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Original Research Article

Incidence of shoulder dystocia and its relation to brachial plexus palsy: a 10 year retrospective review at King Abdulaziz University Hospital

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ABSTRACT

Background: Objective of the study was to determine the incidence of shoulder dystocia (SD) in King Abdulaziz University Hospital (KAUH), with a focus on Brachial Plexus Palsy (BPP) and the accompanying risk factors.

Methods: We conducted a retrospective study of all vaginal deliveries between 2005 and 2014. Out of 29,199 vaginal deliveries, 236 cases were diagnosed with SD at KAUH in Jeddah, KSA. The following maternal and perinatal variables were reviewed by the patients' medical records: (booking status, maternal age, gestational age, maternal Body Mass Index (BMI), presence of diabetes, previous history of SD, instrumental delivery, Birth weight, Erb's and Klumpke's palsies).

Results: A total of 236 cases had SD with an incidence of (0.8%). Only 55 cases among all had BPP. The Erb's palsy was found in 54 cases (30.7%) while Klumpke's palsy was found only in one case (0.6%). There were 121 (68.8%) cases with no BPP and a remaining of 60 unknown BPP outcomes. From the total number of cases with SD, mothers with overweight and obesity were found in 93% of the cases.

Conclusions: Most of clinically diagnosed SD cases did not give the consequence of BPP. However, this complication in addition to other complications of SD mandates extra caution in cases with risk factors.

Keywords: Brachial plexus palsy, Erb's palsy, Shoulder dystocia

INTRODUCTION

Shoulder dystocia (SD) is an Obstetric complication of vaginal deliveries requiring additional obstetric maneuvers. It occurs due to traction of one or both shoulders against the bones of the maternal pelvis.¹ The incidence of SD is generally estimated to be 0.6-1.4% and 0.58-0.70% according to the American College of Obstetricians and Gynecologists (ACOG) and the Royal College of Obstetricians and Gynecologists (RCOG) respectively. Several risk factors leading to SD include maternal diabetes, prolonged labor, obesity, operative vaginal delivery, previous shoulder dystocia and fetal macrosomia.^{2,3} Multiple studies are conducted looking for the most prominent risk factors among all. Fetal

macrosomia was found to be one of the most prominent risks leading to SD.^{2,3} However, it is still difficult to find reliable and dependable risk factors that mandate the occurrence of SD.^{2,3} Adverse neonatal outcomes and maternal harm are increased in the incident of SD. Proper management with different maneuvers such as McRobert's maneuver, suprapubic pressure, rotational maneuvers, and delivery of the posterior arm is important to avoid complications.¹ A very serious fetal complication with variant incidence is brachial plexus palsy.⁵⁻⁷ Injury to C5 and C6 nerve roots, resulting in the clinical findings of Erb-Duchenne palsy, and fewer to that is an injury of the (C7, C8 and T1) nerve roots leading to Klumpke's Palsy.⁸

The aim of our study is to determine the incidence of SD in our tertiary center and to detect the predicting risk factors in our society taking in consideration the outcome of BPP.

METHODS

Ethical approval was obtained from the unit of biomedical ethics At KAUH which is a tertiary center in Jeddah-KSA. A total number of 41,546 deliveries were taken from the labor and delivery annual records. Of those, 29,199 had vaginal deliveries. Afterwards, identification of 236 cases of SD was manually verified from the documentation in the hospital annual records from the first of July 2005 until the 30th of December 2014. Then, a retrospective review of the maternal and neonatal medical paper records of all subjects was obtained and data were collected manually on specifically designed collection sheets. A computerized database was also used to confirm the findings. The following maternal and labor variables were reviewed as inclusion criteria: (maternal booking status, presence of diabetes both frank and gestational diabetes mellitus (GDM), neonatal weight, brachial plexus palsy-Erb's or klump's palsy and the mode of delivery). These variables were analyzed as factors affecting the outcome of SD. Exclusion criteria included multiple fetuses and cesarean section deliveries. Statistical Package for Social Sciences (SPSS) software Version16.0 was used to analyze the data.

