Does Previous Cesarean Delivery Increase the Risk of Ectopic Pregnancy?

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Abstract

Background and Objective: Ectopic pregnancy is the leading cause of pregnancy-related death with an overall incidence of 1-2% and its incidence is increasing. Similarly, cesarean delivery rates are rising and currently rates are close to 25%. It is accepted that history of pelvic surgery is a risk factor for ectopic pregnancy but it is controversial whether previous cesarean delivery is an independent risk factor for ectopic pregnancy. This study is conducted to determine whether previous cesarean delivery increases the risk of ectopic pregnancy.

Methods: In this retrospective, controlled study, we compared ectopic pregnancy cases with those women who gave birth or ultrasonographically confirmed intrauterine pregnancy had been terminated in our department. Women who had a history of abdominal surgery, infertility, pelvic inflammatory disease, and ectopic pregnancy or intrauterine device users were excluded from the study and only multiparas women included to the study.

Results: During the study period, 343 cases who had a surgically confirmed ectopic pregnancy and 11176 women who had an intrauterine pregnancy were analyzed retrospectively and 101 ectopic pregnancy cases were compared with 5017 women with intra-uterine pregnancy who met the inclusion criteria for the study. There were no significant differences between the groups with respect to demographic characteristics (p>0.05). The odds ratio was 1.22 (95%CI:0.79-1.88) (p=0.352).

Conclusion: Although the odds ratio was statistically insignificant in this study, previous cesarean section can be a risk factor for ectopic pregnancy. Further studies are necessary to elucidate the effect of previous cesarean delivery on the risk of ectopic pregnancy.

Keywords: Ectopic pregnancy, Cesarean delivery, complication, risk factors.

Geçirilmiş sezaryen doğum ektopik gebelik riskini arttırır mı?

Amaç: Ektopik gebelik %1-2 oranında görülen, gebeliğe bağlı kadın ölümlerinde ön sıralarda yer alan ve son yıllarda insidansında artma olan ciddi bir komplikasyondur. Sezaryen ile doğum da son yıllarda gittikçe artmış, tüm dünyada doğumların yaklaşık %25'i sezaryen ile olmaya başlamıştır. Genel olarak geçirilmiş pelvik cerrahi ektopik gebelik riskini artıran bir faktör olarak kabul edilir, ancak geçirilmiş sezaryen operasyonunun bu riski artırıp artırmadığı net olarak ortaya konulamamıştır. Bu çalışmada önceden geçirilmiş sezaryen operasyonunun ektopik gebelik riskini artırıp artırmadığı ortaya konulmaya çalışılmıştır.

Yöntem: Bu retrospektif, kontrollü çalışmada, Ocak 1993 - Aralık 2003 tarihleri arasında kliniğimizde ektopik gebelik tanısı almış olan olgular, aynı dönemde kliniğimizde doğum yapmış veya intrauterin gebeliği ultrasonografi ile kesinleşmiş ve gebeliği sonlandırılmış, multipar kadınlarla karşılaştırıldı. Daha önceden geçirilmiş batın cerrahisi olanlar, ektopik gebelik, infertilite veya PID hikayesi olanlar, RIA kullanan olgular çalışma dışı bırakıldı ve sadece multipar kadınlar çalışmaya dahil edildi.

Bulgular: Bu dönemde tanısı cerrahi olarak kesinleştirilmiş 343 ektopik gebelik olgusu ve intrauterin gebelik saptanmış 11176 kadın retrospektif olarak tarandı ve çalışmaya dahil edilme kriterlerine uyan 101 ektopik gebelik olgusu, 5017 intrauterin gebelik olgusu ile karşılaştırıldı. Gruplar arasında demografik özellikler açısından anlamlı bir fark saptanmadı (p>0.05). Çalışmada gruplar arası olasılık oranı (Odds Ratio) 1.22 (%95 Güven aralığı-Confidence Interval 0.79-1.88) olarak saptandı (p=0.352).

