Vaginal Delivery After Cesarean

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Abstract

Objective: To compare the maternal and fetal complication rates of vaginal birth after cesarean (VBAC) and elective cesarean after cesarean (ECAC) and to determine if vbac is performed our clinic or not.

Methods: Fifty five patients having had VBAC and 62 randomly selected patient who have had ECAC between january 2003 and december 2005 were examined retrospectively. The maternal and fetal complications developing in patients who have had VBAC and ECAC were compared and the risks of VBAC were identified.

Results: Among the VBAC and ECAC groups no significant difference was detected in mean age, gravidity, parity, abortus, number of alive children, number of previous ceserian and vaginal delivery and the Apgar scores ($p>0.05$). However a significant differences between the two groups in fetal weight, uterine complications, gestational week and live birth rate were detected. In the VBAC group, no significant difference was found in uterine rupture rates between oxytocin administeration and vacuum extraction ($p<0.05$).

Conclusion: We concluded that the rate of vaginal birth after cesarean was quite low in our clinic, and elective cesarean delivery is preferred in that cases. Vaginal delivery was preferred especially in cases of fetal demise or preterm birth in previous cesarean cases. Any statistically significant difference on fetal complication rates were not found between two groups because of the choice of the vaginal route for delivery in cases with low or null risk of fetal demise. But the maternal complication rates were found high in?

Keywords: Vaginal birth after cesarean, elective cesarean after cesarean.

Sezeryan sonrası vajinal doğum

Amaç: Çalışmamızın amacı; sezaryen sonrası vajinal doğum (SSVD) olguları ile sezaryen sonrası elektif sezaryen (SSES) olgularını maternal ve fetal komplikasyonlar yönünden karşılaştırmak ve SSVD risklerini belirlemektir.

Yöntem: 2003 Ocak- 2005 Aralık tarihleri arasında, SSVD yapan 55 olgu ve basit tesadüfi örnekleme ile seçilmiş SSES yapan 62 olgu retrospektif olarak incelenmiştir. Sezaryen geçirmiş olan olguların bir sonraki doğumlarında gelişmiş olan maternal ve fetal komplikasyonlar, SSVD ile SSES olgularında karşılaştırılmış ve SSVD riskleri araştırılmıştır.

Bulgular: SSVD ve SSES grupları arasında; yaş ortalaması, gebelik, parite, abortus, yaşayan çocuk, sezaryen sayısı, önceki vajinal doğum sayısı ve Apgar skoru açısından anlamlı bir farklılığın olmadığı ($p>0.05$), bununla birlikte her iki grup arasında gebelik haftası, bebek ağırlığı, uterus komplikasyonu gelişmesi, canlı-ölü doğum oranları açısından anlamlı farklılık olduğu izlenmiştir ($p<0.05$). SSVD grubunda, oksitosin uygulaması ve vakum ekstraksiyonu ile uterin rüptür gelişimi arasında anlamlı bir farklılık izlenmemiştir ($p<0.05$).

Sonuç: Kliniğimizde sezaryen sonrası vaginal doğum girişim oranının çok düşük olduğu, genelde bu gibi olgularda sezaryenin tercih edildiği, doğumun gerçekleştirildiği olguların daha çok fetusun kaybedildiği veya termden çok önceki erken gebelik haftalarında oldukları belirlendi. Fetusu kaybetme riskinin olmadığı veya az olduğu bu tip olguların doğuma bırakılmaları nedeni ile fetal komplikasyon oranı incelenen gruplarda benzer bulunurken, maternal komplikasyon oranı ise SSVD grubunda daha yüksek bulunmuştur.

Anahtar Sözcükler: Sezaryen sonrası vajinal doğum, sezaryen sonrası elektif sezaryen.

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Introduction

Cesarean is an initiative which is expensive and also increasing morbidity and mortality but it is also the operation frequently used in obstetrics. Its frequency increases nowadays. As to the researches performed in developed countries, it is reported that cesarean rate reaches 50% today while it was 5% in 1960s.[1] As to the studies performed in close periods, when an operation chance is given to 60-80% of patients who had cesarean before may give a successful vaginal delivery.[2,3]

Uterus rupture which is the most important complication that may appear in vaginal delivery after cesarean (VDAC) has a certain mortality risk in terms of mother and the baby. But while uterus rupture appearance risk is 0.5% in VDAC, mother mortality in cesarean is 25 times more than vaginal delivery.[1-4] By becoming prevalent of VDAC, 30% decrease may be provided in cesarean operations.[5]

The aim of our study is to compare vaginal delivery after cesarean (VDAC) cases with elective cesarean after cesarean (ECAC) cases in terms of maternal and fetal complications, to determine VDAC risks and to ascertain whether vaginal delivery after cesarean is performed or not in our clinic.

