THE ASSOCIATION BETWEEN BODY MASS INDEX AND INTRA-ABDOMINAL ADHESIONS IN WOMEN UNDERGOING PREVIOUS CESAREAN SECTIONS

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ABSTRACT

Background: *Intra-abdominal adhesion formation is an important post-surgery complication and develops at an incidence of 24–83% following cesarean section. Obesity is associated with several disturbances in hemostasis, especially impaired fibrinolysis that may increase incidence of intra-abdominal adhesions.*

Aim of the Work: *Evaluation of the association between body mass index and formation of intra-abdominal adhesion in women undergoing cesarean section.*

Patients and Methods: *Two hundred and ten pregnant women of at least 37 weeks' gestation with history of prior cesarean section were included and divided into two groups according to body mass index (BMI) upon cesarean section (<30 kg/m^2 and ≥30 kg/m^2). The intra-abdominal adhesion incidence and the scar characteristics of the groups were compared.*

Results: *In obese cases, scar thickness was significantly higher 8.7 ± 1.2 vs. 7.3±1.1 mm, different adhesion sites (uterus-bladder, omentum-fascia, uterus-omentum and uterus-fascia) were significantly more frequent, dense adhesion consistencies were more frequent and adhesion size was higher in obese cases. Operative duration was significantly longer in obese cases 40.0 ± 3.0 vs. 36.9 ± 4.0 minutes. Operative complications were non-significantly more frequent in obese cases.*

Conclusion: *In women undergoing cesarean section, there was a significant association between body mass index and formation of intra-abdominal adhesion.*

Keywords: *Body mass index, intra-abdominal adhesions, cesarean sections*

INTRODUCTION:

Cesarean section (CS) is the most widely performed obstetric surgery, and the rate at which CS is performed is increasing rapidly**.** In Egypt, approximately 52% of women gave birth by CS **(1)**.

Although CS is frequently performed as per fetal indications, it can also result in various severe maternal and fetal complicat-ions in comparison to vaginal delivery, including severe hemorrhage, shock, cardiac arrest, fetal loss, major infections, venous thromboembolism, uterine rupture, and hysterectomy**(2)**.

Additionally, one of the most important complications of CS is intra-abdominal adhesions, however, rates of adhesion development recorded at a second cesarean section (CS) are lower and ranged from 24% to 46%, although they increase from 43% to

75% at the third, and up to 83% at the fourth CS[3].

Adhesions are fibrous bands of scar tissue formed between the abdominal organs and tissues and may lead to many postoperative complications, such as intestinal obstruction, chronic pelvic pain, dyspareunia, infertility and visceral injury upon subsequent cesarean sections [4].

Adhesiogenesis is a culmination of increased extracellular matrix (ECM) production associated with diminished matrix degradation, combined with decreased fibrinolytic activity. Physiological changes in pregnancy favor decreased fibrinolysis, with an increased propensity for adhesion development[3].

Although the pathophysiology leading to adhesion development remains poorly understood, a pivotal role has been ascribed to the ability of plasminogen activator activity (PAA) of the mesothelial cells lining the peritoneal cavity to limit adhesion development [3].

Injury to the peritoneum, with loss of the mesothelial cells and reduction of plasminogen activator activity (PAA) exposes underlying fibroblasts and frequently results in adhesions occurring between adjacent surfaces [5].

Peritoneal wound healing is a complex process involving a series of events, including coagulation, hemostasis, inflammation, proliferation, and remodeling. Various cells, cytokines, enzymes, and coagulation molecules play a role in normal wound healing [6].

A molecular or cellular imbalance during this process results in adhesion formation. Adhesion formation increases when the fibrinolytic factor levels decrease, and inflammatory mediators increase. Trauma, hypoxia, infection, and foreign bodies increase the synthesis of fibrinolytic inhibitors and inflammatory mediators. An excessive inflammatory response results in adhesion formation[3].

