



# Shoulder Dystocia: A 10-Year Documented Experience at a Single Obstetric Unit in Port Harcourt

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## **Authors' contributions**

*This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.*

## **Article Information**

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## **ABSTRACT**

**Background:** Shoulder Dystocia (SD) is an important obstetric emergency with dire consequences especially for the baby. Periodic evaluation of this important obstetric complication is imperative in improving outcome. This study was to determine the prevalence, evaluate the risk factors, treatment modality and perinatal outcome at the University of Port Harcourt teaching hospital.

**Materials and Methods:** This was a retrospective study of all mothers who had babies with shoulder dystocia during delivery at the University of Port Harcourt Teaching Hospital, over a 10-year period, from January 1<sup>st</sup> 2010 to December 31<sup>st</sup> 2019. Relevant information extracted from the case files of affected mothers were analyzed using SPSS version 25 software package. Results were presented in simple frequency tables and percentages.

**Results:** Twenty-one patients had babies with shoulder dystocia over the 10-year period. This constituted 0.4% of all vaginal deliveries during the period under review. The mean age of women who had SD was 35.7±0.79 years. It occurred majorly in primiparous women (47.6%) and most had tertiary level of education 11 (52.4%). Majority of shoulder dystocia occurred in mothers with gestational age of 41 weeks (66.7%) and above. The most common risk factor was maternal obesity observed in 17 (81.0%) patients followed by fetal macrosomia documented in 15 (71.4%) cases. In 33.3% of patients there was no identifiable risk factor. Nineteen (90.5%) babies had various degrees of birth asphyxia and there were two (9.5%) cases of perinatal mortality. The McRobert's technique was employed successfully in 20 (95.2%) cases.

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**Conclusion:** Despite the low prevalence of shoulder dystocia, it still represents a huge risk of morbidity for both the mother and fetus. Prompt diagnosis and prompt intervention with an experienced obstetrician are imperative in averting serious perinatal morbidity and mortality. McRobert's manoeuvre was successful in over 90% of cases.

*Keywords: Shoulder dystocia; McRobert's technique; fetal outcome; Port Harcourt.*

## 1. INTRODUCTION

Shoulder dystocia (SD) is defined as a delivery that requires additional obstetric manoeuvres to release the shoulders after gentle downward traction has failed [1,2,3]. Shoulder dystocia is when, after vaginal delivery of the head, the baby's anterior shoulder gets caught above the mother's pubic bone [2,3]. Typically, SD is heralded by the classic "turtle sign" in which the delivered fetal head retracts back tightly against the maternal perineum [4,5].

The reported incidence ranges from 0.6% to 3% among vaginal deliveries of fetuses in the vertex presentation, but there can be a high perinatal mortality and morbidity even when shoulder dystocia is managed appropriately [6-8].

The identifiable risk factors for shoulder dystocia (SD) include: Birth weight  $\geq$  4000g in the index pregnancy (macrosomia), prolonged second stage labour, prolonged active phase of first stage labour, instrumental delivery, maternal diabetes mellitus, increased maternal body mass index (BMI  $>$  30 kg/m<sup>2</sup>, maternal obesity), history of previous shoulder dystocia, labour augmentation, short stature, male gender, induction of labour, post-date pregnancy, advanced maternal age, abnormal pelvic anatomy and epidural anaesthesia [9-11]. Despite its low incidence, SD still represents a huge risk of morbidity for both the mother and the fetus [12-14].

The mechanism of SD involves failure of the fetal shoulders to rotate into the transverse diameter of the pelvic inlet. The posterior shoulder enters the pelvis while the anterior shoulder gets stuck behind the symphysis pubis. In more severe cases both shoulders get stuck at the brim [3,4,15].

Fetal complications include hypoxia, brachial plexus injury (BPI), fractures (humeral and clavicular) and still birth while the mother is likely to suffer from postpartum haemorrhage, major degree perineal tears, uterine rupture and psychological distress [2,3,16].

SD is diagnosed when the baby's body fails to deliver within one minute of delivery of the baby's head [16]. It is a type of obstructed labour [17]. The attendant health-giver should routinely observe for difficulty with delivery of the face and chin; the head remaining tightly applied to the vulva or even retracting ("turtle sign"); failure of restitution of the fetal head; failure of the shoulders to descend [3,18].

A clinical tool that offers a structural frame work for the management of SD is the HELPERR mnemonic from 'Advanced Life Support In Obstetrics' [19]. If the manoeuvres above in the HELPERR mnemonic are unsuccessful, several techniques have been described as "Last resort" [19] or third line manoeuvres [3,9]. These include: cleidotomy, zavanelli manoeuvre, symphysiotomy, hysterotomy and general anaesthesia. Key factors in successfully managing SD include constant preparedness, a team approach and appropriate documentation. SD should be handled by experienced obstetricians.