Methods

27403 cases were retrospectively examined who delivered in between January 2003 – December 2005 in Istanbul Goztepe Training and Research Hospital, Obstetrics and Gynecology Clinic. These cases separated into two groups as the group delivered by cesarean (8730 cases, 31.85%) and the group delivered vaginally (18673 cases, 68.14%).

62 cases were chosen as control group by simple random sampling to 2929 (33,55%) cases who had elective cesarean due to past cesarean within 8730 cases who delivered by cesarean between January 2003 and December 2005. 55 cases (0,29%) were chosen as study group who delivered vaginally after cesarean within 18673 cases (68,14%) delivered vaginally.

In between January 2003 and December, medical records of each 55 cases who delivered vaginally after cesarean and of cases chosen as control group who had elective cesarean after cesarean were examined by using data collecting forms. Data about following variables were collected from medical records of each case.

A. Anamnesis Variables: Maternal age, gestation number, parity, abortus, living child, previous normal spontaneous delivery, previous cesarean number, uterus incision type applied in previous cesarean (lower segment, J, T, classical, etc.) gestational week, existence of oxytocin application in VDAC, existence of forceps or vacuum extraction application in ECAC, Apgar score, existence of alive or death delivery, complications related to uterus, laparotomy, rupture, existence of hysterectomy growth, existence of postoperative complication were examined.

B. Maternal Complications in Cases Vaginally Delivered after Cesarean: Complications about Uterus: collum laceration, atony, scar dehiscence, incomplete and complete rupture, laparotomy, hysterectomy; also effects of oxytocin application on uterine rupture and association of vacuum extraction with uterine complications were evaluated.

C. Apgar score, alive-death delivery existence were evaluated as fetal complication in all cases.

D. As maternal complication in cases who delivered by Elective Cesarean after Cesarean; intraoperative and postoperative complications were evaluated.

Statistical Studies

While evaluating diagnoses obtained from the study, the SPSS (Statistical Package for Social Sciences) for Windows 13.0 was used for statistical analyses. While evaluating study data, Student t test was used for making comparison between groups in which parameters were normally distributed and Mann Whitney U test was used for making comparison between groups in which parameters were not normally distributed in order to compare quantitative data as well as descriptive statistical methods (Average, Standard deviation). Chi-Square test and Fisher's Definite Chi-Square test were used for comparing qualitative data. Significance was evaluated as $p<0.05$.

Results

Delivery types of 27403 cases were summarized in Figure 1. 8730 (31.85%) of all deliveries were performed by cesarean and 18673 (78.9%) of them were performed by normal spontaneous delivery. 2929 of 8730 cesarean deliveries (33.55%) were cases which had cesarean due to previous cesarean. It was determined that 2338 (79.8%) cases had abdominal delivery due to one previous cesarean, 580 (19.8%) cases had abdominal delivery due to two previous cesareans and 11 cases (0.03%) had abdominal delivery due to three previous cesareans. There were only 55 (0.29%) cases who had vaginal delivery after cesarean in 18673 cases vaginally delivered in our clinic.

Statistically no significant difference was found between ECAC and VDAC groups in our study in terms of age average, gestation and parity number, abortus number, living child number and cesarean number ($p>0.05$). But statistically an advanced significant difference was found in terms of gestational week ($p<0.01$).

Statistically no significant difference was found between those delivered by oxytocin and those delivered spontaneously in VDAC group in terms of uterine complication (collum laceration, scar dehiscence, rupture, atony) ($p>0.05$). 9 cases (16.36%) in VDAC group delivered by oxytocin infusion. 46 cases (83.64%) in VDAC group had normal spontaneous normal delivery. While complication related to uterus was found in 4 (44.4%) of 9 cases who delivered by oxytocin infusion, no complication occurred in remaining 5 cases (55.6%). Complication incidence rate related to uterus was 19.6% (9 cases) in cases delivered spontaneously.