RESULTS

Of total number of vaginal deliveries during study period, 236 cases were diagnosed with SD at KAUH. Therefore, the hospital-based incidence of SD in Jeddah was 0.8%. In this study period, 55 neonates (31%) had BPP while 121 neonates (69%) did not have BPP. The rate of Erb's and Klumpke's palsy was found to be 54cases (30.7%) and one case (0.6%), respectively. The remaining 60 cases had no documentation about BPP status in the neonate (Figure 1).

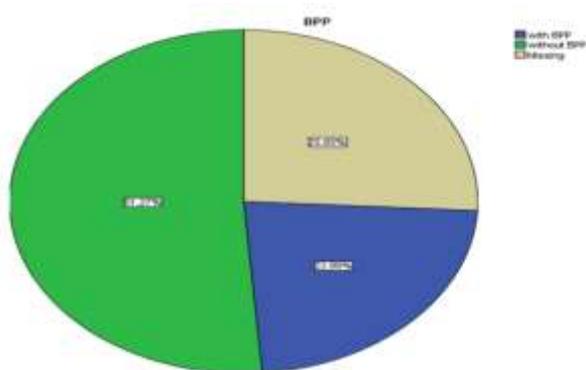


Figure 1: Percentages of brachial plexus palsy cases in the neonate.

Socio-demographic and antenatal characteristics of SD cases are shown in Table 1. Risk factors of SD are demonstrated in Table 2.

Table 1: Socio-demographic and antenatal characteristics of shoulder dystocia cases, KAUH, 2005-2014.

Characteristic	N=236 N (%)
BPP	
With BPP	55 (31)
Without BPP	121 (69)
Age:	
19 or less	3 (1)
20-29	88 (38)
30-39	112 (48)
40 or more	29 (13)
Booking status:	
Booked	127 (56)
unbooked	99 (44)
Gestational age	
36 or less	14 (7)
37-39	93 (44)
40 or more	104 (49)

Table 2: Risk factors of shoulder dystocia cases, KAUH, 2005-2014.

Charictaristic	N=236 N (%)
Diabetic Mother	38 (16)
Not Diabetic mother	198 (84)
BMI:	
Normal weight less 25	7 (7)
Overweight 25-30	32 (31)
Obese Over 30	63 (62)
Birth weight (Kg)	
Normal 4.0 or less 4	132 (66)
Macrosomia 4.1 to 4.5	48 (24)
Over macrosomia 4.6 or more	20 (10)
Mode of delivery	
SVD	207 (89)
Ventous	20 (9)
Forceps	4 (2)
Previous history of SD	11 (5)
No Previous history of SD	209 (95)

Percentage of mothers with high BMI over 25 among 102 cases was (93%) and those with normal BMI were accounted only in (7%). Cases with unknown BMI were 134 cases.

Diabetes including both gestational and frank diabetes was found in 38 cases (16%) (Figure 2). Spontaneous vaginal Delivery was the predominant mode of delivery among all cases with 207 cases (89%). Cases whom delivered by ventouse delivery were 20 (9%) while forceps delivery was only in 4 cases (2%). Mood of delivery was undocumented in 5 cases (Figure 3).

There were 127 (56%) booked ladies and 99 (44%) unbooked ladies with 10 missing booking status. Table 3 shows that the years of 2009 have the highest number of SD cases 1.31% in comparison to all the years in the study period while 2006 have lowest number 0.41%. Date of birth was unknown in 3 cases.

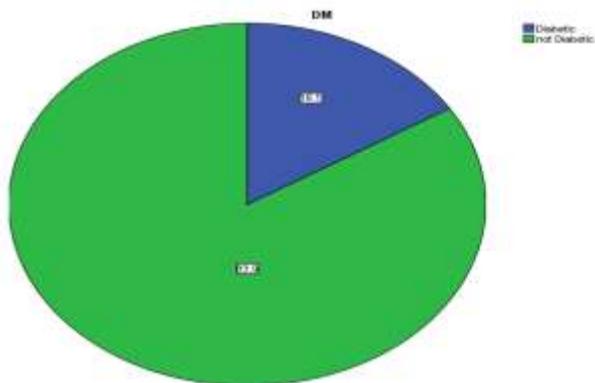


Figure 2: Percentage of diabetes among brachial plexus palsy cases.

