Sabuncuoglu Serefeddin Health Sciences (SSHS)

ISSN: 2667-6338, 2024/Vol.6:2/29-47

RETROSPECTİVE ANALYSİS OF THE EFFİCACY AND SAFETY OF BENİGN GYNECOLOGİCAL LAPAROSCOPİC SURGERY İN PATİENTS WİTH A HİSTORY OF OPEN ABDOMİNAL SURGERY

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Research Article

Received: 27/11/2024 Accepted: 31/12/2024

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Abstract

Objective: In our clinic, we aim to analyze the operative characteristics and complications of patients who have undergone abdomen surgery prior to total laparoscopic hysterectomy, in comparison to those who have not.

Materials and Methods: The study analyzed a total of 2012 cases of laparoscopic hysterectomy conducted at the Women's Diseases and Birth Clinic in Tepecik Training and Research Hospital from January 2021 to December 235. The cases were categorized based on whether the patients had previous abdominal surgery or not. Various demographic characteristics, surgical treatment methods, operation durations, indications for hysterectomy, and postoperative findings were documented. Statistical analysis was performed using the SPSS program, with a significance level set at $P < 0.05$.

Results: No significant differences were found between the two groups in terms of age, body mass index (BMI), preoperative and postoperative hemoglobin (Hb) values and values. In contrast, the difference between preop and post op Hb value measurements ; the level of statistically significant is higher in the group without obdomen surgery (p=0,001). There is no statistically significant difference between indications in both groups as surgical indication (p=0,043). In the group without western surgery, adhesion was observed to be statistically significantly lower (p=0,001). In the group with abdomen surgery, the presence of adhesions sufficient to require adezyolisis is statistically significant (p<0,001).The differences shown by the groups of operation time are not statistically significant (p=0,926). Estimated blood loss is statistically significantly higher in the group with abdomen surgery (p=0,033). Perioperative blood transfusion and hospitalization periods were monitored similarly in both groups.

Conclusion: Higher rates of adhesion and estimated blood loss were observed in patients who had undergone abdominal surgery prior to undergoing TLH.

Keywords: Total laparoscopic hysterectomy, performed operation, complications

Özet

Amaç: Kliniğimizde total laparoskopik histerektomi (TLH) öncesi geçirilmiş batın cerrahisi olan ve olmayan olguların operatif özellikleri ve komplikasyonları karşılaştırılması.

Gereç ve Yöntemler: Tepecik Eğitim ve Araştırma Hastanesi Kadın Hastalıkları ve Doğum Kliniğinde Ocak 2012- Aralık 2021 tarihleri arasında gerçekleştirilen toplam 235 total laparoskopik histerektomi vakası incelendi ve geçirilmiş batın cerrahisi olan ve olmayan olgular olarak ikiye ayrıldı. Hastaların demografik özellikleri, cerrahi tedavi şekilleri, operasyon süreleri, histerektomi endikasyonları ve postoperatif bulguları kaydedildi. İstatistiksel çalışmalar için SPSS programı kullanıldı. P <0,05 değeri istatistiksel olarak anlamlı kabul edildi.

Bulgular: Yaş, vücut kitle indeksi (VKİ), preoperatif ve postoperatif hemoglobin (Hb) değerleri ve değerleri açısından her iki grup arasında anlamlı bir farklılık tespit edilmedi. Buna karşın preop ve post op Hb değeri ölçümleri arasındaki fark; batın cerrahisi olmayan grupta istatistiksel olarak anlamlı düzeyde daha yüksektir (p=0,001). Cerrahi endikasyon olarak her iki grupta endikasyonlar arasında istatiksel olarak anlamlı fark yoktur(p=0,043). Batın cerrahisi olmayan grupta adezyon istatistiksel olarak anlamlı düzeyde daha düşük gözlendi (p=0,001). Batın cerrahisi olan grupta ise adezyolisis gerektirecek kadar adezyon varlığı istatistiksel olarak anlamlı düzeyde daha yüksektir (p<0,001). Operasyon süresinin gruplara göre gösterdiği farklar istatistiksel olarak anlamlı değildir (p=0,926). Tahmini kan kaybı ise batın cerrahisi olan grupta istatistiksel olarak anlamlı düzeyde daha yüksektir(p=0,033). Perioperatif kan transfüzyonu ve hastanede yatış süreleri her iki grupta da benzer olarak izlendi.

