

Rates of deliveries with vacuum extraction and the relationship between maternal age, parity and neonatal APGAR scores

Vakumla dođum oranları ve maternal yař, parite ve neonatal Apgar skorları ile iliřkisi

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ABSTRACT

Objective: The aim of this study is to determine the rate of vacuum extraction, and its relationship with parity and intrauterine fetal condition.

Methods: This study was conducted at Diyarbakır Maternity Hospital in Turkey during 2012 with 20050 newborns who were delivered at the obstetrics/gynecology clinics. Two hundred and forty-nine of them were vacuum deliveries. Parity, maternal age, gestational age, birth weight and APGAR(Activity, Pulse, Grimace, Appearance, Respiration) scores were recorded for each delivery.

Results: Vacuum extraction deliveries were conducted in 249 cases (1.24%). The features and outcomes of the 249 vacuum assisted deliveries were as follows. Mean maternal age was 23.56±4.27 years, and mean gestational 38.73±1.56 weeks and mean parity was 1.95±1.57. Mean first, and fifth minute APGAR scores of the newborns were 7.43±1.33 and 9.24±1.29 points respectively. Parity and birth weights were positively correlated with gestational weeks. APGAR scores observed by the first and fifth minutes were negatively correlated with parity. There was no correlation between birth weights and APGAR scores at any time point. Parity was the only effective parameter on the APGAR scores estimated at the first and fifth minutes.

Conclusions: According to the results of this study, rates of vacuum extraction delivery which have not used frequently in recent times were lower when compared with most of the developed countries. Incidence of cesarean section was 25.4 percent. Cesarean delivery rates were higher than the suggested cesarean rates (15%) by World Health Organisation (WHO). Parity is the major factor that effects the APGAR scores of the neonates. Vacuum extraction delivery may be suggested more often especially for the deliveries of low parity women so as to decrease the cesarean section rates.

Key words: Vacuum assisted delivery, cesarean section, APGAR score, neonatal outcome

ÖZ

Amaç: Bu çalışmanın amacı, vakum ile dođum oranlarının belirlenmesi ve bu yöntemin gebelik sayısı ve intrauterin fetal durum ile iliřkisinin saptanmasıdır.

Yöntemler: Bu çalışmaya Diyarbakır Kadın Hastalıkları ve Dođum Hastanesi Kadın Dođum Kliniđinde 2012 yılı boyunca dođan 20050 yenidođan katılmıştır. Bu bebeklerin 249'unda dođum sırasında vakum yöntemi uygulanmıştır. Gebelik sayısı, anne yaşı, gebelik haftası, dođum kilosu ve APGAR (Activity, Pulse, Grimace, Appearance, Respiration) skorları her bir yenidođan için kaydedilmiştir.

Bulgular: Vakum uygulanan dođumlar tüm dođumlar arasında 1,24% (n:249) olarak saptanmıştır. Toplam 249 vakumla dođuma iliřkin özellikler ve sonuçlar ařađıda belirtilmiştir. Ortalama anne yaşı, gebelik haftası ve parite sırasıyla 23.56±4.27 yıl, 38.73±1.56 hafta ve 1.95±1.57 idi. Yenidođanların dođum sonrası birinci ve beřinci dakikadaki APGAR skorları sırasıyla 7.43±1.33 ve 9.24±1.29 idi. Gebelik sayısı ve yenidođan dođum kilosu gebelik haftası ile pozitif korelasyon göstermiştir. Birinci ve beřinci dk. APGAR skorları gebelik sayısı ile negative iliřki göstermekteydi. Yenidođan dođum kilosu ve APGAR skorları arasında herhangi bir iliřki saptanmadı. Birinci ve beřinci dk. APGAR skorları üzerine etkili olan tek parameter gebelik sayısı olarak bulundu.

Sonuç: Vakum eřliđinde dođum son zamanlarda pek kullanılmayan bir metot olup, bu çalışmanın sonuçlarına göre vakum ile dođum oranı çođu gelişmiş ülkeye göre düşük olarak saptanmıştır. Sezaryen oranları %25,4 idi. Sezaryen dođum oranları DSÖ tarafından önerilen oranların (15%) oldukça üzerinde bulunmuştur. Gebelik sayısı yenidođan APGAR skorunu etkileyen en önemli faktördür. Vakum ile dođurma düşük gebelik sayısı bulunan kadınlarda sezaryen oranlarını da düşürmeye yönelik olarak önerilebilecek bir yöntem olabilir.

Anahtar kelimeler: Vakum ile dođum, sezaryen dođum, APGAR skoru, yenidođan iyiliđi

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INTRODUCTION

Utilization of vacuum extraction device or forceps during vaginal delivery are known as operative vaginal delivery. Prolonged (longer than 120 minutes) second stage of labor, poor labor progress, maternal exhaustion, presumed fetal jeopardy are the well known indications of vacuum extraction. Inadequate cervical dilatation, low birth weight, fetal abnormalities and prematurity (<34 week) are the contraindications of vacuum extraction ⁽¹⁻³⁾.

