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Klinik Çalışma

Comparison of operative and non operative management of acute appendicitis

Akut apandisitte ameliyatsız tedavi ve cerrahi tedavinin karşılaştırılması

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BACKGROUND

In this prospective study, operative and nonoperative management of acute appendicitis were evaluated regarding their safety and cost effectiveness.

METHODS

Two hundred ninety patients presenting to our Emergency Department between March 2005 and March 2006 with acute appendicitis were included in this prospective study. Nonoperative medical therapy was performed in 107 patients (Group 1), and 183 patients were treated surgically (Group 2). Routine follow-up controls were done on the 10th day, at the 3rd and 6th months and at the first year after discharge in Group 1. Both groups were compared regarding age, gender, mean hospital stay, modified Alvarado score, morbidity, mortality, and cost effectiveness.

RESULTS

The male/female ratio of Groups 1 and 2 were 65/42 (mean age: 30.98±1.30) and 125/58 (mean age: 26.25±0.79), respectively. In Group 1, 19 patients were operated. Operation indications were resistance to therapy, patient's request, and operation in another hospital. Although the mean hospital stay of Group 1 was statistically significantly longer than Group 2, the mean cost of the therapy was $559 in Group 2 and $433 in Group 1. Morbidity rates were similar, with no mortality in either group.

CONCLUSION

With its high success rate and cost effectiveness, medical treatment seems to be a good alternative to the gold standard therapy of surgery in management of acute appendicitis.

Key Words: Acute appendicitis; antibiotherapy; nonoperative management; surgery.

AMAÇ

Bu prospektif çalışmada, akut apandisitte konservatif tedavi ve cerrahi tedavinin güvenilirlik ve etkinlik açısından karşılaştırılması amaçlandı.

GEREÇ VE YÖNTEM

Mart 2005 ile Mart 2006 arası klinik olarak akut apandisit tanısı alan 290 hasta acil servise başvurdu. Bu hastaların 107'sine ameliyatsız antibiyotik tedavisi (Grup 1), 183'üne cerrahi tedavi (Grup 2) uygulandı. Grup 1'de taburcu edilen hastalar 10. gün, 3. ay, 6 ay ve 1. yılda rutin kontrollere çağrıldılar. Her iki grup yaş, cinsiyet, ortalama hastanede kalış süresi, modifiye Alvarado skoru, morbidite, mortalite ve maliyet etkinliği açısından değerlendirildi.

BULGULAR

Grup 1 ve Grup 2'de erkek/kadın oranı ve ortalama yaşlar sırasıyla 65/42 ile 30,98±1,30 ve 125/58 ile 26,25±0,79 idi. Grup 1'de hastaların 19'u ameliyat edildi. Ameliyat endikasyonu tedaviye direnç, hastanın kararı, başka merkezlerde ameliyat idi. Ortalama hastanede kalış süresi Grup 1'de istatistiksel olarak daha uzun olsa da ortalama maliyet Grup 1'de 433 $ iken Grup 2'de 559 $ olarak hesaplandı. Morbidite oranları her iki grupta benzer olup hiç mortalite görülmedi.

SONUÇ

Günümüzde altın standart tedavi şekli cerrahi girişim olarak bilinen akut apandisitte, seçilen olgularda antibiyoterapi ile ameliyatsız takibin başarı oranının yüksek ve düşük maliyetli bir alternatif olabileceğini düşünüyoruz.

Anahtar Sözcükler: Akut apandisit; antibiyoterapi; ameliyatsız tedavi; cerrahi.

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Although current management of acute appendicitis is surgical due to the risk of perforation and peritonitis in delayed cases, medical therapy is also suggested in cases with periappendiceal mass or abscess.[1-3] Advances in antibiotherapy and imaging studies suggest medical therapy as a good alternative to surgical approaches in some inflammatory diseases. In this prospective study, the effectiveness of medical therapy in acute appendicitis is compared to the traditional appendectomy procedure.

