

## ADHESION FORMATION AFTER CAESAREAN SECTION

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Cesarean section is one of the most common surgeries performed on women, and its rate keeps increasing. The rates of cesarean in the USA in 1996 and 2009 were 20.7 and 32.9 % respectively, an increase of over 50 % [1]. Approximately the same increase (about 12%) is observed in Azerbaijan, although, in general, the rate is lower: 19.3% for 2011. The repeat cesarean delivery rate among all live births was 6.7 % in 1996 and 14.8 % in 2001, representing an increase of over 120 % [3]. One of the complications after CS can be development of adhesions, which can result in female subfertility (3%), chronic pain (6%), intestinal obstruction (0.2%) and complications in subsequent surgeries [2].

Similar to other abdominal operations, CS is associated with intra-abdominal adhesions leading to longer operating time with subsequent cesareans. Morales et al. found that 46–83% of women develop adhesions after repeat CS (second through fourth CS), and the extent and density of the adhesions increased with each repeat CS [5]. In another study, Tulandi et al. reported increased adhesion development and longer time to delivery in subsequent cesarean [6]. Closure of the peritoneum has been studied with respect to adhesion formation with conflicting results. In a systematic review of observational studies, Shi et al [4]. concluded that a modified Stark's CS with peritoneum closure was associated with fewer adhesions than was non-closure. In a randomised controlled trial, there was no difference in adhesion rate according to peritoneal closure, [5]. and the large CORONIS study found no evidence of an effect of peritoneal closure on adhesion-related symptoms.

The impact of age remains unclear, but obesity and diabetes may contribute to impaired wound healing and increase the risk of postoperative infection [7]. Moro et al. [8]. found that wound infection after CS was associated with tenfold increased risk of abdominal wall adhesions.

The purpose of this study is to estimate incidence of adhesions after cesarean section and to investigate the prevalence and location of pelvic adhesions in women with a history of CS.

**Material and methods.** The study was performed in the Department of Obstetrics and Gynecology at the 1-st Clinical Medical Hospital in Baku, Azerbaijan from 2013 to 2015. We studied 390 women who underwent CS, 300 of them were analysed retrospectively and 60 of them prospectively (main group), the rest 30 patients entered to the control group (first CS). In this study we used 3 adhesion scoring system: peritoneal adhesion index (PAI), adhesion scoring system by Tulandi, general classification. We have excluded from our study patients with a history of previous uterine surgery as well as any other abdominal or pelvic surgery, history of pelvic infection, presence of stage III or IV endometriosis. The prevalence, extent and consistency of adhesions at the time of CS were graded prospectively in 60 patients. We also examined the incision – delivery interval (delivery time), the total operating time, estimated blood loss level as well as the Apgar score.

**Results.** In the current study 30 women had primary CS was control group, 309 women had one repeat CS and 51 had two or three-repeat CSs. The total number of patients with adhesions differed by a reliable prevalence in the prospective group, where the total number of patients examined with a cesarean section in the history was 60 patients among whom 17 (28.3%) women with adhesions were identified. In the retrospective group the number of identified patients with adhesions was 31 (10.3%) among 300 patients. In our research no adhesions were found in women who underwent primary CS. In patients with repeat CS, adhesions mainly were found between the uterus and the bladder, and between the uterus and omentum. In the main group (prospective) the incidence of dense adhesions were significantly higher than mild adhesions ( $95.8 \pm 4.1\%$  and  $4.2 \pm 4.1\%$ ) (table 1.). The estimated blood loss

was 357.7±18.97 ml at primary CS, 294.7±10.0 ml at 2nd CS, and 315.4±24.93 ml at third CS, respectively. The operating time and the incision– delivery interval were also higher at repeat CS compared to the first one. There wasn't significant difference in the