In proper conditions, vacuum extraction is recognised as an effective and safe procedure in obstetrics. Vacuum- assisted delivery rates vary between countries and departments of obstetrics ⁽⁴⁾.

Though the ideal rate of vacuum-assisted delivery remains unknown. Several studies reported vacuum extraction rates as 10-15% in UK 4.5% in USA and less than 1% in Africa ⁽⁵⁻⁷⁾. Vacuum-assisted delivery rates seems to be higher in developed countries.

Recently increased cesarean section rates and decreased vacuum extraction rates are among the main problems of obstetrics, especially for the developing countries. In addition; vacuum extraction may help to decrease the cesarean section rate ⁽⁴⁾. Although the literature advocates that vacuum-assisted delivery is a safe procedure and has a lower complication rate ⁽⁸⁾, only insufficient data about vacuum-assisted delivery rates and perinatal outcomes are available for Turkish population. Aim of this study is to investigate the rate and perinatal outcome of vacuum assisted deliveries in a poorly developed region of Turkey.

MATERIALS and METHODS

This is a retrospective study which is conducted at Diyarbakır Maternity Hospital in Turkey between January 2012 to January 2013 on 20050 newborns. Two hundred and forty-four newborns were delivered with vacuum extraction. Women with singleton pregnancies who delivered at ≥ 37 weeks of gestation in cephalic presentation through 10 cm cervical dilatation, and underwent either attempted operative vaginal

delivery through forceps or vacuum extraction or cesarean delivery without trial of operative vaginal delivery were included in the study. Women with pregnancies complicated by severe anomalies, antepartum or intrapartum stillbirth and prolonged second stage of labor more than 12 hours were excluded. Parity, maternal age, duration of pregnancy, birth weight and APGAR scores were recorded for each delivery. Only low or outlet operative vaginal deliveries were performed. APGAR scores were recorded by a pediatrician who examined the infants at the labor room for all deliveries.

Statistical analysis

SPSS version 11.5 was used for statistical analysis. Descriptive statistics (mean \pm standard deviation, percentages) were evaluated and one sample t-test was used to compare the mean values. The relationship between the variables was examined by Pearson correlation. Multivariable linear regression analysis was performed to examine the effect of parity, fetal weight and gestational age on APGAR scores. $P < 0.05$ was considered as statistical significance.

RESULTS

During this study period 20050 newborns delivered vaginally. Cesarean section rate were 25.4% (n=5093) and 11.8% of them were primary cesarean sections. Vacuum extraction was conducted in 249 cases (1.24%). Mean maternal and gestational ages were 23.56 \pm 4.27 years, and 38.73 \pm 1.56 weeks, respectively. Mean parity was 1.95 \pm 1.57. Mean APGAR scores of the newborns were 7.43 \pm 1.33 at the first

Table 1. Analysis of the maternal and neonatal demographic variables.

	Mean \pm Standart deviation
Maternal Age (years)	23.56 \pm 4.27
Gestational Age (weeks)	38.73 \pm 1.56
Parity	1.95 \pm 1.57
APGAR Score 1. Minute	7.43 \pm 1.33
APGAR Score 5. Minute	9.24 \pm 1.29

One sample t test is used to calculate the mean values.

and 9.24±1.29 at the fifth minutes (Table 1).

APGAR score was >6 in 220 (89,2%) newborns at the first and 236 (94.8%) at the fifth minutes (Table 2).

Table 2. Frequency of the APGAR scores.

	APGAR score	N	%
1. minute	1-3	11	4,4
	4-6	16	6,4
	7 and more	222	89,2
5. minute	1-3	3	1,2
	4-6	10	4
	7 and more	236	94,8
	Total	249	100

Parity (r=0.94 ; p<0.001), gestational age (r=0.23; p<0.001) and neonatal birth weight (r=0.26; p<0.001) were significantly, and positively correlated and APGAR score at first minute (r=-0.13; p=0.003) was significantly, but negatively correlated with maternal age. There was no significant correlation between maternal age and APGAR score at the fifth (r=-0.12; p=0.06) minutes (Table 3).

Table 3. Pearson Correlation analysis of the relationship between the variables.