Sonuç: Bir pelvik cerrahi girişim olarak sezaryen operasyonu sonraki gebeliklerde ektopik gebelik riskini artıran bir faktör olabilir. Ancak burada sunulan çalışmada, olasılık oranı istatistiksel olarak anlamlı seviyelere ulaşmamıştır. Bu konuda daha büyük çaplı, çok merkezli ve uzun süreli takip çalışmalarına ihtiyaç vardır.

Anahtar Sözcükler: Ektopik gebelik, sezaryen doğum, komplikasyon, risk faktörleri.

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Introduction

Ectopic pregnancy has an overall incidence of 1-2% all over the world.[1,2] It is a very severe complication and it is the leading cause of maternal deaths during the first trimester.[3] It has been reported that in recent years, the incidence of ectopic pregnancy has been increasing, particulary in women over 35 years of age.[3,4] Similarly, there has been a remarkable increase in the incidence of caesarean births within the last 25 years. For example, caesarean rate which was 16.5% in the U.S. in 1980s increased up to 25% at present, which is 20% in England.[5] Unfortunately, it is not possible to obtain net figures for caesarean rates in our country due to lack of sound statistical data. However, it is already known that there is a remarkable increase, and such an increase has been observed by almost everybody. For example, the caesarean rate in our hospital, which is a training hospital, increased from 11.5% in 1993 to 38.5% in 2003.

Although it has been claimed that increased rate of ectopic pregnancy is particularly associated with increased rates of chlamydial infections or smoking,[6] increase in caesarean rates may also contribute to this condition.[7] It is already known that, any type of pelvic surgery, mainly in the adnexial regions, is a risk factor for ectopic pregnancy.[8] Similary, it can be concluded that caesarean operation as a surgical intervention can be a risk factor for ectopic pregnancy. The last study published on this subject is dated 1996,[9] indicating that number of studies is insufficient in the last decade where, in fact, caesarean rates have highly increased.

We retrospectively evaluated the cases followed-up in our clinic in the last decade in order to evaluate whether a previous caesarean operation as a surgical intervention increased the risk for ectopic pregnancy or not.

Methods

We planned a retrospective, controlled study in order to evaluate whether a previous caesarean operation subsequently increased the risk for ectopic pregnancy or not. Based on this, we retrospectively examined 343 women who had a surgically confirmed diagnosis of ectopic pregnancy between January 1993 and December 2003 in our clinic and 11176 women aged between 18 and 45 years, who had given birth over 500 g or who had ultrasonographically confirmed intrauterine pregnancy, but whose pregnancy was terminated by any reason in spite of healthy pregnancy during the same period. Of examined cases, pregnant women with a history of spontaneous abortus were excluded since it was not confirmed if they previously had any risk factor increasing the ectopic pregnancy or had intrauterine pregnancy. Also only multiparous women were included in the statistical evaluation in order to achieve intergroup similarity. A total of 5017 women, who met the inclusion criteria and were allocated in the control group, was compared with 101 cases of ectopic pregnancy, who comprised the study group and had the same criteria (Figure 1).

Statistical evaluations were carried out by SPSS Ver. 10.0 (Chicago, IL, ABD), using Chi-square and matched t-test, and $p<0.05$ was considered statistically significant.

Results

Of 101 ectopic pregnancy included in the study, 30 had a previous caesarean delivery (29.7%). The corresponding number in the control group of 5017 cases was 1285 (25.6%). When the groups were compared in terms of age, parity, smoking rate, number of curettage, educational level and oral contraceptive use, no statistically difference was found between the groups ($p>0.05$) (Table 1). Comparison between the study group

Tablo 1. General characteristics of the study and control groups.

Characteristic	Study group n=101	Control group n=5017	P values
Mean age (±SD)	26.3±6.2	27.6±5.9	a.d.
Mean parity (±SD)	1.26±0.3	1.33±0.4	a.d.
Mean number of curettage (±SD)	0.32±0.14	0.44±0.18	a.d.
Mean contraceptive use rate	10 (%9.9)	487 (%9.7)	a.d.
Smoking rate	18 (%17.8)	936 (%18.6)	a.d.
Educational level (year±SD)	7.3±1.4	6.8±1.7	a.d.
Normal delivery or D&C	71 (%70.3)	3732 (%74.4)	a.d.
Caesarean delivery	30 (%29.7)	1285 (%25.6)	a.d.*

SD: Standart deviation, **a.d.:** not significant ($p>0.05$), **D&C:** Dilatation and curettage
* Odds ratio (%95 confidence interval) = 1.22 (0.79-1.88) ($p=0.352$).