Obesity is associated with several disturbances in hemostasis, especially impaired fibrinolysis. The impaired coagulation profile in obese individuals is the result of both environmental and genetic factors [7].

Fibrinolytic activity is strongly and negatively correlated with both Body mass index and waist-to-hip circumference ratio (WHR)[8].

Obesity has become a common health problem today. Increased C-reactive protein (CRP) and cytokine production in adipocytes suggest that obesity is a chronic inflammatory condition[9].

Elevated serum tumor necrosis factor-a (TNF-a) and CRP levels have been reported in obese cases[10].

It has been specifically reported that this chronic inflammatory process plays an important role in the emergence of some diseases, such as coronary artery disease and diabetes mellitus, in obese cases[11].

PATIENTS AND METHODS:

Two hundred and ten pregnant women of at least 37 weeks' gestation with history of prior cesarean section were included and divided into two groups according to body mass index (BMI) upon cesarean section (<30 kg/m2 and ≥30 kg/m2). The intra-abdominal adhesion incidence and the scar characteristics of the groups were compared.

Study type:

The study type was cross-sectional study.

Study place:

The study was conducted at Ain Shams University Maternity Hospital.

Study period:

The study was conducted from December 2020 to June 2021.

Inclusion criteria:

Women with term pregnancies, aged between 18-35years with BMI ≥ 30 kg/ m^2 pre-pregnancy weight, singleton living fetus,

previous cesarean section and accepted to be included in the study.

Exclusion criteria:

Women with history of emergency cesarean section, more than previous one cesarean section, abnormally invasive placenta, appendicitis, exposure to radiation treatment for cancer, gynecological infections (PID), abdominal infections e.g.: peritonitis, any abdominal or pelvic operation for non-obstetric cause, e.g. myomectomy, ectopic pregnancy, diabetes mellitus, abdominal malignancy, endometriosis, Cushing disease, females receiving steroids, wound infection or burst abdomen, history suggestive of massive bleeding during previous cesarean section, smoking, autoimmune disorders, pregnancy after IVF and/or cases without peritoneal closure in previous cesarean section.

Study procedures:

The study started after approval of the research ethics committee, Faculty of Medicine, Ain Shams University. Informed consent was taken from all participants. Data confidentiality was maintained.

Cesarean sections were done by supervisors or experts. Previous cesarean section scars were recorded. Scars were defined as flat, depressed, or hypertrophic relative to the levels of the neighboring skin. All CS were performed using spinal anesthesia; the abdomen was entered by P fannenstiel abdominal incision. The localization and density of the intra-abdominal adhesions were recorded. Intraoperative adhesions were graded according to the modified Nair's classification and categorized as no adhesion, filmy or dense adhesions, the complete absence of adhesion were categorized as grade 0, the presence of a filmy adhesion as grades 1–2, and the presence of dense adhesions as grades 3–4. The viscera adhering to the anterior abdominal wall or uterus, the uterus adhering to the anterior abdominal wall, or the pouch of Douglas being obliterated by dense adhesions were categorized as grade 4. The localizations of the adhesions (omentum, bowel, and uterus) were also noted. Intraoperative recording of degree of adhesion that was encountered during operation adhesions was graded according to proposed classification for CS; each site scored separately based on area of CS incision covered by adhesions to determine total score.

The primary outcome was the association between BMI and degree of intra-abdominal adhesions formation in previous cesarean section. Secondary outcome parameters were operative time (skin incision to delivery of the baby), hemoglobin drop (calculated between preoperative and postoperative hemoglobin levels), visceral injuries and need for blood transfusion.