MATERIALS AND METHODS

Two hundred ninety patients presenting to our Emergency Department between March 2005 and March 2006 with acute appendicitis were included in this prospective study, with Ethical Committee approval (2005/8 6 April 2005). Nonoperative medical therapy was performed in 107 patients (Group 1), whereas the remaining 183 patients were operated (Group 2). In Group 1, in addition to thorough physical examination and complete blood cell count revealing leukocytosis, radiological studies of abdominal ultrasonography (USG) and computerized tomography (CT) were also used to confirm the diagnosis of acute appendicitis accurately at the time of admission. Informed consents were obtained from all the patients, and modified Alvarado scores of both groups were recorded. Intravenous fluid + antibiotherapy with ampicillin (1 g 4x1 daily) + gentamicin (160 mg/day) + metronidazole (500 mg 3x1 daily) and analgesic with diclofenac sodium (50-75 mg 3x1 intramuscular [i.m.] daily) were administered to the patients in Group 1 after cessation of oral feeding. Daily follow-up of these patients was done with respect to complete blood cell count, fever, physical examination, and USG. Patients resistant to medical therapy as confirmed by radiological and physical examination were operated. Patients refractive to medical therapy with worsening of symptoms were taken to operation. Patients with clinical improvement were discharged on the third day of treatment with oral antibiotherapy completed to 10 days. Routine follow-up controls were done on the 10th day, at the 3rd and 6th months and at the 1st year after discharge with hemograms and USG in Group 1.

Statistical Package for Social Sciences (SPSS) ver. 10.0 for Windows was used for statistical evaluations. ANOVA and chi-square test with subtest Fisher's exact test were used, and $p<0.05$ was considered as statistically significant.

RESULTS

The male to female ratio of Group 1 was 65/42 (mean age: 30.98±1.30; range: 16-65). Nineteen (17.8%) of these patients were operated. Mean hospital stay in Group 1 was 3.14±0.10 days (2-5), and the mean follow-up period was 19.91±0.35 (16-28) months. Operation indications were resistance to therapy in 11, patient's request in five, and operation in another hospital in three patients. During the follow-up period, recurrence was seen in nine patients and seven of them were treated surgically, whereas two were re-treated medically. Among these two patients, recurrence occurred in one and he was operated. All of the patients operated in Group 1 had acute appendicitis during surgery but none of them had perforated appendicitis. In five of the operated patients (4.67%), wound infection occurred. Mean cost of the therapy was $433 (585 TL) in the nonoperative group including all radiological investigations and recurrent admissions without operation. In Group 2, the male to female ratio was 125/58 (mean age: 26.25±0.79; range: 13-59). Open appendectomy was performed in 150 patients, whereas the remaining 33 patients had laparoscopic appendectomy. Perforated appendicitis during surgery was observed in 31 of the open and three of the laparoscopic appendectomies. In one of these patients, enterocutaneous fistula, in one patient intraabdominal abscess and in six patients wound infection occurred as complication (4.37%). Mean hospital stay was 2.40±0.14 (1-15) days. Mean cost of the therapy was $559 (755 TL) in those who were operated.

Regarding mean hospital stay, Group 1 had a statistically significantly longer hospital stay than Group 2 ($p=0.0003$). Mean modified Alvarado scores of patients were 6.57±0.12 (3-9) and 6.43±0.07 (3-9) in Groups 1 and 2, respectively. There was no statistically significant difference between groups regarding modified Alvarado scores ($p=0.48$). Morbidity

Table 1. Results of comparison of Groups 1 and 2

	Group 1	Group 2
Total number of patients	107	183
Male/female	65/42	125/58
Mean age	30.98±1.30	26.25±0.79
Mean hospital stay	3.14±0.10	2.4±0.14
Mean cost of therapy	585 TL	755 TL
Mean modified Alvarado scores	6.57±0.12	6.43±0.07
Morbidity	4.67%	4.37%
Mortality	0%	0%

rates were 4.67% and 4.37% in Groups 1 and 2, respectively, and there was no statistically significant difference between groups (p=0.55). No mortality occurred in either group (Table 1).

DISCUSSION

Acute appendicitis has been treated traditionally with early operation since the basis of treatment establishment by Fitz and McBurney.[4] Risk of perforation leading to peritonitis is the main concern in early surgical treatment. However, based on the improvements in antibiotherapies, some authors suggest medical therapy as an effective approach in acute appendicitis.[5,6] Coldrey[6] (1959) reported a 471 patient series treated with parenteral antibiotherapy, with a recurrence rate of 20%; interval appendectomy was needed in 16%. The only mortality in the series was an elderly patient with circulatory problems.