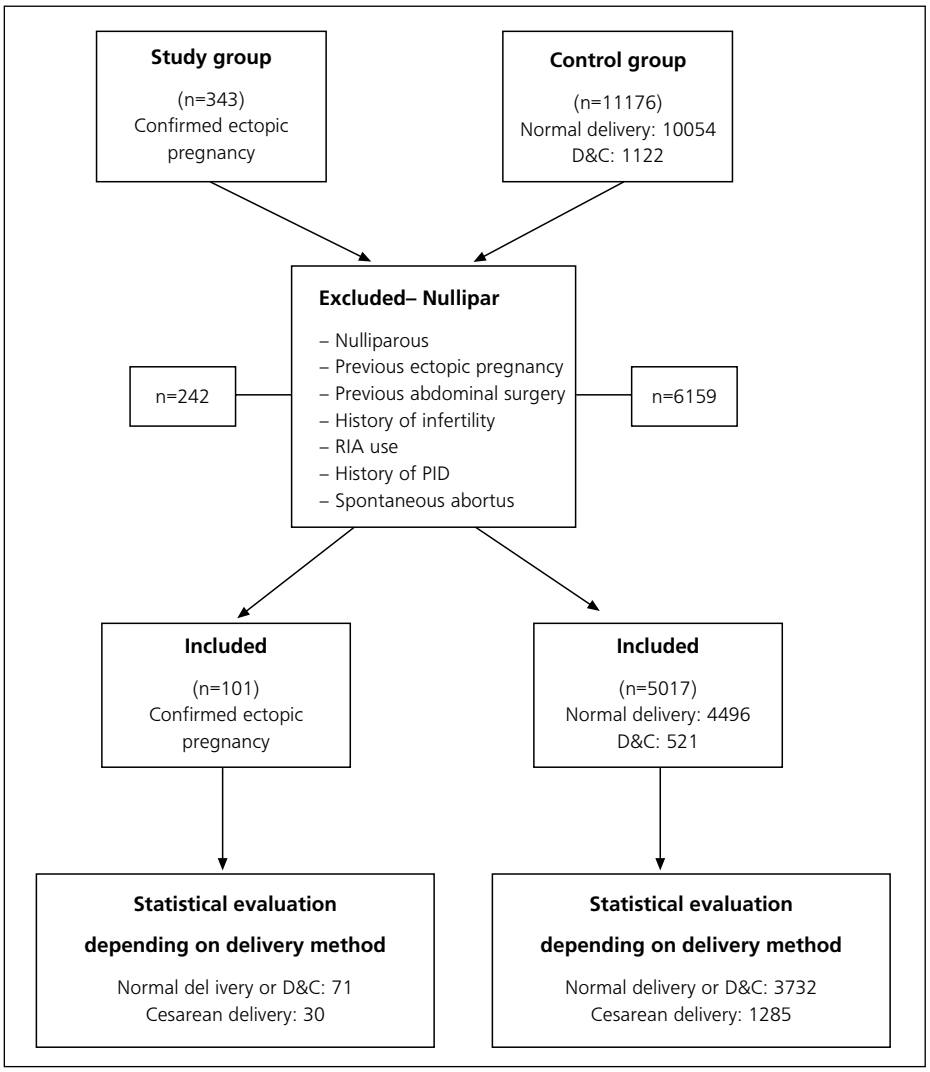

Figure 1. Flowchart (retrospective evaluation of the patients included in the study).

and the control group in terms of caesarean rates gave an odds ratio of 1.22 (95% confidence interval=0.79-1.88) (p=0.352) (Table 1).