RESULTS:

Table 1: Comparison according to BMI regarding demographic characteristics

Variables		BMI ≥30.0 (N=105)	BMI <30.0 (N=105)	p-value
Age (years)	Mean±SD	26.68±4.64	26.49±4.25	^0.378
	Range	18.0–35.0	19.0–35.0	
GA (weeks)	Mean±SD	38.3±0.93	38.46±0.89	^0.101
	Range	37.0–41.0	37.0–41.0	
Gravidity	Median (1st−3rd IQ)	2.0(2.0–3.0)	2.0(2.0–3.0)	¤0.257
	Range	1.0–9.0	1.0–10.0	
Parity	Median (1st−3rd IQ)	1.0(1.0–1.0)	1.0(1.0–1.0)	¤0.067
	Range	1.0–4.0	1.0–4.0	

There was no significant difference between study groups as regard age 26.68 ± 4.64 vs. 26.49 ± 4.25years, gestational age 38.3 ± 0.93 vs. 38.46 ± 0.89 weeks, gravidity 2.0 vs. 2.0 and parity 1.0 vs. 1.0 with p value 0.37, 0.101, 0.257 and 0.067 respectively.

Table 2: Comparison according to BMI regarding scar thickness (mm).

Measures	BMI ≥30.0 (N=105)	BMI <30.0 (N=105)	P-value
Mean±SD	6.79±2.02	7.21±2.03	^0.067*
Range	4.0–10.0	4.0–10.0	

Regarding scar thickness and shape; statistical analysis of current results showed that there was no statistically significant difference between study groups as regard scar thickness p value 0.067, depressed scar was non-significant more frequent 16 (15.2%) vs. 6 (5.7%) and hypertrophied scar was non-significant less frequent in obese cases 76 (72.4%) vs. 85 (81.0%) with p value 0.079. Flat scar was non-significant less frequent in obese cases 13 (12.4%) vs. 14 (13.3%). (Table 2 and 3)

Table 3: Comparison according to BMI regarding scar shape.

Shape	BMI ≥30.0(N=105)	BMI <30.0 (N=105)	P-value
Hypertrophied	76 (72.4%)	85 (81.0%)	#0.079
Flat	13 (12.4%)	14 (13.3%)	
Depressed	16 (15.2%)	6 (5.7%)	

Table 4: Comparison according to BMI regarding adhesions characteristics.

Adhesion sites		BMI ≥30.0 (N=105)	BMI <30.0 (N=105)	P-value
Uterus-Bladder		105 (100%)	105 (100%)	
Omentum-Fascia		34 (32.3%)	20 (19%)	#0.03*
Uterus-Omentum		35 (33.3%)	16 (15.23%)	
Uterus-Fascia		17 (16.2%)	8 (7.6%)	
Pelvic organs		0 (0.0%)	0 (0.0%)	Not applicable
Adhesion consistency				
Uterus-Bladder	Dense	32 (30.4%)	17 (16.2%)	#0.014*
	Filmy	73 (69.5%)	88 (83.8%)	
Omentum-Fascia	Dense	9 (8.5%)	6 (5.7%)	§0.765
	Filmy	25 (23.8%)	14 (13.3%)	
Uterus-Omentum	Dense	7 (6.6%)	4 (3.8%)	§0.723
	Filmy	28 (26.6%)	12 (11.4%)	
Uterus-Fascia	Dense	4 (3.8%)	2 (1.9%)	§1
	Filmy	13 (12.3%)	6 (5.7%)	
Pelvic organs	Dense	0 (0.0%)	0 (0.0%)	Not applicable
	Filmy	0 (0.0%)	0 (0.0%)	
Adhesion size (cm)				
Uterus-Bladder	Mean ± SD	4.24±3.6 N=105	2.85±1.9 N=105	^0.003*
Omentum-Fascia	Mean ± SD	3.52±2.6 N=34	3.8±2.82 N=20	^0.392
Uterus-Omentum	Mean ± SD	3.91±2.8 N=35	2.56±1.86 N=16	^0.045*
Uterus-Fascia	Mean ± SD	3.41±2.62 N=17	3.5±2.77 N=8	^0.469
Pelvic organs		0	0	Not applicable

Regarding adhesions characteristics; statistical analysis of current results showed that different adhesion sites (uterus-bladder, omentum-fascia, uterus-omentum and uterus-fascia) were significantly more frequent in obese cases except adhesions

with pelvic organs; p value = 0.03. Dense adhesion consistencies were more frequent in obese cases and the differences were statistically significant only in uterus-bladder adhesion; p value = 0.014. Adhesion size was higher in obese cases and the differences were statistically significant in uterine-bladder and uterine-omentum adhesion; p value = 0.003 and 0.045 respectively.