Sonuç: Geçirilmiş batın cerrahisi olan TLH vakalarında adezyon ve tahmini kan kaybının daha yüksek olduğu görülmüştür.

Anahtar Kelimeler: Histerektomi, Geçirilmiş Operasyon, Komplikasyon

Main text

1. Introduction

Hysterectomy is the second most commonly performed gynecological procedure worldwide and the most frequently conducted surgery across all medical specialties. Various approaches such as abdominal, vaginal, laparoscopic, or robotic surgery can be utilized for this procedure(Németh, 2014). Laparoscopic techniques are typically recommended for hysterectomies carried out for benign indications. In cases where there is a large pelvic mass, a

significantly enlarged uterus, or a history of abdominal surgery, laparoscopic hysterectomy may pose challenges. However, when vaginal hysterectomy is not feasible, laparoscopic hysterectomy is often the preferred option(Payne & Dauterive, 2008). Recent studies in our country have focused on analyzing the indications and complications associated with total laparoscopic hysterectomy(Salman et al., 2015). Laparoscopic hysterectomy offers several advantages over abdominal hysterectomy, including shorter hospital stays, faster recovery times, reduced intraoperative blood loss, quicker return to daily activities, and improved cosmetic outcomes(Aarts et al., 2015). Consequently, laparoscopic hysterectomy has gained popularity as a safe and effective minimally invasive surgical intervention with high patient satisfaction rates. The choice between abdominal, vaginal, laparoscopic, or robotic techniques should be made based on various factors(Sandberg, Twijnstra, Driessen, & Jansen, 2017). These factors include the patient's indication, history of pelvic operations, size of the uterus, presence of additional diseases, the preference of the surgeon, and the patient's personal preference(Azadi et al., 2023).

2. Material and Methods

During the period spanning from January 2012 to December 2021, a total of 235 TLH cases were analyzed at Tepecik Training and Research Hospital in the Obstetrics and Gynecology Clinic. The preference for TLH over other types of hysterectomy was evident in our clinic, with TLH being the primary choice for all patients unless there were additional medical conditions or patient preferences indicating otherwise. Our research focused on patients aged between 40 and 75 years, both with and without a history of abdominal surgery, who underwent TLH procedures for benign indications.

The demographic characteristics of the cases, including age, parity, and body mass index, were documented, along with the history of any previous abdominal surgeries. The indications for hysterectomy, as well as the duration of the operation, were also recorded. Intraoperative and postoperative complications were carefully noted, as well as the estimated blood loss and the length of hospitalization. The estimated blood loss was determined by calculating the difference between the preoperative and postoperative hemoglobin values. Hemoglobin values were measured one day before the surgery and again 12 hours after the procedure. The duration of the operation was measured from the first incision in the umbilical area to the time when the large trocar was withdrawn. The hospitalization period was calculated as the time between the day of the surgery and the day of discharge from the hospital. It is important to note that patients who

had other reasons for being hospitalized before the surgery were not included in the calculation of the hospital stay. Additionally, all patients who did not experience any complications had a urinary bladder probe taken at the 12th hour after the surgery. Following the surgical procedure, investigations regarding defecation and mycotic infections were conducted. Discharge was granted to patients who did not present with any active complaints and exhibited stable vital signs. The patients underwent systemic and pelvic examinations as part of the routine preoperative preparation. Additionally, anesthesia consultations were carried out, and cervical smears as well as endometrial biopsies were obtained. Patients with severe diabetes, those with malignant results from curettage prior to the operation, adnexal masses, malignancy detected in frozen results, adnexal malignancy, postpartum hemorrhage following cesarean section, hysterectomy, patients necessitating additional surgery during the procedure, laparotomy, supracervical hysterectomy, laparoscopic cystectomy, vaginal hysterectomy, and those with missing records were excluded from the study.