Discussion

In recent years, there is an ongoing increase in the incidence of ectopic pregnancy. For example, incidence of ectopic pregnancy was 0.5% of all pregnancies in the U.S. in 1970 while it was reported as 1.97% in 1992. 10 Ectopic pregnancy also comprises 9-13% of pregnancy associated deaths, and it still rates the first among pregnancy associated deaths during the first trimester.[11] Various risk factors increasing the potential of ectopic pregnancy have been reported so far, and among them most frequent ones are history of infertility and its treatment, previous pelvic infection, previous ectopic pregnancy, previous tubal surgery, smoking, advanced age and RIA use.[12-15] It is known that risk for ectopic pregnancy also increases following the abdominal surgery, particularly pelvic surgical interventions.[6] For years, it has been also considered that as a pelvic surgical intervention, caesarean operation may also increase the risk for ectopic pregnancy, and several cohort and case controlled studies have been conducted to clarify it.

While a considerable increase is observed in the caesarean rates in recent years, complications

related with caesarean operation have become a frequent subject to dispute. Although no sound data is available about the caesarean rates in our population, it has been considered that caesarean rates highly increased in latest years, and a major of this increase is not related with medical issues, and particularly women with higher educational levels and income contributed much to the increase in the caesarean rates.[16] This situation, unfortunately reminds us the Brazilian case. In Brazil where delivery by caesarean section is almost perceived as an indication of higher status, the caesarean delivery rates are 50% in state hospitals, and almost 100% in private hospitals.[17] Of course, caesarean operations carried out without any medical rationale are accompanied with severe complications in the short and long term. Maternal complications related with caesarean operation that may develop in the short term include infection, bleeding, injuries of vicinal organ and anesthetic complications.[18] It was reported that the long-term effects may include development of complications such as uterine rupture in subsequent pregnancies,[4-19] placenta previa[20] and placenta acreta,[21] abruptio placentae, stillbirth at subsequent pregnancy with unknown etiology,[22] pelvic adhesion and associated secondary infertility and ectopic pregnancy.[23] Based on all these reasons, necessary precautions have been taken in many developed countries in order to reduce caesarean rates, and achieve the ideal rate (15%) recommended by the World Health Organization (WHO).[24]

In a cohort study carried out in 1996, Hemminki et al. reported that caesarean operation moderately increased the risk for ectopic pregnancy in the long term, and the increase in the risk was statistically significant as 1.28 fold.[23] In another study by the same group of researchers, the rate was higher and relative risk was 1.4-1.7.[25] However, some case controlled studies carried out during the same period reported that risk for ectopic pregnancy increases following the caesarean operation,[26] but no increase was observed in the risk in some other studies.[9,27] as it can be seen, results of studies on this issue are controversial and no studies can be found during the last decade where in fact a remarkable increase was observed in the caesarean rates. Therefore, the present study including the caesarean operations carried out in the last decade in a training hospital is crucial in demonstrating if caesarean operations increase the risk for ectopic pregnancy, a serious complication of pregnancy. Although it is generally known that retrospective studies are less reliable compared to the prospective studies, and some factors that may have an impact on the results of the study can not be efficiently controlled and thus they may be biased, such studies can be preferred, especially when the number of cases is restricted as they can be conducted in the short term with restricted number of patients. Therefore, we believe that the present study can provide an idea about the subject even tough it is a retrospective and controlled study carried on a few subjects. We found an Odds ratio of 1.22 (95% confidence interval=0.79-1.88) (p=0.352). This ratio is generally parallel to the ones obtained in previous studies.[23,25,26] Although the result does not reach a statistically significant value, ectopic pregnancy should also be taken into consideration among long term complications of caesarean operation as a pelvic surgical intervention.

Conclusion

In conclusion, remarkable increase has been observed both in the incidence of ectopic pregnancies and rate of caesarean deliveries in recent years. Following the caesarean operation, which should be considered as a pelvic surgical operation, there might be an increase in the incidence of ectopic pregnancy as there might be several other complications in the long term. This tendency, which may be harmful in the long term, should be kept in mind particularly in caesarean operations carried without any medical rationale; unnecessary caesarean operations should be avoided, preferring the physiological and natural way as much as possible. In the present study, the Odds ratio was calculated as 1.22 after all other factors increasing the risk for ectopic pregnancy were taken under control, and statistically significant levels were not reached. Therefore, further multi-centered, prospective studies including more cases of ectopic pregnancies with longer follow-up periods are required.

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