Table 5: Comparison according to BMI regarding operation duration (minutes).

Measures	BMI ≥30.0(N=105)	BMI <30.0(N=105)	P-value
Mean±SD	42.85±4.34	37.9±4.04	<0.0001*
Range	35.0–50.0	31.0–44.0	

Regarding operative duration; statistical analysis of current results showed that operation duration was significantly longer in obese cases 42.85 ± 4.34 vs. 37.9 ± 4.04 minutes with p value < 0.0001**.**

Table 6: Comparison according to BMI regarding operative complications.

Variable	BMI ≥30.0 (N=105)	BMI <30.0 (N=105)	P-value
Bladder injury	0 (0.0%)	0 (0.0%)	Not applicable
Bowel injury	0 (0.0%)	0 (0.0%)	

Regarding operative complications; statistical analysis of current results showed that there was no reported intraoperative bladder or bowel injuries among study groups.

Table 7: Comparison according to BMI regarding hemoglobin (gm/dL) and blood transfusion.

Time	Measures	BMI ≥30.0 (N=105)	BMI <30.0 (N=105)	p-value
Pre-operative	Mean ± SD	11.43±0.9	11.55±0.94	^0.178
	Range	10–13.7	10–13.8	
Post-operative	Mean ± SD	10.53±1.09	10.77±1.01	^0.052
	Range	8.1–12.9	8.5–13.0	
Drop	Mean ± SD	0.9±0.7	0.78±0.59	^0.097
	Range	-0.3–2.8	-0.2-3.2	
Blood transfusion		0 (0.0%)	0 (0.0%)	Not applicable

Regarding post-operative hemoglobin (gm/dL) and blood transfusion; statistical analysis of current results showed that there were no significant differences according to BMI regarding postoperative hemoglobin 10.53 ± 1.09 vs. 10.77 ± 1.01 and hemoglobin drop 0.9 ± 0.7 vs.0.78 ± 0.59 with p value 0.052 and 0.097 respectively. Blood transfusion was not recorded in all cases**.**

DISCUSSION:

Current study disagreed with **Kinay and his colleagues** who stated that a hypertrophic scar was encountered in 21% of women with BMI ≥ 30kg/m2 compared to 13% of women with BMI < 30kg/m2. A depressed scar was present in 12% of women with BMI < 30 kg/m2 and 6% of women with BMI ≥ 30 kg/m2. These differences were not statistically significant (P value= 0.61 and 0.138). They aimed to evaluate whether maternal obesity increases the risk of intra-abdominal adhesion formation at cesarean section. Two hundred and two pregnant women of at least 37 weeks' gestation and who had undergone only one prior cesarean section were included in this prospective observational study. The study population was divided into two groups according to body mass index (BMI) upon cesarean section (<30 kg/m2 and >30 kg/m2). The disagreement might be

attributed to racial factors, techniques of skin closure or suture materials [(4)].

Current results were in the same line with **Kinay and his colleagues** who stated that a flat scar was present in 68% of women with BMI < 30 kg/m2 and 82% of women with BMI ≥ 30 kg/m2. This difference was statistically significant (P value=0.024) [(4)].

