and relief of mother from sever damages [8].

SD is among the 4 largest causes of monetary awards for obstetrical tort cases in the US and it still remains a serious challenge to delivery teams [9]. Nowadays, with increasing the mothers' fatness, slow motion lifestyle and increasing of diseases like diabetes mellitus that resulted fetal macrosomia (fetal weight > 4.5 Kg), the incidence of SD and its complications is increasing seriously [5]. In infants with a birth weight of 4-4.5 Kg the rate of SD increases to 5% to 9% [10]. Nearly all of the retrospective SD series have included some risk factors, such as fetal macrosomia, maternal diabetes, abnormal labor, maternal weight, operative vaginal delivery, and previous SD [11].

Efforts to address SD have focused mainly on training in

Cite this article: Sakhavar N, Heidari Z (2018) Nahid & Zahra Head Lifting Maneuver As a Novel Technique for Resolving Shoulder Dystocia. Ann Reprod Med Treat 3(1): 1021.

the acute management of SD and developing risk strategies to identify women at risk for SD so that a prophylactic cesarean delivery could be considered. Despite numerous attempts to identify women at risk for SD have been made, the sensitivity and specificity of these efforts have been poor [6,12].

Most of the cases of SD occur urgently and precise prediction is not possible. Maneuvers that has used for resolving the SD are designed to do one of three things:

1. Increase the functional size of the bony pelvis through flattening of the lumbar lordosis and cephalad rotation of the symphysis pubis.

2. Decrease the bisacromial diameter, the breadth of the shoulders of the fetus.

Change the relationship between fetal bisacromial diameter and the mother bony pelvis axis through an internal or external rotation maneuvers [4].

McRoberts's maneuver is the flexion and abduction of maternal hips. It can successfully resolve the SD in 42 percent of patients [13].

Recently the delivery of the posterior arm (PA) has gained importance in the SD management, particularly with respect to the increased success and reduction of delivery time. Holland et al., have demonstrated that there is also a reduction in Brachial plexus injury (BPI) [14]. In this technique pressure should be applied by the delivering provider at the fetal antecubital fossa in order to flex the forearm. The arm is subsequently swept out over the fetal chest and delivered over the perineum [15]

Rubin Maneuver, often be done simultaneously with McRoberts's Maneuver is moderate suprapubic pressure by a delivery assistant that stands on the side of the bed and be done while downward traction of the fetal head is applied [10].

Wood corkscrew Maneuver, Gaskin Maneuver (all-fours position), Jacquemier Maneuver or Barnum's maneuver, Zavanelli Maneuver, Kleidotomy and symphisotomy are other methods for SD delivery [4,8,10].

The effectiveness of all above-mentioned maneuvers weren't proved and also some of them are very invasive and in many cases cause fetal and maternal complications. The major concern of SD is damage to the fetal upper brachial plexus nerves, Klumpke paralysis, Erb's Palsy, Fetal hypoxia, Fetal death, Cerebral palsy, Maternal post-partum hemorrhage and infection, Vaginal lacerations and 3rd/4th degree tears, extended episiotomies, Laceration of uterine cervix or bladder, Large hematoma, Sub peritoneal hematoma, Uterine rupture, Maternal death due to the severity or mismanagement of complications [16].

Evidence from cadaver studies suggests that lateral or downward tractions of the fetal head, are more likely cause nerve avulsion. In a Swedish series, downward traction on the fetal head had been employed in all cases of residual BPI at 18 months old [17].

McRobert's and Rubin maneuvers simultaneously are effective interventions with reported success over 90% and therefore can be employed in the first step [2]. If the anterior shoulder is not

released with these maneuvers, another maneuver should be attempted [8].

To make easier vaginal SD, many professional bodies have set up guidelines for a systematic approach, [3-5] which would start with the least invasive maneuvers, such as rotational methods and delivery of the PA [18].

Spain et al., found no association between SD maneuvers and neonatal morbidity after adjusting for the duration, a surrogate for severity. Their results demonstrated that clinicians should utilize the maneuver most likely to result in successful delivery [19].

We introduced and discussed a novel technique called "Nahid & Zahra head lifting maneuver" for resolving SD in this study.