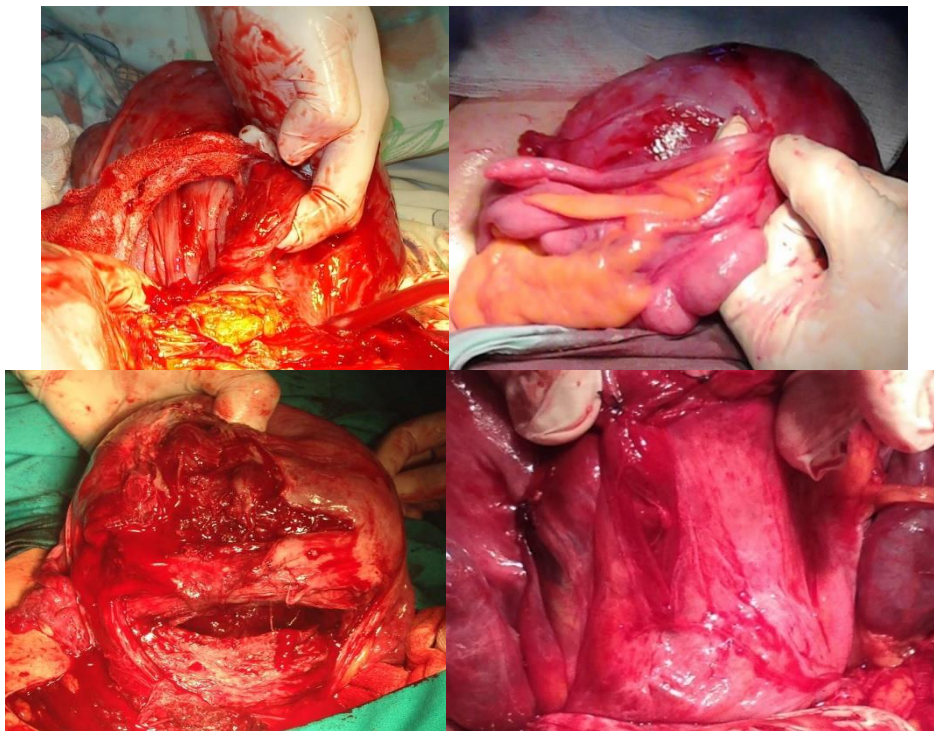
Apgar score among those who had primary CS, repeat one or repeat ≥ 2 CS.

The results of this study has showed, that the incidence of adhesions was much higher after repeated CS. 28.3% after first CS and 69.2% after repeated CS.

**Table 1.**

Classification of intra-abdominal adhesions after cesarean delivery by T. Tulandi

Index	abs.	%
Number of patients with adhesion	17	28,3
Quantity of adhesions: average	24 1,41 ± 0,17	
min – max	1 – 3	
Patients with two and more adhesions	5	29,4
Patients with single adhesion	12	70,6
Location of adhesion:		
Between uterus and bladder	12	50,0 ± 10,2
Between uterus and abdominal fascia	1	4,2 ± 4,1
Between uterus and omentum	7	29,2 ± 9,3
Between omentum and abdominal fascia	2	8,3 ± 5,6
Adhesions to other pelvic structure that interfere with the delivery	2	8,3 ± 5,6
Consistency of the adhesions:		
Filmy	1	4,2 ± 4,1
Dense	23	95,8 ± 4,1
Grade of adhesion:		
< 3 sm	1	4,2 ± 4,1
3-6 sm	20	83,3 ± 7,6
> 6 sm	3	12,5 ± 6,8



*Pic. 1. Dense adhesions after repeated CS*

**Discussion.** Since the number of repeat CS tends to increase, many authors have started to study the influence of repeated CS on adhesion formation. Our study showed that a cesarean section does not pass without a trace for patients. Adhesions with the expression of varying degrees of severity is noted in almost all women with a history of abdominal delivery. Dense adhesions between the uterus and anterior abdominal wall and bladder were observed in most women who underwent repeat CS. We also found adhesions of different localization. Nowadays there isn't any standart classification of adhesion after CS, the need for a standardized adhesion classification is obvious. Routine use of a standardized adhesion classification might enable future investigators to conduct more reproducible retrospective studies and the most important thing is that

knowledge of the presence and severity of adhesions will prepare the obstetrician for future repeat cesarean deliveries. The presence of adhesions increases time to delivery of the fetus and time of surgery. It should be noted that presence of adhesions can increase maternal morbidities with each subsequent cesarean delivery. Such as bowel and bladder injury, need for hysterectomy, post-partum bleeding and etc. We propose to use 3 different classification of intra-abdominal adhesions after cesarean delivery to have more exact image of adhesions condition in pelvic and abdomen. Because each classification hasit own advantages and disadvantages, some of them describe in details localization, the other one describe the intensity and extent of adhesions. For this reason only a combination of these classifications can provide a complete picture of the adhesions.

