

# Shoulder Dystocia: Incidence, Risk Factors and Complications in Saudi Population

A ZARREEN

Gynaecology Department, PGMI/Services Hospital, Lahore

Correspondence to: Dr. Amtullah Zarreen, Consultant Gynaecologist

This study was performed at a district hospital in Saudi Arabia on all neonates born during the 4 years of study period i.e. 15.12.1993 to 14.12.1997. The objective was to find out frequency of shoulder dystocia in that population, risk factors associated with it and the resultant complications of shoulder dystocia. The incidence of shoulder dystocia was 3.98% of total vaginal births and 4.26% of vaginal live births. During the study period there were 203 cases of shoulder dystocia among 5102 total vaginal birth and 5042 vaginal live births. The commonest risk factors associated with shoulder dystocia were fetal macrosomia (118 cases), male sex (107 cases), maternal grand multiparity (107 cases) and diabetes mellitus (26 cases). Of 203 shoulder dystocia cases 21.7% (44 cases) had birth trauma the commonest being fracture clavicle (34 cases) followed by Erb's palsy (8 cases) and fracture humerus (2 cases).

**Key Words:** Shoulder dystocis, risk factors, complications..

Shoulder dystocia means difficult delivery of shoulders after delivery of fetal head. Commonly, it is preceded by the antepartum risk factors like maternal obesity, diabetes mellitus and post-term pregnancy, intrapartum risk factors like induction or augmentation of labour and ventouse or midforceps delivery. More than one risk factor may complicate a pregnancy also. The underlying cause of shoulder dystocia (SD) is fetal macrosomia -- birthweight >4 Kg. ACOG technical bulletin 1990 suggests that all neonates with birth weight 4500 grams or more should be considered macrosomic. In fact, it is not the birth weight alone but an increase in fetal body size in relation to fetal head size that results in difficult delivery of shoulders.

Shoulder dystocia is associated with an increase in maternal and perinatal morbidity and a high incidence of birth trauma. Maternal complications include postpartum hemorrhage (both from uterine atony and from birth canal injury) and puerperal infections. Excessive vaginal lacerations and cervical tears may occur during manipulation. Khanl (1966) described an incidence of 10.3% each. Uterine rupture may follow vigorous attempts to deliver a fetus with stuck shoulders and more so if fundal pressure is applied. Fetal complications include, skeletal injuries like clavicular or humeral fracture and brachial plexus injury. If shoulder dystocia is not managed appropriately, the fetus may end up with severe neurological damage and even still birth. The combination of traction of fetal head and fundal pressure leads to increased risk of neurological and orthopaedic complications.

Reliable prediction of SD before it actually occurs is almost impossible because it is not always possible to make an accurate ante-partum assessment of fetal size by clinical examination especially when pregnancy is complicated by maternal obesity. However clinical examination by a skilled obstetrician and ultrasonic

measurements of biparietal diameter, bisacromial, transthoracic and transabdominal diameter to calculate shoulder to head chest to head ratio may help fairly to identify the high risk group.

Elective caesarian delivery for fetal macrosomia and for cases where SD is strongly anticipated, has been suggested. But this will cause a sharp rise in the caesarian section rates and a large number of women will be subjected to unnecessary operative delivery. Also abdominal delivery of a large infant is not without a hazard. Spellecy has described a 2.6% incidence of birth trauma in infant > 4500 grams ever when delivered abdominally. Thus to prevent SD and its resultant complications, fetal macrosomia should be prevented by decreasing the incidence of obesity, diabetes mellitus and high parity and by adequate diabetic control during pregnancy. Since prediction of SD is not possible, every birth assistant should learn and train herself or himself for the management of SD before the crucial moment when infants' shoulder actually impacts.

## Materials and Methods

The study included all neonates born during the four years of study period in Obstetric and Gynecology department of Zulfi General Hospital. This hospital is located in a medium populated part of the Riyadh region and provides medical care to a population with high incidence of grand multiparity, diabetes mellitus and maternal obesity.

