

## Obes Hastalarda Açık ve Laparoskopik Apendektomi Sonuçlarının Karşılaştırılması

### Comparison of Laparoscopic and Open Appendectomy in the Obes Patients

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#### Özet

**GİRİŞ ve AMAÇ:** Akut apandisit acil cerrahi müdahale gerektiren en yaygın hastalıktır. Açık apendektominin yanı sıra laparoskopik cerrahi de, sık sık akut apandisit tedavisi için tercih edilir. Bu çalışmada akut apandisit hastalarında ameliyat sonrası sonuçlar üzerine obezitenin etkileri değerlendirildi.

**YÖNTEM ve GEREÇLER:** Akut apandisitli 263 hasta çalışmaya alındı. Olgular BMI değerlerine göre, iki gruba ayrıldı. Grup I BMI'i (Body Mass Index) 30 kg / m<sup>2</sup>'den daha düşük olan ve Grup II BMI'i 30 kg / m<sup>2</sup> den daha yüksek olan olgulardan oluşuyordu. Cerrahi prosedürün tipi cerrahın deneyimi ve tercihinin göre karar verildi. Tüm hastalar hem 7 gün ve 15.gün kontrolde çağrıldı ve aynı cerrah tarafından muayene edildi. Gruplar, cinsiyet, yaş ve cerrahi işlemin türü yanı sıra perforasyon oranı, karın içi apse, yara enfeksiyonu, cerrahi kanama, ameliyat süresi gibi postoperatif komplikasyonlar ve hastanede kalış sürelerine göre karşılaştırıldı.

**BULGULAR:** Tüm hastaların yaş ortalaması 33.8 yıl idi. Hastaların,% 73.8(n: 194) Grup I ve% 26.2(n: 69) Grup II idi. Perforasyon Grup I'de 56 (% 22) hastada ve Grup II'de 19 (% 7) hastada (p = 0.48) (Tablo) mevcuttu. İstatistiksel olarak anlamlı fark (sırasıyla p = 0.48 ve 0.13) perforasyon oranı ve cerrahi işlem (laparoskopik veya açık apendektomi) türü açısından gruplar arasında bulunmuştur.

**TARTIŞMA ve SONUÇ:** Laparoskopik veya açık olarak uygulanan cerrahi tekniğin cerrahi sonuçlar üzerine etkisi olmadığı görülmüştür

#### Abstract

**INTRODUCTION:** Acute appendicitis is the most common disease that requires emergency surgical intervention. Laparoscopic appendectomy, as well as open appendectomy, is frequently preferred for the treatment of acute appendicitis. The present study evaluated the effects of obesity on postoperative outcomes in the patients with acute appendicitis.

**METHODS:** A total of 263 patients with acute appendicitis were included in the study. The cases were divided into two groups according to the BMI (Body Mass Index) values. Group I consisted of the cases with a BMI lower than 30 kg/m<sup>2</sup> and Group II consisted of those with a BMI higher than 30 kg/m<sup>2</sup>. The type of surgical procedure was decided based on the experience and preference of the surgeon. All patients were called for control visit both 7 days and 15 days later and were examined by the same surgeon. The groups were compared in terms of gender, age and type of surgical procedure, as well as the postoperative complications such as perforation rate, intra-abdominal abscess, wound infection, surgical bleeding, surgery duration, and mean hospital stay.

**RESULTS:** The mean age of all patients was 33.8 years. Of the patients, 73.8%(n: 194) were in Group I and 26.2%(n: 69) were in Group II. Perforation was present in 56 (22%) patients in Group I and in 19 (7%) patients in Group II (p= 0.48) (Table). No statistically significant difference was found between the groups in terms of perforation rate and type of surgical procedure (laparoscopic or open appendectomy) (p= 0.48 and 0.13 respectively).

**DISCUSSION AND CONCLUSION:** Surgical techniques had no effect on surgery outcomes since the numbers of patients that underwent laparoscopic and open surgeries are equal.