The majority of cases of shoulder dystocia occur in women with no risk factors [20]. Shoulder dystocia therefore requires a high level of suspicion; being an unpredictable and largely unpreventable obstetric emergency, with devastating consequences. Despite its infrequent occurrence, all accoucher must be prepared with a high level of awareness of existing risk factors and must always be alert to the possibility of shoulder dystocia with any delivery. Despite these recommendations, SD remains an entity without a clear definition [14,15,21].

### 1.1 Objectives

1. To determine the prevalence and risk factors for shoulder dystocia at the University of Port Harcourt Teaching Hospital (UPTH).
2. To appraise the social demographic pattern, treatment outcome and complications, in women whose deliveries were complicated with SD.

**2. MATERIALS AND METHODS**

Case notes of the patients who had babies with shoulder dystocia at the University of Port Harcourt Teaching Hospital, over a 10-year period between 1<sup>st</sup> January 2010 and 31<sup>st</sup> December 2019 were retrospectively reviewed. The case notes of the patients were retrieved from the medical records department and studied. Data was also obtained from the Special care baby unit (SCBU), and analyzed. Permission were obtained from the Heads of Department of medical records, Obstetrics and the Special care baby unit (SCBU) for the use of hospital records. During the 10-year period, there were 5218 vaginal deliveries, out of which 24 had Shoulder dystocia. Twenty-one (87.5 % retrieval rate) case files were retrieved and important information which include age, parity, risk factors for SD, gestational age at delivery, intervention and outcomes were entered into a predesigned spread-sheet. Data were analyzed using SPSS version 25 software package. Results were presented in percentages and simple frequency tables.

**3. RESULTS**

During the 10-year period under review, there were 5218 vaginal deliveries with 24 documented cases of shoulder dystocia giving a prevalence rate of 0.45%. However, only 21 (87.5%) case files were retrieved and analysed.

Table 1 : Shows the maternal biodata :- More than two-third of the patients 16 (76.2%) were aged between 25 - 35 years, and the mean age of the study population was 35.7± 0.79 years. Most of the women were primiparous 10 (47.6%) and most had tertiary level of education

11(52.4%). Majority of the cases of shoulder dystocia occurred in women whose gestational age were 41 weeks and above 14 (66.7%).

Table 2 shows the fetal outcome:- Of the total number of babies with shoulder dystocia at delivered, majority were males 14 (66.7%) one-third were females 7 (33.3%). Majority occurred in babies with birth weight of 4.0kg and above, 15 (71.4%).

A large number of the babies 17 (81%) had mild to moderate birth asphyxia, with good fetal outcome and 2 (9.5%) of the babies both of unbooked (referred cases) mothers were delivered dead. Two (9.5%) of the babies had severe birth asphyxia and they were admitted into the Special care baby unit (SCBU) and were successfully treated. Eleven (52.4%) babies on the whole were admitted into the SCBU and were discharged eventually.

Shoulder dystocia occurred more in women with BMI ≥ 30kg/m<sup>2</sup> (17, 80.9%) while fetal macrosomia featured in 15 (71.4%) cases. Other common risk factors were prolonged pregnancy 7 (33.3%) and prolonged second stage of labour 6 (28.6%) as shown in Table 3.

Table 4:- shows obstetric complications, treatment outcome and complications in the management of shoulder dystocia. Ten (47.6%) of the women were given episiotomy. Six (28.6%) of the women sustained 1<sup>st</sup> degree perineal tear while 1 (4.8%) woman had 2<sup>nd</sup> degree perineal tear. All the patients had vaginal deliveries following intervention. McRobert's technique was employed successfully in 20

**Table 1. Maternal biodata**

| Variables               | Frequency (n=21) | Percentage (%) |
|-------------------------|------------------|----------------|
| Age (years)             |                  |                |
| 25-29                   | 8                | 38.1           |
| 30-34                   | 8                | 38.1           |
| ≥ 35                    | 5                | 23.8           |
| Mean ±S.D               | 35±0.793         |                |
| Parity                  |                  |                |
| Nulliparous             | 6                | 28.6           |
| Primiparous             | 10               | 47.6           |
| Multiparaous            | 5                | 23.8           |
| Gestational age (weeks) |                  |                |
| < 37                    | 1                | 4.8            |
| 37-40                   | 6                | 28.5           |
| 41 and above            | 14               | 66.7           |