Prior to laparoscopy, all patients received anesthesia consultation and provided consent for potential complications. Pre-operative preparations included dietary restrictions, purgative enema, and fasting for six hours. Intravenous cefazoline was administered one hour before surgery based on body mass index to prevent infection. Varicose veins were treated for thromboembolic prevention, with low molecular weight heparin applied starting two hours before the procedure until the tenth day post-operation. Enoxaparin was injected under the skin 8 hours before surgery for thromboembolism prophylaxis. A single dose was administered per day until discharge. All operations were performed by the same surgeons who had laparoscopy training and also had case experience in these surgical techniques. The ASA score of all patients was 1 and 2. Before the operation, all patients were given general anesthesia in the lithotomy position by wearing a urinary bladder probe and a nasogastric tube. In terms of short-term and long-term complications, patients were evaluated by calling for outpatient clinic control at certain intervals.

The ethical dimension of the research

Ethical approval for this study is from the ethics committee of Tepecik Training and Research Hospital 2021. 06. Taken with 21 numbers. The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki by the World Medical Association.

3. Results

The research involved 120 cases of TLH in the working group, which had a history of gynecological surgery, and 115 cases of TLH in the control group, which had no history of abdominal surgery. Upon detailed examination of patients who had undergone Western Surgeries, the most common type of surgery was cesarean delivery, accounting for 88 cases (73.3%), followed by laparomic myomectomy with 24 cases (20%), and laparatomic cystectomy with 8 cases (6.67%). The average age in the study group was 47.2 years (minimum: 31, maximum: 84, standard deviation: 6.956), while in the control group, it was 50.22 years (minimum: 32, maximum: 86, standard deviation: 7.66). The body mass index in the study group was 32.3 kg/m2 (minimum: 22.4, maximum: 37.2, standard deviation: 6.44), and in the control group, it was 32.4 kg/m2 (minimum: 21.8, maximum: 36.4, standard deviation: 6.16). The average parity count in the working group was 3.23 (minimum: 0, maximum: 8, standard deviation: 2.74), while in the control group, it was 3.16 (minimum: 0, maximum: 8, standard deviation: 2.37). There were no statistically significant differences in mean age, parity, and body mass index between the two groups included in the study. (Table 1: Demographic data of both groups; Table 2: Indications for hysterectomy of both groups)

Table 1. Comparison of Demographic Data of Cases.

Demographics	**Group**		**p**
	Abdominal Surgery (+) (n:120)	**Abdominal Surgery (-) (n:115)**	
Age(year)	47,2(min:31 max:84 sd:6,956)	50,22(min32 max:86 sd:7,66)	0,064*
BMI(kg/m2)	32,3(min:22,4 max:37,2 sd:6,44	32,4 (min:21,8 max36,4: sd:6,16)	0,058
Parite(n)	3,23(min:0 max:8 sd:2,74)	3,16(min:0 max:8 sd:2,37)	0,062

**BMI:Body mass index (BMI) *p:0,05*

Table 2: Contrasting Indications for Hysterectomy Among Cases

Parameter	**Group**		**p**
	Abdominal Surgery (+)(n:120)	**Abdominal Surgery (-)(n:115)**	

Abnormal Uterine Bleeding	67(%55,4)	54(%44,6)	
Myom	8(%35,6)	29(%64,4)	
Pelvic pain	3(%30,0)	7(%70,00)	0,074
Adnexial Mass	13(%58,8)	10(%41,2)	
Endometrial hyperplasia	9(%39,1)	15(%60,9)	

*p:0,05

Among the indications for hysterectomy in our patients, abnormal uterine bleeding accounted for 121 cases (54.4%), while myoma uteri caused decreased frequency in 37 cases (15.7%). Endometrial hyperplasia was responsible for 23 cases (9.7%), adrenal mass for 23 cases (9.7%), and chronic pelvic pain for 10 cases (4.25%). The difference between these indications was not statistically significant (p: 0.074).

The study group had a mean duration of surgery of 144.33 minutes (min:87 max:216 sd: 45.37), while the control group had a mean duration of surgery of 144.92 minutes (min:68 max:230 sd: 51.29). However, this difference was not statistically significant. The preoperative and postoperative hemoglobin measurements did not show any statistically significant differences in either group. However, the group without abdomen surgery had statistically significantly higher differences between their preoperative and postoperative measurements (p=0.001). The estimated blood loss was statistically significantly higher in the group with western surgery (330.94) (p=0.033). There was no significant difference in blood transfusion due to intraoperative bleeding. The hospitalization period was 2.34 days (min:2 max:8 sd:2.84) in the study group and 2.44 days (min:2 max:10 sd:3.02) in the control group, which was not statistically significant. The post-operative complication rates did not differ statistically significantly, although there were more complications in the study group (p>0.05). Detailed data on complications can be found in Table-3.