Current study disagreed with **Taylan and his colleagues.** They studied 143 patients regarding risk factors for presence of adhesions. 53 cases that were found to have adhesions had flat scars (54.2%) & 32 cases that were found to have no adhesions had flat scars (71.1%), 40 cases that were found to have adhesions had slightly intended scar (40.8%) & 9 cases that were found to have no adhesions were found to have slightly intended scar (2%) & 3 cases that were found to have adhesions had hypertrophic scar (3%) & 4 cases that were found to have no adhesions had hypertrophic scar (8.8%). This difference was statistically significant (P value= 0.01). That may be explained by fewer number of cases examined in his study and the fact that cases included in his study performed higher number of cesarean sections. They aimed to investigate whether we can predict the presence and severity of intra-abdominal adhesions before cesarean section using patient history, symptoms, and abdominal skin scar characteristics**.** In this prospective study, 143 pregnant women with history of previous abdominal surgery were included and they delivered by cesarean. Preoperative abdominal scar characteristics and symptoms as well as intraoperative abdominal adhesions were evaluated using the Manchester Scar Scale, a symptomtology questionnaire and the More Comprehensive Adhesion Scoring Method, respectively[(12)].

Current study agreed with **Hesselman and his colleagues** who stated that presence of adhesions in abdominal gynecological surgery is associated with women's personal history of cesarean section. Obesity further increased the incidence of adhesions. This was a longitudinal population-based register study. Women undergoing benign hysterectomy and/or adnexal surgery (n = 44 455), during 2000–2014, with a previous delivery during 1973–2013, were identified in the Swedish National Quality register of gynaecological surgery. They assessed intra-operative adhesions in a subjective way dividing degree of adhesions into minimal, moderate and extensive. Women with BMI ≥ 30 kg/m2 showed statistically significant more adhesions (OR: 1.91, 95% CI: 1.49–2.45)[(13)].

Current study agreed with **Kinay and his colleagues** who showed that 40% of women with BMI > 30kg/m2 had omental adhesions but only 24% of women with BMI < 30kg/m2 had omental adhesions with p value= 0.016), however, adhesions with uterus & bowel represented only 3% & 1% respectively of women with BMI > 30kg/m2 and 2% & 2% respectively of women with BMI < 30kg/m2 which was statistically insignificant (P value= 0.6) [(4)].

Current study agreed with **Gultekin** who studied the effect of parietal peritoneal closure on omental adhesions development in 2048 women; found that 56% of women that were found to have no adhesions had BMI < 25 kg/m2 in comparison to 44% in women with BMI > 25 kg/m2. Also, 72% of women that were found to have omental adhesions in one space had BMI < 25 kg/m2 in comparison to 28% in women with BMI > 25 kg/m2. Also, 17.1% of women that were found to have omental adhesions in multiple spaces had BMI < 25 kg/m2 in comparison to 82.9% in women with BMI > 25 kg/m2. This results were statistically significant with P value <0.001[(14)].

Current study agreed with **Girsen and his colleagues** who stated that increasing BMI is related to increased incision-to-delivery interval and total operative time at cesarean section with morbidly obese BMI

exposing women to the highest risk of prolonged incision-to-delivery interval. They enrolled 21, 372 women with singleton gestations undergoing uncomplicated primary and repeat cesarean sections that were identified from the Maternal-Fetal Medicine Units Network Cesarean Registry. Women were classified by BMI category at time of delivery (normal 18.5–24.9, overweight 25.0–29.9, obese 30.0–39.9, and morbidly obese 40 or greater). Incision-to-delivery interval and total operative times during cesarean section were compared among the three groups **(15)**.

Current study was in line with **Smid and his colleagues** who stated that median operative time increased as obesity severity increased. Median operative time was also longer for non-emergency CS in each of the BMI categories compared to emergency CS. This was a secondary analysis of the de-identified MFMU Cesarean Registry of 36 women with singleton pregnancies. Maternal body mass index (BMI) at delivery was 37 categorized as BMI 18.5-29.9 kg/m2, BMI 30-39.9 kg/m2, BMI 40-49.9 kg/m2, and BMI ³ 38 50 kg/m2. The primary outcome was any intraoperative complication, was defined as having at least one major intraoperative complication, including peri-operative blood transfusion, intraoperative injury (bowel, bladder, ureteral injury; broad ligament hematoma), atony requiring surgical intervention, repeat laparotomy, and hysterectomy**(16)**.

