Experimental
&
Clinical Article

Laparoscopic Versus Abdominal Myomectomy Postoperative Outcomes

Nicel TAŞDEMİR[1], Cem ÇELİK[1], Remzi ABALI[1], Ayşegül KAYALI[1], Abdulaziz GÜL[1], Özkan ÖZDAMAR[2]

Tekirdağ, Turkey

OBJECTIVE: Myomas are benign uterine tumors affecting 25-70% of reproductive-aged women. Myomectomy remains the gold-standard for women who request preservation of fertility. We performed an observational investigation of a series of patients scheduled for laparoscopic or abdominal myomectomy to evaluate post-surgical parameters, operation duration, after laparoscopic and abdominal myomectomy.

STUDY DESIGN: The manuscript involved data from women who were operated between February 2011 and February 2013. Patients enrolled into the study were compared according to the age, body weight, height, body mass indexes (BMI), the number of the myomas, and operation time. Additionally, pre and postoperative hemoglobin and hematocrit levels and the length of hospital stay were noted.

RESULTS: Twenty-two patients underwent laparoscopy and 15 patients underwent laparotomy. Mean age was 40.1±9.1 in laparoscopy group and 38.5±6.7 in laparotomy group(p=0.513). Mean BMI was 26.1±4.1 in laparoscopy group and 27.9±5 in laparotomy group (p=0.281). Myoma numbers were similar in both groups (p=0.232). Operation duration was longer in laparoscopy group(148.33±66.26) compared to laparotomy group (102.75±42.37) (p=0.013). Preoperative and postoperative hemoglobin and hematocrit levels were similar in both groups (Hemoglobin ppre=0.680, ppost=0.499; Hematocrit ppre=0.946, ppost=0.499). The pre and post-operative hemoglobin and hematocrit levels were comparable (p=0.782 and 0.717). The median value of hospitalization duration for laparoscopy group was 2.5 days(2-8) and for laparotomy group it was 3 days (2-6) (p=0,008).

CONCLUSION: Our study demonstrated laparoscopic approach needed significantly longer operative time but shorter hospitalization. We think that the time loss during the morcellation is important in the prolongation of the operation. Not observing any differences in variations of hematologic parameters supports the idea that the time is lost during the morcellation. In selected group of patients, laparoscopic myomectomy is an attractive alternative to laparotomic myomectomy, providing clear advantages such as shorter hospitalization duration.

Key Words: Uterine myoma, Laparoscopy, Laparotomy, Myomectomy

Gynecol Obstet Reprod Med 2014;20:48-52

Introduction

Myomas are benign, hormone-sensitive, fibromuscular tumors of the uterus affecting up to 25-70% of reproductive aged women.[1-3] These benign tumors originate from uterine smooth muscle cells and can cause severe symptoms such as abnormal uterine bleeding, pelvic pain and infertility.[3] Though only a small percentage of the myomas present with clinically important symptoms, they still remain the leading indication for hysterectomy.[4,5] Traditionally, myomectomy is needed when the myoma is symptomatic, causing pain, menorrhagia and iron deficiency anemia, or asymptomatic but growing rapidly and causing recurrent pregnancy losses in the exclusion of other reasonable factors to explain infertility.[6,7] The current management options range from medical treatment with oral contraceptives, nonsteroidal anti-inflammatory medications, aromatase inhibitors or GnRH agonists to surgical procedures such as hysterectomy, myomectomy, uterine artery embolization. Yet, with technological advancement, new therapeutic options, such as MRI-guided high frequency ultrasound, and radio frequency ablation or image-guided focused ultrasound thermal therapy, have been introduced for women desiring uterine preservation.[8,9,10] Nevertheless myomectomy still remains the gold-standard for women affected by symptoms of a fibroid uterus who request preservation of their fertility.