**Chart 1. Occupation**

| <b>Variables</b>   | <b>Frequency (n=21)</b> | <b>Percentage (%)</b> |
|--------------------|-------------------------|-----------------------|
| Occupation         |                         |                       |
| Civil servant      | 7                       | 33.3                  |
| House wife         | 4                       | 19.0                  |
| Business woman     | 4                       | 19.0                  |
| Trader             | 4                       | 19.0                  |
| Student            | 2                       | 9.5                   |
| Level of Education |                         |                       |
| Primary            | 2                       | 9.5                   |
| Secondary          | 8                       | 38.1                  |
| Tertiary           | 11                      | 52.4                  |

**Table 2. Fetal data**

| <b>Variables</b>         | <b>Frequency (n=21)</b> | <b>Percentage (%)</b> |
|--------------------------|-------------------------|-----------------------|
| <b>Sex</b>               |                         |                       |
| Male                     | 14                      | 66.7                  |
| Female                   | 7                       | 33.3                  |
| <b>Birth weight (KG)</b> |                         |                       |
| <3.5 – 3.99              | 6                       | 28.6                  |
| 4.0 - 4.49               | 9                       | 42.8                  |
| ≥4.5                     | 6                       | 28.6                  |
| <b>Asphyxia (n=19)</b>   |                         |                       |
| Severe                   | 2                       | 9.5                   |
| Moderate                 | 9                       | 42.9                  |
| Mild                     | 5                       | 23.8                  |
| None                     | 3                       | 14.3                  |
| <b>Fetal outcome</b>     |                         |                       |
| Still birth              | 2                       | 9.5                   |
| Alive                    | 19                      | 90.5                  |
| SCBU ADMISSION           | 11                      | 52.4                  |

**Table 3. Risk factors for shoulder dystocia**

| <b>Variables</b>           | <b>Number</b> | <b>Percentage (%)</b> |
|----------------------------|---------------|-----------------------|
| BMI (kg/m <sup>2</sup> )   |               |                       |
| ≥18.5 - 29.9               | 4             | 19.0                  |
| 30 -34.9                   | 10            | 47.6                  |
| 35 - ≥ 39.9                | 7             | 33.3                  |
| Fetal macrosomia           | 15            | 71.4                  |
| Prolonged Pregnancy        | 7             | 33.3                  |
| Prolonged Second Stage     | 6             | 28.6                  |
| Previous Shoulder Dystocia | 4             | 19.0                  |
| Diabetes Mellitus          | 6             | 28.6                  |
| Advanced maternal age      | 3             | 14.3                  |

**Table 4. Obstetric characteristics, treatment outcome and complications in the management of shoulder dystocia**

| Variables                  | Frequency (n=21) | Percentage (%) |
|----------------------------|------------------|----------------|
| <b>Onset of labour</b>     |                  |                |
| Spontaneous                | 17               | 81.0           |
| Induction of labour        | 4                | 19.0           |
| <b>Mode of delivery</b>    |                  |                |
| SVD                        | 20               | 95.2           |
| Operative Vaginal Delivery | 1                | 4.8            |
| <b>Perineal tear</b>       |                  |                |
| Episiotomy                 | 10               | 47.6           |
| 1st Degree                 | 6                | 28.6           |
| 2 <sup>nd</sup> degree     | 1                | 4.8            |
| None                       | 4                | 19.0           |
| <b>Time interval</b>       |                  |                |
| < 5 mins                   | 17               | 80.9           |
| ≥ 5mins                    | 4                | 19.1           |

(95.2%) cases while delivery of the posterior arm was used in one (4.8%) patient successfully. Seventeen (66.7%) women delivered within 5 mins of intervention (diagnosis-delivery interval) while 4 (33.3%) patients had some level of delay before successful outcome. All the patients had minimal to moderate blood loss (<300ml). There was no case of postpartum haemorrhage, and no maternal mortality was reported.

#### 4. DISCUSSION

Shoulder dystocia refers to any difficult experienced in the delivery of the shoulders. The shoulders should follow the head in the same contraction. If they do not, then the difficulty can range from slight to complete obstruction of delivery [1,6,22]. The American Society of Obstetricians and Gynecologist defines shoulder dystocia as a “delivery that requires additional obstetric manoeuvres following failure of gentle downward traction on the fetal head to effect delivery of the shoulders” [2,14].

This study was a retrospective analysis giving an incidence of 0.4%. In the literature, the reported incidence varies from 0.2% to 3% [4,7,15]. This large range may be due to the fact that there is no set definition for shoulder dystocia. The true incidence may actually be higher because it is not reported by doctors or midwives due to fear of litigation. Worldwide, shoulder dystocia may be increasing [12,17]. because women are having children at a later age and with increasing prevalence of obesity.