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## РЕЗЮМЕ

### Формирование спаек после операции кесарева сечения

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**Ключевые слова:** Кесарево сечение, спайки, классификация

**Цель.** Оценить частоту спаек после кесарева сечения и исследовать распространенность и расположение тазовых спаек у женщин с наличием в анамнезе кесарева сечения.

**Материалы и методы.** Всего в исследование были включены 390 пациенток, перенесших операцию кесарева сечения в 1-м Клиническом медицинском центре в Баку, Азербайджан в период с января 2013 года по январь 2015 года. Мы изучили 30 случаев первичной операции КС и 360 случаев повторных операций КС. Использовали 3 классификации для оценки спаек: индекс перитонеальных спаек (PAI), классификация спаечного процесса по Т.Туланди и общая классификация распространенности спаек, степень и выраженность спаек оценивалась проспективно.

**Результаты.** В проспективную группу были включены 60 пациенток из них у 17 (28,3%) наблюдался спаечный процесс. В ретроспективной группе число выявленных пациенток со спайками составило 31 (10,3%) из 300 пациентов. В нашем исследовании не было выявлено наличие спаечного процесса у женщин, при первой операции КС. Спайки в основном были обнаружены между маткой и мочевым пузырем, а также между маткой и яичниками. Результаты данного исследования показали, что встречаемость спаек было намного больше после повторных операций кесарева сечения. С 10,3% - до 28,3% после первого кесарева сечения и с 21,1% - до 69,2% после повторного кесарева сечения.

## XÜLASƏ

### Keysəriyyə kəsiyi əməliyyatından sonra bitişmələrin formalaşması

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**Məqsəd.** Anamnezində keysəriyyə kəsiyi əməliyyatı olan qadınlarda, bitişmələrin rastgəlmə tezliyinin qiymətləndirilməsi həmçinin çanaqda bitişmələrin yayılmasının və lokalizasiyanın araşdırılmasıdır.

**Materiallar və metodlar.** Araşdırmaya 2013-cü ilin yanvar ayından 2015-ci ilin yanvara ayınadək Bakıda yerləşən 1 saylı Kliniki Tibbi Mərkəzdə keysəriyyə kəsiyi əməliyyatı aparılmış, ümümlərdə 390 xəstə daxil edilmişdir. 30 kliniki halda birincili keysəriyyə əməliyyatı və 360 kliniki halda təkrari keysəriyyə əməliyyatı öyrənilmişdir. Bitişmələrin qiymətləndirilməsi üçün üç təsnifatdan istifadə olunmuşdur: peritoneal bitişmə indeksi (PAI), T. Tulandiya görə bitişmələrin təsnifatı və bitişmə prosesinin ümümi təsnifatı, bitişmələrin dərəcəsi və təzahüri prospektiv qiymətləndirilmişdir.

**Nəticələr.** Prospektiv qrupda 60 xəstədən 17-də (28,3%) bitişmə prosesi olmuşdur. Retrospektiv qrupda isə 300 xəstədən 31-də (10,3%) bitişmələr rast gəlinmişdir. Bizim araşdırmamızda ilkin keysəriyyə kəsiyi əməliyyatından sonra bitişmələr aşkar edilməmişdir. Bitişmələr əsasən uşaqlıq və sidik kisəsinin arasında, həmçinin uşaqlıq və yumurtalıq arasında aşkar edilmişdir. Araşdırmamızın nəticələri bitişmələrin rastgəlinməsinin təkrari keysəriyyə əməliyyatından sonra daha çox olduğunu göstərmişdir. Birinci keysəriyyə əməliyyatından sonra 10,3% -dən 28,3% -ə qədər, təkrari keysəriyyə əməliyyatından sonra 21,1% -dən 69,2% -ə qədər olmuşdur