Current study was inconsistence with **Lawrence and his colleagues** who stated that obese women had greater surgery time. They investigated associations between maternal body mass index (BMI) and the in-theatre time taken to perform surgery for cesarean section. Using the Strengthening the Reporting of Observational Studies in Epidemiology guidelines, they identified all women who underwent cesarean section at a single institution (2009–2015). Of a total of 24 761 cesarean sections, 5607 (22.7%) women were obese at antenatal registration. In-theatre surgical duration (38 vs 52 min, $P < 0.001$) were longer in women with BMI ≥50 kg/m2 (BMI-50) than those with normal BMI (BMI-N). This difference remained significant after controlling for antenatal, intra-operative and immediate postoperative variables **(17)**.

Current study disagreed with **Saadia** who stated that regarding bladder injuries, three pregnant women with BMI more than or equal to 30kg/m2 suffered from bladder injury representing 1.5% of cases in the studied group. On the other hand, no pregnant women with BMI less than 30 suffered from bladder injuries. However, there was no statistically significant difference between both groups with p value= 1 **(18)**.

Current study agreed with **Smid and his colleagues** who stated that in contrast to the risk for post-cesarean complications, the risk of 60 intraoperative complications does not appear to be increased in obese women, even 61 among those with super obesity **(16)**.

Current study agreed with **Machado** who discussed complications of cesarean sections in obese women. They studied 971 cases, the cases were divided into 4 groups according to BMI into women with BMI <30, 30-34.9, 35-39.9 & >40. Only 1 woman only in the group of cases with BMI 35-39.9 kg/m2 suffered from bowel injury. This difference was statistically insignificant with P value =0.5**(19)**.

Current study agreed with **Phipps and his colleagues** who studied risk factors of bladder injuries in cesarean sections and they concluded that BMI has no significant effect on bladder injuries. In their study, number of women suffered from bladder injuries was 42 out of 126 studied women; they had BMI 29.9±5.4 kg/m2 in comparison to 84 women with BMI 33±6.7kg/m2 and were not complicated by bladder injuries. This difference was

statistically significant with p value= 0.01 [(20)].

Current study disagreed with **Fyfe and his colleagues** who stated that among women with cesarean sections, those who were obese had a near twofold increase in the rate of major PPH compared to women with normal BMI (normal [13.7%], overweight [17.4%], obese [24.2%]). They aimed to determine in a cohort of nulliparous women delivering at term whether overweight and obesity are independent risk factors for major postpartum haemorrhage (PPH ≥1000ml) after vaginal and cesarean section. It was a retrospective cohort study and the study population was nulliparous singleton pregnancies delivered at term at National Women's Hospital, Auckland, New Zealand from 2006 to 2009 (N=11, 363) [(21)].

Current study disagreed with **Butwick and his colleagues** who stated that at most, maternal obesity has a modest effect on hemorrhage risk. They conducted a cohort study of women who underwent delivery hospitalization in California between 2008 and 2012. Using multilevel regression, the authors examined the relationships between body mass index with hemorrhage (primary outcome), atonic hemorrhage, and severe hemorrhage (secondary outcomes). In this cohort, the absolute event rate for hemorrhage was 60, 604/2, 176, 673 (2.8%). Compared to normal body mass index women, the odds of hemorrhage and atonic hemorrhage were modestly increased for overweight women and obesity class I. After cesarean section, women in any obesity class had up to 14% decreased odds of severe hemorrhage[(22)].