Table 3. Preoperative and postoperative findings

Parameter	**Group**		
	Abdominal Surgery (+)(n:120)	**Abdominal Surgery (-)(n:115)**	p

Duration of Operation	144,33±45,37	144,92±51,29	0,926
Preop Hb (g / dL)	11,99±1,66	12,29±1,42	0,141
Postop Hb (g / dL)	12,00±1,63	12,00±1,56	0,974
Preoperative Postoperative Hb Difference (g/dL).)	-0,02±0,239	0,28±0,99	0,001*
Approximate Blood Loss (mL)	330,15±241,74	266,94±208,81	0,033*
Hospitalization duration (in days)	2,34±2,84	2,44±3,02	0,133
Duration of Operation (min)	144,33±45,37	144,92±51,29	0,926

**p:0,05 *Hb:Hemoglobin(g/dL)*

In the study group, 5 (4.17%) and 4 (3.48%) patients in the control group underwent a blood transfusion due to intraoperative excessive bleeding. In the study group, 1 (0.83%) ureter and 2 (1.67%) bladder injuries were present, while in the control group 1 (0.87%), bladder injuries were present. In the postoperative study group 1 (0.83%) vesikovaginal fistula was observed. Intestinal injury is present in 1 (0.83%) patient in the study group. Total complication rates were 10(8.33%) in the control group 5(4.35%). There was no statistically significant difference between the groups.

Statistically significant differences were observed in the presence of adhesions between the group without abdominal surgery and the group with abdominal surgery, with a lower occurrence of adhesions in the former and a higher occurrence requiring adhesiolysis in the latter ($p<0.001$).

All patients who experienced complications after TLH have undergone the necessary repairs and subsequent treatments. The diagnostic process involved the application of the methylene blue tampon staining test, followed by cystoscopy, magnetic resonance imaging (MRI), and intravenous pyelography for further evaluation. Based on the results of these examinations, the urology clinic collaborated in managing the patients' treatment. The decision to continue follow-up was made after confirming the absence of persistent fistula in the post-repair

examinations for vesikovaginal fistula. However, one patient exhibited bladder injury in the ureter, while two patients had intraoperative ureter damage. Advanced examinations were conducted on these cases, and a conservative treatment approach with stent placement was decided upon. The analysis of complications is presented in Table 4.

Table 4. Analyzing Complications

Parameter	**Group**		
	Abdominal Surgery (+)(n:120)	**Abdominal Surgery (-)(n:115)**	**p**
Intraoperative bleeding	5(%4,17)	4(%3,48)	>0,05
Damage to the ureter	1(%0,83)	0	
Bladder injury	2(%1,67)	1(%0,87)	
Intestinal injury	1(%0,83)	0	
Vesicoureteral Fistula	1(%0,83)	0	
Total Complication	10(%8,33)	5(%4,35)	
Adhesion	24(%20)	2(%2,3)	<0,001

**p:0,05*

4. Discussion

With the advancements in technology and the increasing demand for perfection from patients, laparoscopic hysterectomy has emerged as an appealing option for both surgeons and patients. In comparison to abdominal hysterectomy, TLH offers advantages such as shorter hospital stays, quicker recovery periods, minimal blood loss, and reduced need for pain relief(Orhan et al., 2019).

TLH is primarily used for the treatment of non-malignant gynecological conditions. These conditions encompass uterine fibroids, adenomyosis, endometriosis, non-cancerous adrenal masses, abnormal uterine bleeding, tubo-ovarian abscess, endometrial hyperplasia, and cervical intraepithelial neoplasia (Németh, 2014; Salman et al., 2015). In our study, the most prevalent

indications for TLH were abnormal uterine bleeding and uterine fibroids. Although there is no evidence demonstrating a connection between TLH indications and the choice of surgical procedure, the indications in our study were similar in both groups.