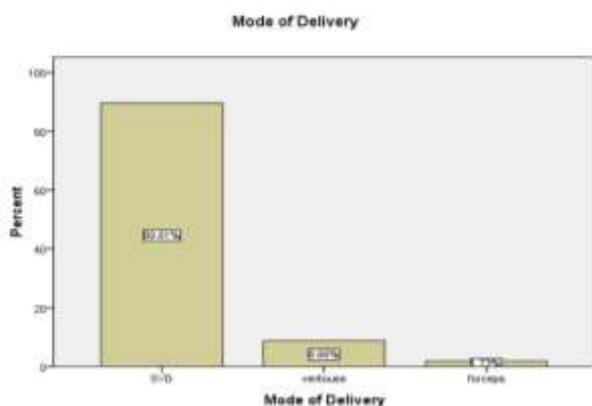


Figure 3: Mode of delivery among brachial plexus palsy cases.

Table 3: Incidence of SD.

Year	Total delivery	Total VD	Total SD	Incidences %
2014	3283	2153	16	0.74%
2013	4373	2984	19	0.64%
2012	4599	3239	22	0.68%
2011	4760	3288	23	0.76%
2010	4238	3035	23	0.76%
2009	4243	2744	36	1.31%
2008	4398	3315	35	1.06%
2007	3919	2917	20	0.69%
2006	3834	3440	14	0.41%
2005	3899	3084	25	0.81%
Total	41546	29199	233	0.77%

DISCUSSION

In the study, we calculated the incidence of SD in our tertiary center-KAUH. There were a total of 41546 deliveries in the years from 2005-2014 including both vaginal deliveries and caesarian sections. A total of 236 cases of SD where found out of 29,199 vaginal deliveries in percentage of 0.8% which is in the range of the studies that we compared our research with. One of them is Alexandra Hansen study who found the incidence of SD from 28 different articles to be 0.7%.⁹ They measured that incidence throughout the years out of 2,575,283 vaginal births with 18,222 diagnosed cases with SD. In our records, we found that the incidence of SD on 2009 was 1.3% which is the highest among the years and the incidence on 2006 was 0.4% which is the lowest throughout the years in the study period (Table 3 shows the incidence of SD per a year). In regards to Erb's palsy, we identified 54 cases 30.7% out of the total number of SD cases. On the other hand, a study of K Weizsaecker which was done in USA and correlated the incidence of Erb's palsy with the incidence of SD, all the cases of Erb's palsy were taken retrospectively and found that 67% cases were associated with the earlier diagnosis of SD.³ Similar to our results regarding diabetes is a retrospective study of Joseph G in Los Angeles with 221 case of SD during the period of August 1995 to February 2004, 45 cases 20.4% of women had diabetes.¹⁰ In A study conducted in Oman among 111 cases with shoulder dystocia and 111 controls, during 1994-2006 diabetes mellitus was found in 40 cases of SD 36% which was higher than our results.¹¹ Taking maternal weight as a risk factor, the former study had similar results to our study where normal maternal weight was found in 11cases (10%) only. Overweight was in 28 case (25%) and obesity in 72 case (65%).¹¹

Operative vaginal delivery was found in a higher rate than what we found in other studies including one retrospective cohort study by T. Burkhardt that calculated 34.3 % operative vaginal deliveries in a period from January 1995 to June 2011.¹² From the cases of SD, a case control study in National Maternity Hospital found identified 12 cases (18%) of operative vaginal delivery in a total of 66 cases.¹³

Limitations

Our SD cases were collected from patients' medical records; there were a lot of missing information from either maternal or neonatal files leading to the exclusion of those cases.

Furthermore, our study was exclusive to our hospital and not a multi centric one, so we could not be able to reflect our results on the whole population of Saudi Arabia nor Jeddah city.

CONCLUSION

Most of clinically diagnosed SD cases did not give the consequence of BPP. However, this complication in addition to other complications of SD mandates extra caution in cases with risk factors. We recommend that all personnel dealing with women in labor should be satisfactorily skilled and continuously trained to predict and deal with this obstetrical obstacle.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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