Midwives attend low risk normal vaginal deliveries and pediatrician sees the newborns next morning. For high-risk cases, delivery is supervised/conducted by obstetrician on duty and pediatrician is also called in, to attend the delivery (for immediate newborn care and examination). The diagnosis of shoulder dystocia is noted down in the labour record by the accoucheur (be it a midwife or an obstetrician). Clinical diagnosis of any birth

injury like brachial plexus palsy, clavicular, or humeral fracture was charted down in the birth record by the pediatrician. In cases where skeletal injury was only suspected, X-ray examination was done to make a clear diagnosis.

Maternal and neonatal data were collected by review of all the charts, which were retrieved from medical record section. Also data were collected from record books of nursery, labour room, maternity ward and outpatient departments.

## Results

Out of 5350 deliveries at out hospital during the study period there were 203 cases of SD. Maternal age was between 20 to 30 years in 94 cases between 31 to 40 in 89 cases more than 40 in 14 cases and less than 20 in only 6 cases (Table-1). Regarding parity, 107 mothers were grand multiparous (para 5 or more) while 96 mothers were para 4 or less (Table - 2). Out of 203 cases of SD, in 102 maternal weight was between 61 to 80 kg. in 71 between 81 to 100 Kg. in 16 less than 60 Kg. and in 14 more than 100 Kg including one lady with 140 Kg and another with 150 Kg (Table - 3).

Table - 1: Maternal Age

Age in Years	n=	%age
20	6	02.95%
20-30	94	46.30%
31-40	89	43.80%
40	14	06.90%
Total :	203	99.95%

Table - 2: Parity

Parity	n=	%age
P0-P4	96	47.30%
P5 and above	107	52.70%
Total :	203	100 %

Table - 3: Maternal Weight

Weight in Kg.	n=.	%age
60	16	07.88%
61-80	102	50.24%
81-100	71	34.97%
100	14	06.89%
Total :	203	99.98%

Overall prevalence of diabetes mellitus in pregnancy was 12% during the study period. But among mothers whose deliveries were complicated with SD, 41 (20.18%) were diabetic (26 on Insulin Inj. and 15 on diet control). Thus diabetes mellitus was found to be a definite risk factor in cases of SD (Table - 4).

Table - 4: Association of Diabetes Mellitus with SD

Status	n=.	%age
Non-diabetic	162	79.80%
Diabetic (on Insulin)	26	12.80%
Diabetic (on Diet)	15	7.38%
Total :	203	99.98%

All the 203 babies with history of SD at birth were born alive and as product of singleton pregnancies. These were

107 (52.7%) males and 96 (47.3%) females. The number of normosomic babies (birth weight < 4 Kg.) was 85 (41.8%) while 118 babies (58.12%) were macrosomic (birth weight > 4 Kg.) (Table - 5). Out of total 5350 births during the study period, 4870 were normosomic and 480 were macrosomic. In other words only 85 out of 4870 normosomic (i.e. 1.74%) had SD while 118 out of 480 macrosomics (i.e. 24.6%) had SD.

Table - 5: Foetal Birth Weight

Weight in Kg.	n=	%age
< 4 Kg.	85	41.80
4-5 Kg.	107	52.70
> 5 Kg.	11	5.40
Total :	203	99.90

Of 5350 total births, 5290 were born alive while 60 had a still birth. Out of 5290 live births, 243 were delivered by caesarian section 4844 had a vaginal delivery without SD and 203 had SD during delivery. A total of 76 newborns suffered birth injuries 32 from non-SD group of 4844 (i.e. 0.66%) and 44 out of 203 cases with SD (i.e. 21.67%).

Regarding type of birth injuries, 35 had isolated fracture of either clavicle, 2 had Erb's palsy, one had humeral fracture, 5 had fracture clavicle and Erb's palsy both and one had humeral fracture along with Erb's palsy (Table - 6).