Statistically no significant difference was found between tool usage in delivery and complication existence related to uterus in VDAC group ($p>0.05$). Vacuum extraction was applied to 8 cases (14.50%) in VDAC group consisting of 55 cases. While complication incidence rate related to uterus was 37.5% (3 cases) in 8 cases who had vacuum extraction during delivery, complication incidence rate related to uterus was found as 21.3% (10 cases) in 47 cases whose delivery was performed without tool usage.

Statistically an advanced significant difference was found between VDAC (55 cases) and ECAC (62 cases) groups in terms of baby weight ($p<0.01$). While average birth weights of babies within VDAC group was 2752±873.4 (median 3080), average birth weights of babies within ECAC group was found as 3112.4±485.9 (median 3085). Birth weights of babies within VDAC group

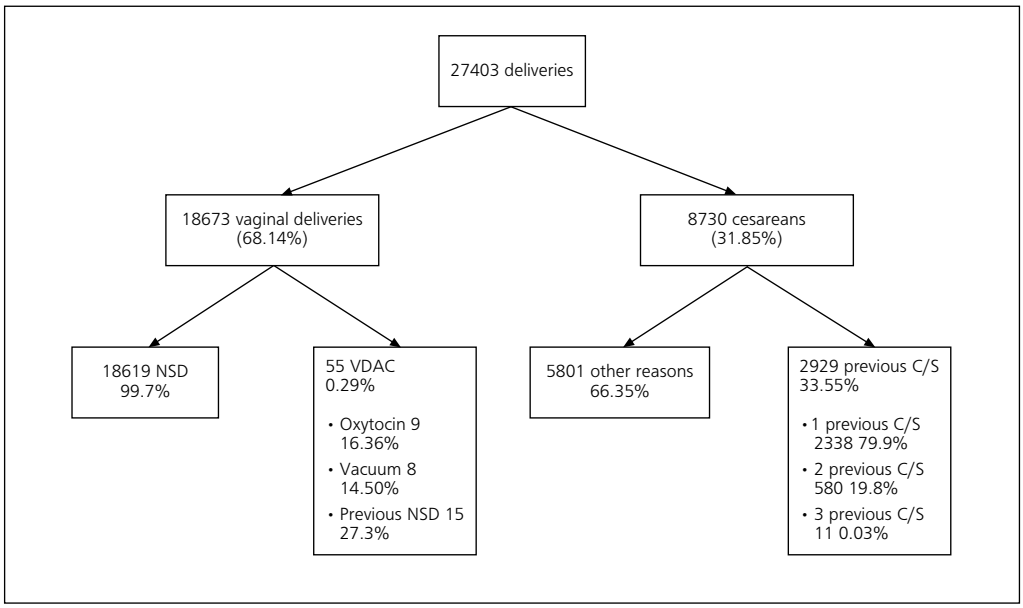

Diagram 1. Diagram of numbers and rates of normal spontaneous and cesarean deliveries in between January 2003 and December 2005.

is significantly low than birth weights of babies within ECAC group (p: 0.008) (Table 1).

There was statistically a significant difference between VDAC (55 cases) and ECAC (62 cases) groups as to the alive-death delivery rates (p<0.05). While alive delivery was observed in 54 (92.7%) cases in VDAC group, death delivery was observed 4 (7.3%) of them. It was observed that all deliveries (62 cases, 100%) in cesarean group were alive (p: 0.046) (Table 1).

Statistically no significant difference was found between VDAC and ECAC groups as to Apgar score averages (p>0.05) (Table 1). While Apgar score average was 7.18±2.33 (median 8) in VDAC group, it was found as 8.16±0.48 (median 8) in ECAC group (p: 0.056).

There was significantly advanced difference between VDAC and ECAC as to the incidence rates of complication related to uterus (collum laceration, scar dehiscence, atony) (p<0.01). While the incidence rate of complication related to uterus in VDAC group (55 cases) was 23.6% (13 cases), the incidence rate of complication related to uterus in ECAC group (62 cases) was found as 6.5% (4 cases). The incidence rate of complication related to uterus in VDAC group (23.6%) was found significantly higher than the incidence rate of complication related to uterus in ECAC group (6.5%) (p: 0.008). Scar dehiscence rate was 3.64% (2 cases), collum laceration was 18.18% (10 cases) and uterine atony was 3.64% (2 cases) in vaginal delivery after cesarean group. Uterine artery laceration was 1.61% (1 case), uterine atony was 3.63% (2 cases) and scar dehiscence rate was 1.61% (1 case) in elective cesarean after cesarean group. Statistically no significant difference was observed between two groups in terms of scar dehiscence (uterus rupture) (p>0.05) (Table 1).