Finally, current study agreed with **Saadia** who studied 245 cases to assess effect of obesity on women undergoing cesarean sections. She divided the studied cases into 2 groups {women with BMI less than 30(83 cases) & those with BMI more than or equal to 30 (162cases)} her results showed that hemoglobin fall was not correlated with BMI (r =0.083, p value=0.06) [(18)].

Strengths:

The strengths of current study were due to every effort was made to ascertain that all follow-up data were correct, and only complete information was included in data analysis. All clinical assessment, cesarean sections and assessment of study outcomes were done by the same team.

Limitations:

The limitations of current study were due to COVID 19 pandemic, **i**t was a cross-sectional study with higher liability to bias due to egg chicken dilemma phenomena and relatively small sample size regarding accuracy of study outcomes.

Conclusion and Recommendations:

In women undergoing cesarean section, there was a significant association between body mass index and formation of intra-abdominal adhesion with no effect on scar thickness, more frequent depressed scar and dense adhesions, larger adhesion size, longer operation duration and no effect on intraoperative bleeding.

In women undergoing cesarean section, more care, surgeon's experience and meticulous hemostasis should be considered in cases with high BMI to decrease incidence of expected intraoperative adhesions.

Statistical Analysis:

Categorical data was presented as number and percentage, and intergroup differences were compared using the Pearson correlation co-efficient, chi-square test and Fischer exact test. Ordinal data was compared using the chi-squared test for trend. Kolmogorov-Smirnov test was used to determine if data normally distributed or not. Continuous numerical variables were presented as mean and standard deviation,

and the differences between two groups were compared using the unpaired t-test. If data were parametric normally distributed, or was presented as median and range, and the differences between two groups were compared using Mann-Whitney test, if data were skewed or non-parametric. P values were statistically significant if less than .05.

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العلاقة بين مؤشر كتلة الجسم والالتصاقات داخل البطن عند النساء اللواتي خضعن لقيصرية سابقة

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المقدمة: تكوين الالتصاق داخل البطن هو تعقيد مهم بعد الجراحة ويتطور بنسبة 24-83٪ بعد الولادة القيصرية. ترتبط السمنة بالعديد من الاضطرابات في الإرقاء ، خاصةً ضعف انحلال الفبرين الذي قد يزيد من حدوث التصاقات داخل البطن.

هدف العمل: تقييم العلاقة بين مؤشر كتلة الجسم وتشكيل التصاقات داخل البطن عند النساء اللواتي خضعن لعملية قيصرية.

المرضى وطرق البحث: تم تضمين مائتين وعشر نساء حوامل لا يقل عن 37 أسبوعًا من الحمل ولديهن تاريخ لعملية قيصرية سابقة وتم تقسيمهن إلى مجموعتين وفقًا لمؤشر كتلة الجسم (BMI) عند الولادة القيصرية (<30 كجم / م 2 و 30 كجم / م 2). تمت مقارنة معدل حدوث الالتصاق داخل البطن وخصائص الندبات للمجموعات.

النتائج: في حالات السمنة ، كانت سماكة الندبة أعلى بشكل ملحوظ 8.7 ± 1.2 مقابل 7.3 ± 1.1 مم ، وكانت مواقع الالتصاق المختلفة (الرحم والمثانة واللفافة الثربية والرحم واللفافة الرحمية) أكثر تواتراً بشكل ملحوظ ، واتساق التصاق كثيف كان أكثر تواتراً. أكثر تكرارا وكان حجم الالتصاق أعلى في حالات السمنة. كانت مدة العملية أطول بكثير في حالات السمنة 40.0 ± 3.0 مقابل 36.9 ± 4.0 دقيقة. كانت المضاعفات الجراحية غير متكررة بشكل ملحوظ في حالات السمنة.

الخلاصة: في النساء اللواتي يخضعن لعملية قيصرية ، كان هناك ارتباط كبير بين مؤشر كتلة الجسم وتشكيل التصاق داخل البطن.