Although, an increasing incidence of shoulder dystocia was noted as the infant birth weight

increased, 28.6% of shoulder dystocia occurred in infants with birth weight less than 4kg, therefore, fetal macrosomia alone may not be an excellent predictor of SD even though a greater proportion of SD was recorded in babies with birth weight greater than 4kg.

The association between maternal diabetes and shoulder dystocia has long been recognized [20]. This is due to the high levels of glucose causing high levels of fetal insulin which leads to fat deposition, leading to fetal macrosomia but with brain sparing effect. Diabetes mellitus, post maturity, maternal obesity are factors associated with a large sized infant, which should signal the possible occurrence of shoulder dystocia.

Slow progress during the first stage of labour and prolonged second stage have been reported as being associated with shoulder dystocia. These associations tend to be much stronger with increasing fetal weight [8]. This was also the finding from this study.

The recurrent risk of shoulder dystocia is quoted as between 1.1% and 16.7% based on retrospective analysis. In this study history of previous shoulder dystocia was documented in 19% of cases. The American College of Obstetricians and Gynaecologists states that “because most subsequent deliveries will not be complicated by shoulder dystocia, the benefit of universal elective caesarean delivery is questionable in patients who have a history of shoulder dystocia [2,14]. The high success rate recorded in this study negates the need for elective caesarean section. Shoulder dystocia is too rare and too unpredictable for prophylactic

caesarean section to be of benefit [7]. The solution for shoulder dystocia is for all birth attendants to know how to manage the condition when it arises [7].

The Royal College of Obstetricians and gynaecologists states that episiotomy may not be necessary in all cases of shoulder dystocia [1,3]. Dandolu et al. showed that a decrease in the use of episiotomy did not result in an increase in the occurrence of shoulder dystocia [23]. Episiotomy was given in about 10 ( 47.6%) of patients in this study.

The first step in managing this emergency is to diagnose shoulder dystocia and to call for help. Signs of possible shoulder dystocia include failure of the baby's shoulder to deliver with the standard amount of maternal effort and moderate traction of the head, or the "turtle sign" which occurs when the baby's head is retracted back against the mother's perineum. Steps to manage the crisis should be taken calmly and quickly. The mother should be informed of the situation and encouraged to help actively. An assistant should record the times and manoeuvres attempted. Several manoeuvres to overcome shoulder dystocia have evolved through clinical experience [19]. One should move quickly through the manoeuvres if they are unsuccessful.

The McRobert's position is usually attempted first as it does not involve direct manipulation of the fetus [10,19]. The mother's thighs are flexed towards her chest to tilt her pelvis forward, thereby producing a significant cephalad rotation of the symphysis pubis and subsequent flattening of the sacrum [24]. While encouraging the mother to bear down, pressure is applied above her pubic symphysis to push the baby's anterior shoulder away from the midline and into the pelvis. McRobert's manoeuvre was employed successfully in 95.2% of cases in this study and it is the preferred first line intervention in all cases of SD in the study centre.

For severe shoulder dystocia that cannot be overcome by any of the conventional methods, three salvage procedures have been described. These manoeuvres are posterior axillary sling traction (PAST), the Zavanelli manoeuvre, and fracture of the clavicles [25,26]. Fortunately, in this study these last resort manoeuvres were not necessary.

Shoulder dystocia is associated with serious complications for both mother and baby. The

mother who delivers a baby with shoulder dystocia has an increased chance of sustaining perineal trauma, tears to the cervix, third- and fourth- degree perineal tears [7]. She may experience significant blood loss from tears or uterine atony. In this study, the rate of perineal tear varies from 4.8% and 28.6% for second and first degree perineal tears respectively. Reported complications from other studies which were not found in this study include: postpartum bladder atony, lateral femoral nerve palsies, injury to the symphysis pubis and rarely uterine rupture [10,16]. About 20% of babies delivered with shoulder dystocia will suffer some sort of injury. The severity of injury depends on the time it takes to resolve the shoulder dystocia and the number of manoeuvres used. Risks to the baby include contusions, lacerations, fractures of the humerus and clavicles, damage to the brachial plexus leading to nerve palsies, and hypoxia leading to cerebral palsy and even death. Cerebral palsy is associated with prolonged head-to-shoulder delivery time. These complications were not found in this study. The paucity of serious complications in this study may be linked to the fact that these deliveries were conducted by experienced obstetricians with prompt intervention. It should be noted that many of the complications seen following shoulder dystocia can also occur following normal vagina deliveries and even caesarean sections.

Conclusion: Shoulder dystocia is a rare but serious mechanical complication of vagina delivery. Prompt diagnosis, prompt intervention with an experienced obstetrician were imperative in averting serious maternal and fetal complications. McRobert's technique as a first line intervention in this study was successful in 95.4% of cases.

## CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

## ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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