In cases of TLH, the average duration of hospital stays ranges from 1.4 to 4 days, as reported in previous studies(Garry et al., 2004). However, our study found a similar duration of postoperative hospitalization in both groups. This could be attributed to the preference for laparoscopic surgery by experienced specialists in our clinic, which is a frequent occurrence. The laparoscopic experience of the surgeon and the team, as well as the clinical characteristics of the cases, can influence the average operation time in planned TLH cases(Nagata et al., 2019; Sridhar & Susmitha, 2016). Previous studies have reported an average blood loss of 130 (±189) ml during TLH procedures(Nagata et al., 2019). It is worth noting that the literature suggests that laparoscopic interventions result in less perioperative blood loss(Sridhar & Susmitha, 2016). In our study, we observed an average hospital stay of 2.38 ± 2.97 days for TLH cases, an average operation time of 144.62 ± 47.26 minutes, and an average blood loss of 298.6 ± ml, which aligns with findings from other studies(Garry et al., 2004; Nagata et al., 2019).

Laparoscopic hysterectomy complications may vary depending on the patient's position, trocar ingress, gas insufflation, and the tools and energy modalities utilized during the operation. Injuries to major blood vessels can lead to organ damage such as the intestine, ureter, and bladder. Additionally, potential complications include trocar site hernias, hematomas, infections, vaginal cuff dehiscence, and thromboembolism(Louie et al., 2018; Sridhar & Susmitha, 2016). Notably, none of the patients in our study experienced late-stage complications, wound site infections, cuff prolapse, or cuff dissensus. Studies on TLH cases have reported a major complication rate of 5-7%, while our study showed a 6.3% complication rate, consistent with existing literature(Garry et al., 2004; McDonnell, Hollingworth, Chivers, Cohen, & Salfinger, 2018; Orhan et al., 2019). Ureter and bladder damage are the most common complications, with post-TLH ureter damage occurring in approximately 0.5-1% of cases and bladder injuries in 2-3%(Bretschneider, Casas-Puig, Sheyn, Hijaz, & Ferrando, 2019; McDonnell et al., 2018). Properly isolating lower urinary system structures before operating on other pelvic structures, identifying tissue planes, and using monopolar cautiously are essential in preventing complications(Bretschneider et al., 2019; McDonnell et al., 2018).

When we evaluated in terms of complications, our major complication rate in our case group was determined as 10 (8.33%) cases. The complication rate of 8.33% by us is thought to be

due to intra-abdomen adhesions secondary to previous abdomen operations of our patients. In our operations, 26 (11.06%) patients have been shown to have enough adhesion to require adezyolysis. Although TLH is a good surgical choice in benign gynecological cases, it should be borne in mind that complication rates are high in cases with advanced stage intra-peritoneal adhesion. In meta-analyses of Yinghua et al., which included seven studies, it was shown that undergone intraabdominal surgery increased TLH complication rates(Xu, Wang, & Wang, 2015). Lim et al. In their study, involving 482 patients, there was no difference in the rate of major complications between the 158 cases with adhesion and the other group(Lim et al., 2017). Although the use of laparoscopic surgery has become widespread, it can be expected that neighboring organ and vascular injuries are more common due to adhesion in cases of pelvic inflammatory disease and endometriosis with widespread advanced adhesion(Tarik & Fehmi, 2004; Wattiez et al., 2002).

Failure to recognize complications during TLH or address overnight complications in a timely manner can have serious consequences for morbidity. It may take an average of 7 to 14 days for certain complications to manifest after surgery. One such complication is the vesicovaginal fistula, which is characterized by continuous urine leakage from the vagina, pain on the same side, and significant findings indicating hydronephrosis. In our study, patients who developed vesicovaginal fistula reported urine leakage within the first 10 days after surgery. However, since this clinical issue is not typically identified during the operation, it is recommended to conduct cystoscopy, MRI urography, and IVP imaging after a thorough physical examination to assess the extent of urinary system injury(Aydin & Mercimek, 2020; Dallas, Rogo-Gupta, & Elliott, 2019).