Although numerous different operative techniques have

[1] *Namık Kemal University Facuty of Medicine Department of Obstetric and Gynecology, Tekirdağ*

[2] *Gölcük Military Hospital Department of Obstetrics and Gynecology Gölcük, Kocaeli*

Address of Correspondence: *Nicel Taşdemir*
Namık Kemal University Facuty of Medicine, Department of Obstetric And Gynecology, Altınova Tekirdağ, Turkey
nicelta@gmail.com

Submitted for Publication: *18. 11. 2013*
Accepted for Publication: *10. 01. 2014*

been described, myomectomies via laparotomy and laparoscopy are the two most commonly preferred approaches in the management of symptomatic uterine myomas.[6] While traditional open myomectomy results in a limited morbidity similar to that of hysterectomy,[11] laparoscopic myomectomy, according to some authors, provides clear advantages in medical, social and economic terms, with lower post-operative pain and shorter recovery time.[12] Even though operative times were significantly longer with laparoscopic myomectomy, patients have quicker recovery, shorter hospital stays, and have generally equivalent clinical outcomes compared with abdominal myomectomy. However, laparoscopic myomectomy is a stringent, distressing and sometimes troublesome procedure for many endoscopic surgeons and still needs to be thoroughly evaluated. Despite advances in laparoscopic technique, as well as the advantages of laparoscopic myomectomy reported over 30 years, most gynecologic procedures are still performed through abdominal incisions.[13] Many authors accept the advantages of laparoscopic approach compared to the abdominal surgery, yet laparoscopic myomectomy is still a controversial operation.

We performed an observational investigation of a series of patients scheduled for laparoscopic or abdominal myomectomy to evaluate post-surgical parameters, operation time, after laparoscopic and abdominal myomectomy.

Material and Method

The present manuscript involved data from women who were decided to undergo myomectomy operation due to the indications above and were operated in the period between February 2011 and February 2013 at the Department of Obstetrics and Gynecology, Namık Kemal University, Tekirdağ, Turkey. Ethics committee approval was not obtained because of retrospective and observational nature of study and no intervention was applied to patients for the study. Women of reproductive age with fibroids who wanted a minimally invasive treatment option and desired uterine preservation were evaluated. Patient selection was based upon the following criteria: pain or pressure symptoms, myomas attributed to infertility or reproductive dysfunction, rapidly growing and having a diameter of 5-10 cm myomas and menstrual disorders. Those patients who underwent a hysterectomy due to these indications were not enrolled into the study. Transvaginal and abdominal ultrasound was used to determine the number, size, localization and relationship with the endometrial cavity of the myoma.

Patients enrolled into the study were compared according to the age, body weight, height, body mass indexes (BMI), the number of the myomas, and operation time. Additionally, pre and postoperative hemoglobin and hematocrit levels and the length of hospital stay were noted. For each patient, total operating time, from skin incision to closure, were recorded. All patients underwent general anesthesia and received a prophylactic antibiotic dosage of Cefazolin 2 g iv. prior to the procedure. All operations were performed by the same investigators. Uniform procedures for hospital discharge were adopted in both groups.

Abdominal myomectomy was performed through a 10-12 cm low transverse incision. The subcutaneous fat and abdominal fascia were opened crosswise and the abdominal muscle and underlying parietal peritoneum were opened longitudinally on the midline. After examination of the uterus and adnexa, a linear uterine incision was made on the most prominent part of the leiomyoma. No pharmacological vasoconstriction or mechanical vascular occlusion technique was used before uterine incision. When possible, uterine incisions were made on the anterior wall or the fundus in an attempt to reduce post-operative adhesions. After identification of the myoma capsule, enucleation was made following the cleavage plane. The uterine defects were sutured in a single or double layer with interrupted sutures of 1-0 polyglactin 910 (Vicryl®, Ethicon SpA, Italy). The serosa was approximated with 3-0 polyglactin 910. After washing the pelvis with saline solution and hemostasis was established, laparotomy was closed in separate layers.