Discussion

Cesarean delivery history increases complication growth possibility which may constitute risks such as ectopic gestation in next pregnancy, placenta implantation disorders, febrile and thromboembolic events for both mother and the baby.[6]

Rupture risk that may occur in antepartum and intrapartum period within next gestation of a case who has a cesarean delivery history increases cesarean delivery rates.[7]

Macones et al reported in their multi-centered studies in which they researched maternal complications in vaginal delivery after cesarean cases that age average of VDAC cases was significantly lower than the age average of ECAC cases (p<0.001).[8] Rageth et al reported that cases who preferred vaginal delivery after cesarean instead of elective cesarean were patients from younger age group.[9]

In our study, significantly no difference was found between VDAC and ECAC groups in terms of age average (P>0.05).

As to the VDAC and ECAC decision critrea of Rageth et al; VDAC was more successful in cases younger than 40 years.[9]

McMahon et al reported that success rate of VDAC was decreased in cases older than 35 years

Table 1. Distribution table between groups as to baby weight, Apgar and alive-death delivery and uterus complication rates.

	VDAC Average ± SD	Median	ECAC Average ± SD	Median	Test stats. p
Baby weight	2752.5±873.4	3080	3112.4±485.9	3085	t:-2,707; p:0,008**
APGAR	7.18±2.33	8	8.16±0.48	8	Z:-1,910; p:0,056
Alive-Death Delivery	**n**	**%**	**n**	**%**	
Alive	51	92.7	62	100,0	Fc2
Death	4	7.3	-	-	p:0,046*
There is complication in uterus	13	23.6	4	6.5	c2:6,931
There is not complication in uterus	42	76.4	58	93.5	p:0,008**
There is scar dehiscence	2	3.64	1	1.61	p>0,05
There is not scar dehiscence	53	96.36	61	98.39	

t: Student t test, **Z:** Mann Whitney U test, **Fc2:** Fisher's exact exact chi-square *significant as p<0.05, **advanced significant as p<0.01

old and that therefore urgent cesarean rate was increased.[10]

In our study; scar dehiscence was seen in 2 cases (3.63%) 19 and 20 years old who had complications in VDAC group. In VDAC cases, we think that we need wider case groups in order to create connection between maternal age and uterine rupture.

Macones et al reported that vaginal delivery success was 75.5% in cases who had one cesarean operation; vaginal delivery success was 75.0% in cases who had two cesarean operations and that uterine rupture probability was 87/1000 during vaginal delivery in cases who had one cesarean operation and uterine rupture probability was 200/1000 during vaginal delivery in cases who had two or more cesarean operations.[8]

According to Flamm et al,[11] Farmer et al[12] and Jones et al;[13] uterine rupture growth risk is 0.5-0.8% in cases vaginally delivered after cesarean and the rate increases to 1.5% if non-bleeding scar dehiscence cases are added to this group.

Uterine rupture occurred in our two VDAC cases (3.63%) in our study. The delivery was performed without complication in two VDAC cases who had previously 2 cesarean operations. Our this diagnosis is same as diagnoses of Macones et al.[8]

Macones et al examined maternal complications in vaginal delivery after cesarean; they found that there was statistically significant difference between average gestational weeks of VDAC and ECAC cases and they reported that gestational weeks of VDAC were significantly lower than gestational weeks of cesarean cases after cesarean ($p<0.01$).[8]

Also in our study, gestational weeks of VDAC cases were significantly lower than average gestational weeks of ECAC cases (p: 0.004).

Macones et al reported that there was an increase in uterine rupture risk of VDAC in gestations over 37 weeks.[8]

In our study, scar dehiscence was observed in 2 cases (3.63%) in VDAC group and both cases were over 37th gestational week. Our this diagnosis is same as diagnoses of Macones et al.