Table - 6: Birth Injuries in SD Cases

No	Type of Injury	n=.	%age
1.	Fracture Clavicle	350	17.24
2.	Erb's palsy	2	00.98
3.	Fracture humerus	1	00.49
4.	(1)+(2)	5	02.46
5.	(2)+(3)	1	00.49
	Total :	203	21.66

All the affected babies were regularly followed-up by pediatricians and orthopedist at 2 and 4 weeks and thereafter as and when indicated.

## Discussion

The incidence of SD in any hospital depends upon the criteria for diagnosis and the nature of population in the catchment area. In our study the incidence of SD was 3.98%, Gross and co-authors have reported incidence of SD as 0.23%. Their diagnostic criterion was the necessity of certain procedure to tackle the problem of SD in addition to episiotomy and down ward traction. Acker and co-workers found that 2% of vaginal deliveries with birth weight more than 2.5 Kg had SD. Their diagnosis of SD was based on assessment of the person writing the charts. The incidence in our study was higher than other reports. Our diagnosis depended only on the judgement of the birth assistant.

The incidence of grand multiparity among SD cases was 52.7% compared to 22.9% in the female population

delivered during pregnancy in general. Of the total 203 SD cases, 41.9% occurred in the babies born to the mothers weighing > 81 Kg. This is higher than 30% reported by Seighworth G et al<sup>4</sup>. About three decades ago, Schwartz B<sup>5</sup> had found that maternal weight of more than 81 Kg. increases the relative risk of SD by a factor of 8. The higher occurrence of SD in diabetic mothers is well known. In our study the incidence of SD in 7% of infants born to mothers with gestational diabetes mellitus. Cousin L<sup>6</sup> reported an incidence of SD in diabetic mothers as 16.7% compared to 1.7% in controls. Our figures of SD are higher for diabetic as well as non-diabetic mothers. The reason may be a higher incidence of fetal macrosomia in our population. In our hospital during the study period 9% of babies born were macrosomic. Compared to 7.6% reported by Langer<sup>14</sup>. Even if not macrosomic, infants of diabetic mothers are at a higher risk of SD than infants of non-diabetic mothers of comparable weights Smelzer J<sup>7</sup>.

Most cases of SD still occur in infants of average birth weight Gross TL<sup>8</sup> and Acker D<sup>3</sup> found that almost half of all SD cases occur in non-macrosomic babies (birth weight < 4 Kg). In our study 41.9% newborns with SD weighed less than 4 Kg. But still macrosomia proved an important risk factor for SD (incidence being 24.6% in macrosomic group versus 1.7% in non-macrosomic group).

Regarding birth trauma, brachial plexus injury and fracture of humerus and clavicle were studied. There were only two cases of humeral fracture both associated with SD. Clavicle is the bone most frequently fractured during birth and may be injured during 15% of deliveries with SD. The incidence of fracture clavicle was 12.3/1000 live births compared with 2-18.7/1000 in other reports<sup>9,10</sup> (Oppenheim WL, Turpenny PD), Narchi H et al have reported an incidence as low as 1.69 per live births from a Saudi population study. Regarding brachial plexus damage, it was found in 1.7/1000 live births. This is higher than 0.4/1000 reported by Greenwald AG<sup>12</sup>. However, our figures are lower than those reported by Jackson ST<sup>13</sup> and Narchi<sup>11</sup>. These were 2.5/1000 and 4.17/1000 respectively. In this study, all cases were proceeded by SD and all had upper brachial plexus damage expressed as Erbs' palsy. In fact, Erbs' palsy is the commonest among brachial plexus injuries that may followed SD. It is present at least

temporarily after 6.7-15% of such deliveries. In our study the incidence was 4.4% of SD cases.

### Conclusion

In this study we found grand-multiparity, maternal obesity, diabetes mellitus and fetal macrosomia to be the definite risk factors for SD and to prevent SD and it's resultant complications measure should be taken to bring down the incidence of these predisposing risk factors in a given population. We agree with Hermandes and Wendel (1990) for the use of "shoulder dystocia drill to familiarize with the principles and to appropriately train obstetric residents and midwife attending deliveries.

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