Following a hysterectomy, it is crucial to identify the root cause of any complications that may arise. It is important to consider the possibility of delayed thermal damage as a potential cause. Our research attributes the low complication rates post TLH to the utilization of cutting-edge surgical materials and technology, as well as the high level of experience of the surgeons involved. Introducing organ transplants early on as an alternative measure for surgical complications is believed to have played a role in reducing complication rates in TLH procedures at our clinic. Upon reviewing our data, it is apparent that organ damage is promptly identified and treated during surgery in all TLH cases. Our study involved a total of 15 patients diagnosed with complications, and apart from the development of adhesion, there was no significant difference in the rates of complication occurrence between the two groups, despite the variations in TLH

techniques and the consistent use of energy modalities. We attribute this to the routine organ dissection in laparoscopic cases, as well as the surgeons' increased experience and their efforts to minimize thermal propagation distance in laparoscopic instruments compared to previous years. It is worth highlighting that our study demonstrates lower complication rates compared to literature.

5. Conclusion

Following the established method and surgical principles that an experienced surgeon adheres to is believed to lower complication rates. Our research, along with similar studies, will enhance the existing literature, particularly in terms of preventing complications and effectively managing them.

Acknowledgement

The authors have no relevant financial or non-financial interests to disclose.

Conflicts of interest

This study was performed in line with the principles of the Declaration of Helsinki. Ethical approval for this study is from the ethics committee of Tepecik Training and Research Hospital 2021. 06. Taken with 21 numbers.

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Funding Statement

This research received no specific grant from any funding agency, commercial or not-for-profit sectors.

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Revision of the manuscript before submission, not only for spelling and grammar but also for intellectual content: M.F.Balcı, İ.E.Ertaş, M.Alan

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Figure(s) and Table(s)

Table 1. Comparison of Demographic Data of Cases.

Demographics	**Group**		**p**
	Abdominal Surgery (+) (n:120)	**Abdominal Surgery (-) (n:115)**	
Age(year)	47,2(min:31 max:84 sd:6,956)	50,22(min32 max:86 sd:7,66)	0,064*
BMI(kg/m2)	32,3(min:22,4 max:37,2 sd:6,44	32,4 (min:21,8 max36,4: sd:6,16)	0,058
Parite(n)	3,23(min:0 max:8 sd:2,74)	3,16(min:0 max:8 sd:2,37)	0,062

**BMI:Body mass index (BMI) *p:0,05*

Table 2: Contrasting Indications for Hysterectomy Among Cases

Parameter	**Group**		**p**
	Abdominal Surgery (+)(n:120)	**Abdominal Surgery (-)(n:115)**	
Abnormal Uterine Bleeding	67(%55,4)	54(%44,6)	
Myom	8(%35,6)	29(%64,4)	
Pelvic pain	3(%30,0)	7(%70,00)	0,074
Adnexial Mass	13(%58,8)	10(%41,2)	
Endometrial hyperplasia	9(%39,1)	15(%60,9)	

*p:0,05

Table 3. Preoperative and postoperative findings

Parameter	**Group**		p
	Abdominal Surgery (+)(n:120)	**Abdominal Surgery (-)(n:115)**	
Duration of Operation	144,33±45,37	144,92±51,29	0,926
Preop Hb (g / dL)	11,99±1,66	12,29±1,42	0,141
Postop Hb (g / dL)	12,00±1,63	12,00±1,56	0,974
Preoperative Postoperative Hb Difference (g/dL).)	-0,02±0,239	0,28±0,99	0,001*
Approximate Blood Loss (mL)	330,15±241,74	266,94±208,81	0,033*
Hospitalization duration (in days)	2,34±2,84	2,44±3,02	0,133
Duration of Operation (min)	144,33±45,37	144,92±51,29	0,926

**p:0,05 *Hb:Hemoglobin(g/dL)*

Table 4.Analyzing Complications

Parameter	**Group**		**p**
	Abdominal Surgery (+)(n:120)	**Abdominal Surgery (-)(n:115)**	
Intraoperative bleeding	5(%4,17)	4(%3,48)	>0,05
Damage to the ureter	1(%0,83)	0	
Bladder injury	2(%1,67)	1(%0,87)	
Intestinal injury	1(%0,83)	0	
Vesicoureteral Fistula	1(%0,83)	0	
Total Complication	10(%8,33)	5(%4,35)	

Adhesion	24(%20)	2(%2,3)	<0,001

**p:0,05*