In laparoscopic myomectomy, a pneumoperitoneum was provided with carbon dioxide insufflation through a Veress needle. A standard umbilical incision was made to introduce the laparoscope which was connected to a camera for video monitoring. Two suprapubic 5 mm trocars were inserted into the abdomen to the left and the right of the umbilicus. In order to provide optimal exposure, particularly in posteriorly located myomas, uterine cannulation was used. A longitudinal vertical incision was made in the most prominent part of the myoma. The incision was extended until it reached the capsule. The myometrium retracted as the incision was made, exposing the tumor. The myoma was enucleated by entering into the cleavage plane with claw forceps and scissors. Constant traction combining adequate traction with a tenaculum forceps with counter-traction with a grasper facilitated dissection. Vessels in the connective tissue bridges between the fibroid tissue and uterus were coagulated with bipolar current before being cut. The uterine wall then sutured in one or two layers, depending on the depth of the uterine wound, with an interrupted or continuous suture of polyglactin 910 (Vicryl®, Polyglactine, Ethicon SpA, Italy) using intracorporeal knots. After the closure of peritoneum, hemostasis was further controlled under video laparoscopy, and an accurate rinsing of the pelvic cavity was performed via a suction-irrigator.

The primary outcome of the study was the comparison be-

tween the two surgical procedures of the operation time, blood loss and the period of hospital stay. Secondary outcome was intra-operative or post-operative complications.

Statistical analyses were conducted using the Statistical Package for the Social Sciences for Windows 15.0 software (SPSS, Chicago, IL, USA). Descriptive statistics were given as mean, standard deviation, median, min-max, frequency and percentage. The Kolmogorov Smirnov test was used to evaluate whether the continuous variables were normally distributed. For continuous variables the independent samples t-test or Mann Whitney U-test were used as appropriate. The chi-square or Fisher's exact test was used to compare nominal variables. A probability value <0.05 was considered the minimum level of statistical significance. A two-sided p-value was considered for all comparisons.

Results

A total of 42 patients with symptomatic uterine myomas who desire to maintain their fertility were recruited. Twenty-two patients underwent laparoscopy (52.3%) and 15 laparotomy (35.7%). Laparoconversion, defined as the substitution of laparoscopy by laparotomy due to intra-operative complications, occurred in 5 patients (11.9%).

Patients in both groups were similar in age, weight, height and BMI (Table 1). Myoma numbers preoperatively detected were similar in both groups (p=0.232). Both groups were similar in terms of prior abdominal surgery history (p=0.204).

Operation duration was longer in laparoscopy group (148.33±66.26) compared to laparotomy group (102.75± 42.37) and the difference was statistically significant (p=0.013). Preoperative and postoperative hemoglobin levels were similar in both groups (laparoscopy: 11.9±1.50 and 10.14 ±1.39, laparotomy: 11.70±1.75 and 9.80±1.79, p=0.680 and 0.499, respectively). Pre-operative and post-operative hematocrit levels were similar in both groups (laparoscopy: 37.18±3.94 and 31.40±3.77, laparotomy: 37.10±3.80 and 30.85±4.46, p=0.946 and 0.663, respectively). When the difference between pre and post-operative hemoglobin and hematocrit levels were compared, no significant differences were detected (p=0.782 and 0.717, respectively) (Table 2).

The median number of myomas was 1.72 in laparoscopy group (median; 1.0 range; 1.00 - 6.00) and 2.20 in laparotomy group (median; 1.0 range; 1.00 - 7.00). The median value of hospitalization duration for laparoscopy group was 2.5 days (2 - 8) and for laparotomy group it was 3 days (2-6) and the difference was statistically significant (p=0.008). No major intra-operative or post-operative complications in both groups occurred.

Discussion

With technological advancement and increasing skill in minimal access surgery, laparoscopic myomectomy is increasingly performed for the management of clinically significant leiomyoma in appropriately selected women. It has been an al-

Table 1: Comparison of demographic data of the study population

	LS n=22	LT n=15	p value
Age (years)	40.09 ± 9.11	38.45 ± 6.66	0.513
Weight (kg)	67.88 ± 10.39	73.56 ± 12.82	0.164
Height (cm)	161.1 ± 5.49	162.5 ± 5.60	0.505
BMI (kg/m^2)	26.10 ± 4.14	27.91 ± 5.04	0.281
Number of Myomas	1.00 (1.00-6.00)	1.00 (1.00-7.00)	0.232