Macones et al reported that previous vaginal delivery was protective for uterine rupture and it decreased rupture probability 60%.[8] Hendler et al reported that vaginal delivery before cesarean and vaginal delivery after cesarean were factors increasing the success probability in VDAC and that caused less operative vaginal delivery and less 3rd and 4th grade perineal laceration but that second vaginal delivery after cesarean might increase uterine scar dehiscence risk.[14] Weinstein et al mentioned that previous vaginal delivery increased VDAC success rate.[15] Our results are compatible with both researchers. Scar dehiscence seen in VDAC group as 3.63% (2 cases) were in patients who did not have previously vaginal delivery history.

Macones et al reported that there was 3 times increased uterine rupture risk in VDAC cases who were applied delivery induction by prostaglandin or oxytocin but that increased risk occurred when prostaglandin and oxytocin were used consecutively.[8] Authors reported that induction did not cause any increase in uterine rupture risk when compared with spontaneous delivery cases but using prostaglandins and oxytocin together caused increase in uterine rupture risk.[8]

In our study, statistically no significant difference was found between oxytocin induction and uterine rupture. While 9 (16.3%) of 55 cases in VDAC group delivered by oxytocin induction, 46 (83.7%) cases had normal spontaneous delivery.

Hassan et al reported in their study in which they examined 244 VDAC cases that 165% (67.2%) cases had successful normal spontaneous delivery, 7 (3.2%) cases were delivered by forceps, 11 (5.2%) cases were delivered by vacuum extraction and 61 (24.4%) cases delivered by urgent cesarean.[7]

In our study, 8 (14.5%) of 55 cases in VDAC group were delivered by vacuum extraction and remaining 47 (85.5%) cases had normal spontaneous delivery. While incidence risk of complication related to uterus was 37.5% in 8 cases who were delivered by vacuum extraction, incidence risk of complication related to uterus was found as 21.3% of cases whose delivery were done without

using any tool. Collum laceration was occurred as uterus complication in 3 cases who were applied vacuum extraction. Statistically no significant relation was found between vacuum extraction and existence of complication related to uterus.

In our study, there is statistically a significant difference between VDAC and ECAC cases in terms of baby weights. This difference depends on VDAC group cases having more preterm gestations and on ECAC group cases being term deliveries.

Macones et al mentioned that birth weights lower than 4000 g do not increase uterine rupture risk.[8]

In our study, this difference ($p<0.01$) between baby weights which is statistically significant does not cause a significant difference in terms of uterus rupture existence. If term babies in VDAC group were higher, we could meet with more uterus rupture.

Hassan et al reported in their study in which they examined complications in VDAC that Apgar scores of babies in VDAC group were over 8 with the rate of 71.2% and between 6 and 8 with the rate of 24.6% when compared with ECAC.[7]

Ling and Xuz mentioned in their study in which they examined vaginal delivery after cesarean that Apgar scores of newborns in VDAC group were over 8 with the rate of 83.7% when compared with ECAC and that neonatal asphyxia was observed with the rate of 17.3%.[16]

In our study, there is no significant difference between VDAC and EDAC cases in terms of Apgar scores. In our study, it was observed that 60% of 55 cases within VDAC group had Apgar score 8 and above, 20% (11 cases) of them had Apgar score between 6 and 8, 12.7% of them had Apgar score between 1-2 and 7.2% of babies were born dead. Cases with dead-born were the patients who applied our clinic for intrauterine fetal death. Babies who were born with lower Apgar score were those who had lower birth weights. Growing neonatal asphyxia depends on prematurity not on vaginal delivery after cesarean. According to these results, we think that VDAC does not have any risk when compared with ECAC in terms of neonatal asphyxia.

Macones et al reported that maternal complications and major operative complications such as uterine rupture, bladder and intestinal injury, uterine artery laceration were seen more frequently in VDAC cases but minor complications such as blood transfusion, postpartum fever were seen in ECAC cases more frequently.[8]

In our study, 3.63% scar dehiscence was observed in VDAC group as major complication and 1.61% uterine artery laceration and 1.61% scar dehiscence were observed in ACEC group as major complication. As minor complication, appearance of postoperative 1st day blood transfusion requirement was observed in ECAC group with the rate of 1.61%. In our study, incidence rate of complication related to uterus is 23.6% in VDAC while it was 6.5% in ECAC group. The reason for this difference is collum laceration with the rate of 18.18% in VDAC group.