MATERIAL AND METHODS

In this retrospective, descriptive study, data were reviewed for all cases in which Nahid & Zahra head lifting maneuver were used at the Zahedan University of Medical Sciences (ZAUMS), Zahedan, Iran, between 1996- 2018.

It was discovered in the delivery room in 1996 by Dr. Sakhavar and her colleague Dr. Fatehi in Obstetrics and Gynecology department, Quds hospital, Zahedan University of Medical Sciences (ZAUMS), Zahedan, Iran. After that time, it was applied for all SD cases that the first line maneuvers (McRoberts and Rubin) were not successful.

All patients provided written informed consent. The ethics committee of ZAUMS approved this study (IR.zaums.rec.1394-403, Feb 07, 2016). On the other hand, we intended to introduce this maneuver as an efficient technique for SD delivery in complex situations.

Shoulder dystocia management

After recognition of SD, first step in our protocol is getting help from an anesthetist and a pediatrician. The second step is encouraging the mother for cooperation and stopping pushing because it can worsen the impaction of the shoulders. The third step is McRoberts's & Rubin maneuvers after discharge the bladder and continuing gently downward traction on the fetal head. If these fail, an episiotomy may be needed to facilitate the shoulder delivery and finally in this step we prefer to do our novel maneuver. In other words, Nahid and Zahra head lifting maneuver have been applied for all cases that McRoberts's and Rubin maneuvers had been failed and there was a need for additional maneuvers for SD delivery.

Nahid & Zahra head Lifting Maneuver

In this maneuver the woman should be laid flat and any pillows should be removed from under her back. With one assistant stands back against the mother's face on the mother's lithotomy bed while she/he put her/his legs on the two sides of the mother pelvis and bends forward. Then, she/he must take the fetus head from two sides and lift it upward gently (Figure 1), in this way we will have a suitable and sufficient space, inferior the fetus posterior shoulder, in this step we must aid delivery of the PA (Figure 2). Delivering the PA reduces the diameter of the fetal shoulders by the width of the arm. The fetal wrist should be

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Figure 1 Nahid & Zahra Head Lifting Maneuver.



grasped and the PA should be gently withdrawn from the vagina in a straight line. In this way, delivery of the PA and posterior shoulder could be simply performed and then the vaginal space will be wider for easy delivery of the anterior shoulder. We think if we use Labor Delivery Recovery (LDR) Bed, more safety could be existed for assistant standing up on the bed.

RESULTS

The creation of "Nahid and Zahra head lifting maneuver" is the conclusion of 20 year experiences in a referral maternity hospital in ZAUMS, Sistan & Baluchistan province in southeast of Iran. The maneuver that had been done in 16 SD cases from 1996 till now and has Completely (100%) been successful and hadn't had any serious or permanent maternal or fetal complications. It was successfully performed even in one urgent case that the fetus weight was 6.75 Kg. Age range of mothers was 31-42 years. Gestational age was 37-43 weeks. Their Gravidity was 5-8 and 13 from 16 cases were diabetic (8 were diabetes mellitus and 5 gestational diabetes). Birth weight range of newborns was 4.6-6.75 Kg.

In 8 cases the head delivery occurred prior to the hospital entrance and the fetuses were expired. Our novel maneuver was successfully applied and there was no need for caesarean sections in these cases.

Our procedure is very fast and takes only 40-45 seconds. This maneuver has no need any special device and is too simple to perform and very effective.

DISCUSSION

In SD due to compression of the umbilical cord between the fetal body and the walls of the vaginal canal, there is a short critical time to save the feta health and prevention of the hypoxia and ischemic encephalopathy. Thus, the obstetrician must select the best and most effective maneuver very quickly for releasing the SD. It was recently reported that if the SD delivery time be less than five minutes there was a very low rate of hypoxic ischemic injuries [20].

The occurrence of SD cannot be accurately predicted based on antenatal risk factors or labor abnormalities. Therefore, the clinician should be well-prepared for possible occurrence of SD in all vaginal deliveries, be cognizant of the various maneuvers that have been shown to be effective in delivering the SDs, and have a step-wise plan of action, which allows expeditious execution of diagnosis and treatment [21].

The goal of management is to safely affect delivery of the fetus before asphyxia and cortical injury occur from umbilical cord compression and impeded inspiration, and without causing peripheral neurologic injury or another trauma [22].