LS = Laparoscopic myomectomy group, LT = Laparotomic myomectomy group

Table 2: Comparison of perioperative outcome measurements

	LS n=22	LT n=15	p value
Operation Duration (min)	148.33 ± 66.26	102.75 ± 42.37	0.013
Preoperative Hb (gr/dl)	11.90 ± 1.50	11.70 ± 1.75	0.680
Postoperative Hb (gr/dl)	10.14 ± 1.39	9.80 ± 1.79	0.499
Difference in Hb (gr/dl)	-1.77 ± 1.47	-1.90 ± 1.48	0.782
Preoperative Htc (%)	37.18 ± 3.94	37.10 ± 3.80	0.946
Postoperative Htc (%)	31.40 ± 3.77	30.85 ± 4.46	0.663
Difference in Htc (%)	-5.77 ± 4.34	-6.25 ± 4.10	0.717
Hospitalization Duration (Day)	2.5 (2 - 8)	3 (2 - 6)	0.008

LS = Laparoscopic myomectomy group, LT = Laparotomic myomectomy group, Hb = Hemoglobin levels, Htc = Hematocrit levels

ternative to abdominal procedure for women who desire uterine conservation. This technique has been performed safely and has consistently demonstrated advantages, such as decreased blood loss, shorter hospital stay, less postoperative disability, and comparable complication rates compared to abdominal myomectomy[14-16] and are considered superior due to its low invasiveness and reduced postoperative adhesion risk. [17] The American College of Obstetricians and Gynecologist and the American Association of Gynecologic Laparoscopist have confirmed the advantages of laparoscopy over laparotomy.[13]

Numerous published reports demonstrated that laparoscopic myomectomy was associated with shorter hospital stay.[16,18-20] Our data, confirming the previous reports, suggested that patients underwent laparoscopic myomectomy had significantly shorter mean hospital stay when compared with that of classical abdominal myomectomy (p=0.008). Many factors might affect the time of discharge, in addition to type of the preferred surgical technique, including the number of myomas and the maximal myoma size. Our patients in laparoscopy group had a mean myoma number of 1.72. Mais et al.[16] reported a lower time of discharge and their mean number of myomas was 2.4. Similar results on mean hospital stay were demonstrated by Seracchioli et al.[20] and they reported a mean myoma number of 2.7.

Intraoperative blood loss, which is revealed as a decrease in hemoglobin and hematocrit levels, is ever concerns for myomectomy procedures. Analyzing the literature, there are conflicting data from these variables. Seracchioli et al.[20] Nezhat et al.,[21] Stringer et al.[22] and Chang et al.[23] reported less estimated blood loss for laparoscopic approach, whereas Mais et al.[16] reported no difference. In a meta-analysis of randomized controlled trials, laparoscopic myomectomy was shown to be associated with a reduced operative blood loss[24] Our study did not demonstrate a significant difference in postoperative hemoglobin, hematocrit levels and pre-post operative hemoglobin, hematocrit differences.

Operative time is one of the criticized points of the laparoscopic technique. Many studies pointed out laparoscopic myomectomy to be associated with longer operation time compared with abdominal myomectomy. Mais et al.,[16] in their randomized trial, indicated that operative time was significantly longer for laparoscopy compared to the abdominal myomectomy. Jin et al[24] and Stringer et al[22] reported similar results. Contrarily, Chang et al.[23] indicated that compared with open myomectomy, laparoscopic myomectomy was associated with shorter surgical time and less blood loss. Our study demonstrated laparoscopic approach needed significantly longer operative time (p=0.013). We think that the time loss during the morcellation of the resected specimens is important in the prolongation of the operative time. Additionally, the longer operation time might be attributed to several factors including adversity in myoma location or time-consuming suturing process. Not observing any differences in variations of hematologic parameters supports the idea that the time is lost, not in the possibly hemorrhagic period of the operation, but in the morcellation of the excised parts.

However there are some limitations to this study such as the fact that the study data are limited to a single institution. The patients are not randomized. Long-term data such as pregnancy and obstetric outcomes as well as recurrence rate, were not in the scope of the present trial. The weight of the leiomyoma, which may affect the operative time and the average blood loss, is not examined and compared between the groups.