Macones et al reported that uterus rupture rate in VDAC group was higher than uterus rupture in ECAC group ($p<0.001$).[8]

In our study, it was observed that uterus rupture grew in the rate of 3.63% in VDAC group and grew in the rate of 1.6% in ECAC group. This difference is statistically significant ($p<0.001$).

It is determined that initiative rate for vaginal delivery after cesarean was low in our clinic and it is understood that generally cesarean was preferred in such cases, that mostly fetus was lost in cases that delivered or they were in early gestational weeks before term. While fetal complication rates were found similar in examined groups which did not have any or less risk of losing fetus but it was observed that maternal complications were high two times but it did not cause any serious morbidity and mortality.

One of the precautions for decreasing cesarean rates in our clinic is to review conditions for vaginal delivery before deciding cesarean in next deliveries for those who had cesarean before and not to decide immediately elective cesarean. It is impor-

tant to inform the patient and to take her consent in this decision phase.

References

1. Anderson GM, Lomas J: Determinants of the increasing cesarean birth rate: Ontario data 1979- 1982. *N Eng J Med* 1984; 311: 887.
2. Flamm BL, Newman LA, Thomas SJ, Fallon D, Yoshida MM. Vaginal birth after cesarean delivery: Results of a 5-year multicenter collaborative study. *Obstet Gynecol* 1990; 76: 750-4.
3. Chauhan SP, Martin JN Jr, Henrichs CE, Morrison JC, Magann EF. Maternal and perinatal complications with uterine rupture in 142.075 patients who attempted vaginal birth after cesarean delivery: a review of the literature [review]. *Am J Obstet Gynecol* 2003; 189: 408–17.
4. Cunningham FG, MacDonald PC, Gant NF, et al(Eds). Operative Obstetrics in Williams Obstetrics. Cesarean section and Cesarean hysterectomy. 21st edition. Connecticut, Appleton & Lange; 2001; p: 538-60.
5. Van der Walt WA, Cronje HS, Bam RH. Vaginal delivery after one caesarean section. *Int J Gynecol Obstet* 1994; 46: 271-7.
6. Hemminki E, Meriläinen J. Long-term effects of cesarean sections: Ectopic pregnancies and placental problems. Am *J Obstet Gynecol* 1996; 174: 1569–74.
7. Hassan A. Trial of scar and vaginal birth after cesarean section. *J Ayub Med Coll Abbottabad* 2005; 17: 57-61.
8. Macones GA, Peipert J, Nelson DB. Maternal complications with vaginal birth after scesarean delivery: A multicenter study. *Am J Obstet Gynecol* 2005; 193: 1656-62.
9. Rageth JC, Juzi C, Grossenbacher H. Delivery of previous cesarean: A risk evaluation. *Obstet Gynecol* 1999; 93: 332-7.
10. McMahon MJ, Luther ER, Bowes WA Jr, Olshan AF. Comparison of a trial of labor with an elective second cesarean section. *N Engl J Med* 1996; 335: 689-95.
11. Flamm BL, Goings JR, Liu Y, Wolde-Tsadik G. Elective repeat cesarean delivery versus trial of labor:A prospective multicenter study. *Obstet Gynecol* 1994; 83: 927-32.
12. Farmer RM, Kirschbaum T, Potter D, Strong TH, Medearis AL. Uterine rupture during trial of labor after previous cesarean section. *Am J Obstet Gynecol* 1991; 165: 996–1001.
13. Jones RO, Nagashima AW, Hartnett-Goodman MM, Goodlin RC. Rupture of low transverse cesarean scars during trial of labor. *Obstet Gynecol* 1991; 77: 815-7.
14. Hendler I, Bjold E. Effect of prior vaginal delivery of prior vaginal birth after cesarean delivery on obstetric outcomes in women undergoing trial of labor. *Obstet Gynecol* 2004; 104: 273-7.
15. Weinstein D, Benshushan A, Tanos V, Zilberstein R, Rojansky N. Predictive score for vaginal birth after cesarean section. *Am J Obstet Gynecol* 1996; 174: 192-8.
16. Ling C, Xuz L. The prospective study of trial of labor following previous cesarean section. *Zhonghua Fu Chan Ke Za Zhi* 1995; 30: 721-3.