It is difficult to recommend an absolute time limit for the management of SD as there are no conclusive data available, but there appears to be a very low rate of hypoxic ischemic injury up to five minutes [2].

Following the failure of McRoberts' maneuver, subsequent application of rotational methods and PA delivery have similar high success rates, but it has been shown that the former may be associated with less fetal injury [18].

Previous studies showed that McRoberts's maneuver and suprapubic pressure are widely practiced as the primary steps to relieve SD and are associated with low rates of fetal injury. Hoffman et al., also demonstrated that the delivery of the posterior shoulder had the highest overall rate of success compared to all other maneuvers [4]. As quick resolution of SD is the primary goal, the delivery of the posterior shoulder following the less technically demanding maneuvers of McRoberts and suprapubic pressure would be an appropriate approach. Likewise, it was demonstrated that the risk of fetal injury increased with the number of maneuvers performed [23]. This finding further

strengthens the argument for using the most effective procedure (delivery of the PA) earlier in the approach to the cases of SD. Interestingly Hoffmann et al., did not demonstrate a loss of efficacy of any maneuver regardless of its timing. This would suggest that at no point in the acute management of SD should any maneuver be completely abandoned [4].

In a retrospective, review of 250 SD cases that occurred between 1991 and 1994 in Los Angeles County-University of Southern California Medical Center, success rate of the McRoberts's maneuver alone was 42%. More than half (54.2%) of the SDs were resolved with combination of McRoberts's maneuver, suprapubic pressure, and/or proctoepisiotomy [11].

In one case series, 'All-fours' technique has been described with an 83% success rate [24].

Few others have investigated success rates of particular maneuvers and their relationship to birth injury. Chauhan et al showed that they were unable to identify any particular maneuver associated with a lower risk of fetal injury [4,23]. Most cases in their study required five or more maneuvers to resolve the SD and were associated with a mean prolonged delivery time of 10.75 minutes. The rarity of this complication coupled with the need for multiple maneuvers and prolonged time of delivery highlight the extreme degree of difficulty in the resolving SD cases. Nonetheless, the small number of cases precludes meaningful comment on optimal management or prediction of these rare cases [4].

So, creation of a novel, simple, quick and noninvasive maneuvers in resolving SD has much more importance. As we know, in SD delivery the main problem is a deficit of space in the vaginal canal for the hand entrance. The weight of the fetus head and body due to earth gravity force caused the compression of fetus body and posterior shoulder to the posterior vaginal wall. If we can lift the fetus head more effectively, we will acquire a suitable widening space for facilitating delivering the fetus PA. This idea led us to create an effective, noninvasive simple maneuver for resolving SD. With attention of our first names and its mechanism, we named it "Nahid & Zahra head Lifting Maneuver".

Nahid and Zahra head lifting maneuver causes easy and fast delivery of posterior shoulder. Hoffman et al., demonstrated that delivery of the posterior shoulder was the superior to other maneuvers in the acute management of SD. In line of our results, Hoffman et al., strongly encourage the early uses of suitable maneuvers to deliver the posterior shoulder in SD cases [4].

In the general, the operator has up to five minutes to deliver a previously well-oxygenated term infant before an increased risk of asphyxia injury occurs [2,25].

Head and body weight bearing by the assistant in head lifting procedure causes widening of the heavy fetus inferior space and complete obstetrician hand entrance and posterior shoulder delivery maneuver in a very short time.

If we use Nahid and Zahra head lifting maneuver, PA delivery could be done very easy and fast. Therefore, we recommend our novel technique as the first line procedure for resolving SD. The fear of fetal manipulation in this technique can be overcome by appropriate training of obstetricians with mannequins.

CONCLUSIONS

Nahid & Zahra head lifting maneuver is an easy, effective and time saving method for resolving SD. If our observations are confirmed in larger series, it could become part of the routine procedure or even a first line procedure for resolving and even for preventing from SD.

ACKNOWLEDGMENTS

The authors thank from Zahedan University of Medical Sciences (ZAUMS) and mothers that provide the conditions of this experience research. We also especially thank Dr. Zahra Fatehi for her early help in idea creation of this maneuver.

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Cite this article

Sakhavar N, Heidari Z (2018) Nahid & Zahra Head Lifting Maneuver As a Novel Technique for Resolving Shoulder Dystocia. Ann Reprod Med Treat 3(1): 1021.