In selected group of patients, laparoscopic myomectomy, is an attractive alternative to conventional laparotomic myomectomy, providing clear advantages such as shorter hospitalization duration. In our opinion, laparoscopic myomectomy is no longer a controversial operation and can be performed in a great number of cases.

Laparoskopik ve Abdominal Miyomektominin Postoperatif Sonuçları Açısından Karşılaştırılması

AMAÇ: Miyomlar üreme çağındaki kadınların % 25-50'sini etkileyen benign uterin tümörlerdir. Miyomektomi fertilitesinin korunmasını talep eden kadınlar için halen altın standart tedavi yöntemidir. Ameliyat sonrası parametreleri ve operasyon süresini değerlendirmek için laparoskopik ve abdominal miyomektomi yapılan hastalarda gözlemsel bir çalışma planladık.

GEREÇ VE YÖNTEM: Makalemizde Şubat 2011 ile Şubat 2013 tarihleri arasında opere edilen hastaların verilerini değerlendirdik. Çalışmaya dahil edilen hastalar yaş, kilo, boy, vücut kitle endeksi (VKE), miyomların sayısı ve operasyon süresi açısından karşılaştırıldı. Ek olarak ameliyat öncesi ve sonrası hemoglobin ve hematokrit değerleri ve hastanede kalış süreleri kaydedildi.

BULGULAR: Yirmi iki hastaya laparoskopi uygulanırken, 15 hastaya laparotomi yapıldı. Ortalama yaş laparoskopi grubunda 40,1±9,1 iken, laparotomi grubunda 38,5±6,7 idi (p=0,513). Ortalama VKE laparoskopi grubunda 26,1±4,1 iken, laparotomi grubunda 27,9±5'di (p=0,281). Miyom sayıları iki grupta da benzerdi (p=0.232). Operasyon süresi laparoskopi grubunda daha uzundu (148,33±66,26 dakika ve 102,75±42,37 dakika)(p=0.013). Preoperatif ve postoperatif hemoglobin ve hematokrit seviyeleri iki grupta benzerdi (Hemoglobin ppre= 0,680, ppost= 0,499, Hematokrit ppre=0,946, ppost= 0,499). Ameliyat öncesi ve sonrası hemoglobin ve hematokrit değerleri arasında iki grupta da fark yoktu (p=0,782 ve 0,717). Laparoskopi grubu için hastanede yatış süresi ortanca değeri 2,5

gün (2-8) iken, laparotomi grubunda 3 gün (2-6)'dü (p=0,008).

SONUÇ: Çalışmamız, laparoskopinin daha uzun bir ameliyat süresi ama daha kısa bir hastanede yatış süresi gerektirdiğini göstermiştir. Operasyon süresinin uzamasında morselasyon sırasında kaybedilen zamanın önemli olduğunu düşünüyoruz. Hematolojik parametrelerde değişim gözlenmeyişi de zaman kaybının morselasyon sırasında olduğu düşüncesini desteklemektedir. Seçilmiş hasta gruplarında, laparoskopik miyomektomi, laparotomiye göre kısa hospitalizasyon süresi gibi belirgin avantajlar sağlamaktadır.