**Anahtar Kelimeler** Akut apandisit, Obezite, Laparoskopik apendektomi, Açık apendektomi

**Keywords:** Acute appendicitis, Obesity, Laparoscopic appendectomy, Open appendectomy

#### INTRODUCTION

Acute appendicitis, which is frequently encountered in the population with a lifetime

risk of 8.7% for males and 6.7% for females, is the most common disease that requires emergency surgical intervention. Although many theorems have been suggested for its etiology,

development due to luminal obstruction is the most commonly accepted one (1). Laparoscopic appendectomy, as well as open appendectomy, is frequently preferred for the treatment of acute appendicitis (2). Today, obesity is a worldwide health problem (3). Although there are many studies reporting that obesity unfavorably affects surgical outcomes, there are also studies defending that it does not (4,5). The present study evaluated the effects of obesity on postoperative outcomes in the patients with acute appendicitis.

## METHODS

A total of 263 patients with acute appendicitis, who underwent laparoscopic appendectomy between April 2012 and June 2013, were included in the study. It was planned as a prospective nonrandomized trial and informed consent forms were signed by all patients prior to the surgical procedure. Patients with immunosuppression and diabetes mellitus, using steroid medications, and patients under the age of 18 and over the age of 65 years were excluded from the study. Cases diagnosed as plastron appendicitis, which had history of abdominal surgery and negative appendectomy proven macroscopically and histopathologically, were also excluded. Surgical procedures were performed by the same surgeon.

The cases were divided into two groups according to the BMI values. Group I consisted of the cases with a BMI lower than 30 kg/m<sup>2</sup> and Group II consisted of those with a BMI higher than 30 kg/m<sup>2</sup>. The type of surgical procedure was decided based on the experience and preference of the surgeon. All patients were called for control visit both 7 days and 15 days later and were examined by the same surgeon.

The groups were compared in terms of gender, age and type of surgical procedure, as well as the postoperative complications such as perforation rate, intra-abdominal abscess, wound infection, surgical bleeding, surgery duration, and mean hospital stay.

## RESULTS

A total of 263 patients, of whom 43% (n:115) were female and 57% (n:148) were male, were recruited. The mean age of all patients was 33.8 (min:16, max:64) years. Of the patients, 73.8% (n:194) were in Group I and 26.2% (n:69) were in Group II. Perforation was not detected in 138 (53%) patients in Group I and 50 (19%) patients in Group II. Perforation was present in 56 (22%) patients in Group I and in 19 (7%) patients in Group II (p= 0.48). (Table 1)

**Table 1:** Clinical characteristics of the patients

	Group I	Group II	P value
	73.8%( n: 194)	26.2%( n:69)	
Perforation rate	22%	19%	0.48
The type of surgery (open/laparoscopic)	33.1% / 40.7%	14.1% / 12.2%	0.13
Intra-abdominal abscess	0.5%	1.9%	0.005
Wound infection	6.2%	8%	0.001
Mean hospital stay (day)	2 (1-13)	3 (1-22)	0.001
Surgery duration (minute)	36.6 ± 10.9	49.6±15.9	0.001
Surgical bleeding	1%	1.4%	0.60

Open appendectomy was performed in 87 (33.1%) of patients in Group I and in 37 (14.1%) patients in Group II, whereas laparoscopic appendectomy was performed in 107 (40.7%) patients in Group I and in 32 (12.2%) patients in Group II. No statistically significant difference was found between the groups in terms of perforation rate and type of surgical procedure (laparoscopic or open appendectomy) ( $p= 0.48$  and  $0.13$  respectively). Abscess was observed in 0.5% ( $n:1$ ) and wound site infection was observed in 6.2% ( $n:12$ ) of the patients in Group I, whereas abscess was observed in 1.9% ( $n:5$ ) and wound site infection was observed in 8% ( $n:21$ ) of the patients in Group II. The difference between the groups in terms of abscess development and wound site infection was statistically significant ( $p=0.005$  and  $p=0.001$  respectively). When the groups were compared in terms of surgery duration, it was higher in Group II ( $49.6 \pm 15.9$  minutes) versus Group I ( $36.6 \pm 10.9$  minutes) ( $p=0.001$ ). Mean hospital stay was 2 (1-13) days for the patients in Group I and 3 (1-22) days for the patients in Group II ( $p=0.001$ ). Prevalence of bleeding that requires re-surgery was 1% ( $n:2$ ) in Group I and 1.4% ( $n:1$ ) in Group II and the difference was not statistically significant ( $p= 0.60$ ). (Table 1)