		Maternal Age	Gestational Age	Parity	Fetal Weight	1.Minute APGAR Score
Maternal Age	R	1,00	0,23	0,94	0,26	-0,13
	P		<0,001	<0,001	<0,001	0,03
Gestational Age	R	0,23	1,00	0,24	0,96	0,01
	P	<0,001		<0,001	<0,001	0,91
Parity	R	0,94	0,24	1,00	0,28	-0,20
	P	<0,001	<0,001		<0,001	<0,001
Fetal Weight	R	0,26	0,96	0,28	1,00	-0,01
	P	<0,001	<0,001	<0,001		0,98
1. Minute APGAR Score	R	-0,13	0,01	-0,20	0,00	1,00
	P	0,03	0,91	<0,001	0,98	
5. Minute APGAR Score	R	-0,12	0,06	-0,19	0,05	0,89
	P	0,06	0,38	<0,001	0,40	<0,001

Parity (r=0.24; p<0.001), and neonatal birth weights (r=0.96; p<0.001) were positively correlated with gestational age. No significant correlation was found between gestational age and APGAR scores (p>0.05). APGAR scores at the first (r=-0.2) and fifth minutes (r=-0.19) were negatively, and neonatal birth weights (r=0,28) were positively correlated with parity (p<0.001). There was no significant correlation

between neonatal birth weights and APGAR scores at any time point (p>0.05) (Table 3).

Parity was the only effective parameter on the APGAR scores at both first and fifth minutes (Table 4 and 5).

Table 4. Multivariable regression analysis about the effect of independent variables (Gestational age, Parity and Fetal Birth Weight) on the 1. Minute APGAR scores as a dependent variable.

	Beta	P
Gestational Age	-0,03	0,88
Parity	-0,22	<0,001
Fetal Weight	0,14	0,90

Table 5. Multivariable regression analysis about the effect of independent variables (Gestational age, Parity and Fetal Birth Weight) on the 5. Minute APGAR scores as a dependent variable.

	Beta	P
Gestational Age	-0,03	0,90
Parity	-0,22	<0,001
Fetal Weight	0,14	0,53

DISCUSSION

This is the first study which describes the vacuum-assisted vaginal delivery rate in Turkey.

Vacuum assisted delivery is a unique form of operative deliveries which is used to shorten the second period of the labor. Several studies showed the association between fetal mortality and prolonged second period of the labor (1,2). In our study vacuum- assisted delivery rate was lower than developed countries. For example vacuum-extraction delivery rates are reportedly 10-15% in UK and 4.5% in the USA (5,6). On the other hand our data were similar to those of the African countries where the vacuum rate is less than one percent (7). Vacuum-extraction delivery becomes a more popular method in developed countries. Sanhal et al. (8) reported in their review article that vacuum-assisted delivery rates for Turkish population is still unknown. In this study, vacuum-assisted, and cesarean delivery rates were 1.24% and 25.4, respectively. The lower vacuum-assisted delivery rates seem to be associated with cesarean section rates higher than those suggested by WHO (9-11).

The complications of vacuum- assisted deliveries usually occur during early postnatal period. APGAR scoring system is a well known indicator for fetal wellbeing. In this study 5th minute-APGAR scores were higher than 7th minute-Apgar scores in %94.8 of neonates. This result indicates the safety of vacuum-extraction delivery.

Several studies showed the relationship between operative delivery and poor neonatal outcomes ⁽¹²⁻¹⁶⁾. Sekeroglu et al. ⁽¹⁷⁾ and Baser et al. ⁽¹⁸⁾ reported that higher maternal age is associated with decreased APGAR scores and poor neonatal outcomes. In this study maternal age was negatively correlated with 1th minute-APGAR scores but there was no significant correlation with 5th minute APGAR scores, and maternal age.

Higher number of parity is a well known parameter which is associated with low APGAR scores and poor neonatal outcomes ⁽¹⁹⁻²¹⁾. But there is still a lack of data about the relationship between parity and neonatal outcomes related to vacuum-assisted deliveries. Our data showed that higher parity is negatively correlated with APGAR scores. Parity is also one of the most effective factors on the APGAR score. Anemia, uterine atony and chronic diseases may explain the association between multiparity and low APGAR scores ⁽²¹⁾.

There are conflicted results in several studies about the effect of parity on the neonatal birth weights. Low birth weight due to high parity is defined in the final declaration of Turkey Demographic and Health Survey (TDHS) 2008 ⁽⁹⁾. Kılıç et al. ⁽²²⁾ reported the rates of low birth weight newborns as %9.8 for primipar, %10.2 for multipar and %17.3 for grandmultipar mothers. Conversely Babinzki et al. ⁽²⁰⁾ and Juntunen et al. ⁽²³⁾ reported that increased parity is related with high-birth weight newborns. There was a positive correlation between the number of parities and neonatal birth weight in this study.

As a conclusion, vacuum-extraction delivery rates are found to be lower than most of the developed countries. Average APGAR score of the neonates were good 1th and 5th minutes. Parity is the major

factor that effects the APGAR score of the neonates. Vacuum- assisted delivery should be encouraged in low parity women so as to decrease the cesarean section rates.

Disclosure statement

The authors declare that there are no conflicts of interest.

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