Anahtar Kelimeler: Uterin miyom, Laparoskopi, Laparotomi, Miyomektomi

References

1. Houston KD, Hunter DS, Hodges LC, Walker CL. Uterine leiomyomas: mechanisms of tumorigenesis. Toxicol Pathol 2001;29:100-104.
2. Day Baird D, Dunson DB, Hill MC, Cousins D, Schectman JM. High cumulative incidence of uterine leiomyoma in black and white women: ultrasound evidence. Am J Obstet Gynecol 2003;188:100-107.
3. Bowden W, Skorupski J, Kovanci E, Rajkovic A. Detection of novel copy number variants in uterine leiomyomas using high-resolution SNP arrays. Mol Hum Reprod 2009;15:563-568.
4. Laughlin SK, Stewart EA. Uterine Leiomyomas: Individualizing the Approach to a Heterogenous Condition. Obstet Gynecol 2011;117(2):396-403.
5. Agdi M, Tulandi T. Minimally invasive approach for myomectomy. Semin Reprod Med 2010;28(3):228-34.
6. Vollenhoven BJ, Lawrence AS, Healy DL. Uterine fibroids: a clinical review. Br J Obstet Gynecol 1990;97: 285-98.
7. Donnez J, Mathieu PE, Bassil S, Smets M, Nisolle M, Berliere M. Fibroids: management and treatment: the state of the art. Hum Reprod 1996;11:1837-40.
8. Shen SH, Fennessy F, McDannold N, Jolesz F, Tempany C. Image-guided thermal therapy of uterine fibroids. Semin Ultrasound CT MR 2009;30:91-104
9. Al-Hendy A, Salama S. Gene therapy and uterine leiomyoma: a review. Hum Reprod Update 2006;12:385-400.
10. Ezzati M, Norian JM, Segars JH. Management of uterine fibroids in the patient pursuing assisted reproductive technologies. Womens Health (Lond Engl) 2009;5:413-421.
11. LaMorte AI, Lalwani S, Diamond MP. Morbidity associated with abdominal myomectomy. Obstet Gynecol 1993;82:897-900.
12. Di Gregorio A, Maccario S, Raspollini M. The role of laparoscopic myomectomy in women of reproductive age. Reprod Biomed Online 2002;4(Suppl 3):55-8.
13. Payne TN, Pitter MC. Robotic-assisted surgery for the com- munity gynecologist: can it be adopted? Clin Obstet Gynecol 2011;54(3):391-411.
14. Falcone T, Bedaiwy MA. Minimally invasive management of uterine fibroids. Curr Opin Obstet Gynecol 2002; 14(4):401-7.
15. Nezhat C, Nezhat F, Silfen SL, Schaffer N, Evans D. Laparoscopic myomectomy. Int J Fertil 1991;36(5):275-80.
16. Mais V, Ajossa S, Guerriero S, Mascia M, Solla E, Melis GB. Laparoscopic versus abdominal myomectomy: a prospective, randomized trial to evaluate benefits in early outcome. Am J Obstet Gynecol 1996;174(2):654-8.
17. Dubuisson JB, Fauconnier A, Deffarges JV, et al. Pregnancy outcome and deliveries following laparoscopic myomectomy. Hum Reprod 2000;15:869-73.
18. Marret H, Chevillot M, Giraudeau B; Study Group of the French Society of Gynaecology and Obstetrics (Ouest Division). A retrospective multicentre study comparing myomectomy by laparoscopy and laparotomy in current surgical practice. What are the best patient selection criteria? Eur J Obstet Gynecol Reprod Biol 2004;10; 117(1):82-6.
19. Silva BA, Falcone T, Bradley L, Goldberg JM, Mascha E, Lindsey R, Stevens L. Case-control study of laparoscopic versus abdominal myomectomy. J Laparoendosc Adv Surg Tech A 2000;10(4):191-7.
20. Seracchioli R, Rossi S, Govoni F, Rossi E, Venturoli S, Bulletti C, Flamigni C. Fertility and obstetric outcome after laparoscopic myomectomy of large myomata: a randomized comparison with abdominal myomectomy. Hum Reprod 2000;15(12):2663-8.
21. Nezhat C, Nezhat F, Bess O, Nezhat CH, Mashiach R. Laparoscopically assisted myomectomy: A report of new technique in 57 cases. Int J Fertil 1994;39:39-44.
22. Stringer NH, Walter JC, Meyer PM. Comparison of 49 laparoscopic myomectomies with 49 open myomectomies. J Am Assoc Gynecol Laparosc 1997;4:457-64.
23. Chang CC, Chen W. A comparison of surgical outcomes between laparoscopic and open myomectomy in Southern Taiwan. Int J Gynaecol Obstet 2012;119(2):189-93.
24. Jin C, Hu Y, Chen XC, Zheng FY, Lin F, Zhou K, et al. Laparoscopic versus open myomectomy - a meta-analysis of randomized controlled trials. Eur J Obstet Gynecol Reprod Biol 2009;145:14-21.