## DISCUSSION

In population, acute appendicitis is more prevalent in males particularly in the 2<sup>nd</sup> and 3<sup>rd</sup> decades. Appendix perforation causes substantial problems at diagnostic and therapeutic phases. It is more prevalent between the ages 0 and 9 years or over the age of 50 years.

Perforation is encountered in approximately 13% of overall appendicitis cases. In the present study, the mean age was 33.8 years. This higher age resulted from the fact that the study was performed in surgery clinic, which does not include pediatric patients. Consistent with the literature, 57% ( $n:148$ ) of the cases were male.

Perforation posed an important problem with a prevalence rate of 15.5% during diagnosis and monitoring phases of the present study as well.

Along with technological advancement, laparoscopy has begun to be used in surgical procedures. However, laparoscopy has not been widely accepted in appendectomy as in cholecystectomy. This might have resulted from long surgery duration of laparoscopy, necessity of experienced surgeon, being more expensive, and requiring higher amount of equipment. In the present study, the type of surgery was up to the surgeon's choice. Therefore, experience and familiarity of the surgeon have been affective in the choice of surgical technique. In the present study, 124 (47.1%) of the cases underwent open appendectomy and 139 (52.9%) underwent laparoscopic appendectomy. Whilst laparoscopic appendectomy was preferred in 32 (46.4%) cases in Group II with high BMI, it was preferred in 107 (55.2%) cases in Group I with low BMI. There was no statistically significant difference between the groups in terms of surgery preference. In the present study, there was no significant factor that might have influenced the surgery preference.

Mortality rate of acute appendicitis is less than 0.3% but is increased to 1.7% in the patients with perforation. The most common complication of appendectomy surgeries is the wound site infection with a rate of 5-33% (1). Intra-abdominal abscess is less common and encountered by approximately 2%. In the present study, any postoperative mortality was observed. The most common postoperative complication was wound site infection followed by intra-abdominal abscess and bleeding. Wound site infection was observed in 33 (12.5%) of all cases, whereas intra-abdominal abscess was observed in six (2.3%) cases. These complication rates are consistent with the literature (6). Moreover, three (1.1%) of the cases developed bleeding that required re-surgery.

Overweight and obesity is becoming an important problem all over the world with gradually increasing prevalence due to high-calorie diet and sedentary life style. Obesity is usually assessed by BMI values, despite the opinions that BMI could not evaluate the body fat ratio adequately (3,7,8). Cases are classified as normal, overweight or obese according to their BMIs. In the present study, we as well assessed the obesity via BMI, which is reliable and easy to apply. In the present study, there were 69 (26.2%) cases with a BMI over 30 kg/m<sup>2</sup>. This can be considered high for a randomly selected population.

Unfavorable effects of obesity on diabetes, hypertension, and cardiovascular disease are indisputable. Although it has been proven in some studies that obesity has not unfavorable effect on surgery outcomes, many studies have also proven unfavorable effects of obesity on surgery outcomes. It is being defended that obesity has no unfavorable side effects on surgery particularly in laparoscopic surgeries (3,4,5,8). The present study as well investigated the effect of obesity on postoperative outcomes of appendectomy. In the present study, wound site infection and intra-abdominal abscess were more prevalent in obese patients versus the patients with normal BMI. Moreover, mean surgery duration and mean hospital stay were also longer in obese patients.

## CONCLUSION

In conclusion, surgical techniques had no effect on surgery outcomes since the numbers of patients that underwent laparoscopic and open surgeries are equal.

## Conflict of interest

There is no conflict of interest in connection with any commercial associations, and all authors have nothing to disclose.

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