The diagnostic difficulties in women of childbearing age is well known and mainly due to uterine or adnexal disease with symptoms indistinguishable from appendicitis. Therefore, in our series, diagnostic confirmation was supported with radiological imaging studies as USG and CT. Although imaging studies increase diagnostic accuracy, most studies suggest that clinical judgement remains the most important diagnostic tool. However, to strengthen our study, we added diagnostic imaging studies to avoid limitations of diagnostic accuracy.[7]

In current practice, medical therapy is preferred in cases with perforation and periappendiceal abscess formation as an adjunct to percutaneous drainage.[5]

In a study performed by Yamini et al.,[8] 66 patients with perforated appendicitis were treated initially with parenteral antibiotherapy. Those resistant to therapy within 48-72 hours were percutaneously drained under CT (58%). Among these patients, 51 (92%) were treated successfully without any need for surgery. The mean hospital stay in that study was 7.6 days, and patients were called for interval appendectomy within 6-12 weeks.

In another study performed by Oliak et al.,[4] 77 patients were treated nonoperatively for acute appendicitis between 1992 and 1998. The success and complication rates were reported as 95% and 12%, respectively. Recurrence occurred in five patients (6.5%) within 30 weeks of the follow-up period, and two of these patients were retreated nonoperatively. The difference in that study was the lack of periappendicular mass in perforated cases. Although the recurrence rate seems to be low, the power of that study could be challenged in terms of the short follow-up period as 30 weeks. In our study, based on both the higher number of patients and the longer follow-up period, the recurrence rate seems more reasonable than in other studies.

The first prospective randomized study regarding medical therapy for acute appendicitis was performed by Eriksson and Granstrom in 1995.[9] In that pilot study, 20 patients were treated with antibiotics compared with the remaining 20 having appendectomy. Except for one patient requiring surgery after 12 hours, all patients in the medical therapy group were discharged within two days. In the one-year follow-up period, seven patients were readmitted with recurrence and were operated after diagnosis was confirmed. The authors suggested that medical therapy could be an alternative in high-risk surgical patients. In another prospective randomized multi-centered study performed by same authors in 2006, 252 male patients with acute appendicitis were randomized into two groups.[10] Those randomized to antibiotic therapy were treated intravenously for two days, followed by oral therapy for 10 days. In 15 patients (12%), symptoms persisted for 24 hours, and appendectomy was performed. In seven of these (5%), perforated appendicitis was observed. The remaining 113 patients were successfully treated with antibiotics. The other group of patients was operated on with open or laparoscopic surgery. In the one-year follow-up period, there were 16 recurrences (15%) in the medical therapy group. They suggested that antibiotherapy may be offered in high-risk surgical patients and obese patients. Their recurrence rate was slightly higher compared to our study; moreover, there were 42 female patients in our series. In both studies, patients with recurrences were offered medical therapy again.

It is known that presence of fecalith within the appendix increases recurrence incidence, but data in some studies suggest that obstruction is not an important factor in the etiology of appendicitis, although it may develop as a result of the inflammatory process.[10,11] In studies with medical therapy, advantages were shorter hospital stay with lower hospital costs. In our series, the mean hospital stay of the medical therapy group was three days, considered within reasonable limits. Moreover, cost of medical therapy was $433 (585 TL) including admissions of recurrences, whereas cost of appendectomy accord-

ing to the Ministry of Health Budget Regulations Booklet in the same time period was $559 (755 TL). This difference suggests that medical therapy is more advantageous regarding cost effectiveness. Another advantage of medical therapy is the lack of surgery- and anesthesia-related risks. Operative complication rates are reported to be 17%, with the most common complication being wound infection followed by postoperative intestinal obstructions.[10] It is suggested that each year over 250,000 appendectomies for presumed appendicitis are performed in the United States with a 15% negative appendectomy rate. With this medical approach, negative appendectomy rates may be decreased, thereby avoiding possible complications.[12,13]

The only disadvantage of conservative therapy in our series seems to be the statistically significantly longer hospital stay due to intravenous antibiotherapy in the first three days after admission; however, improvements in this study with increased numbers of patients may lead to merely oral antibiotherapy, thus decreasing hospital stay.

In a systematic review of published literature discussing the need for surgery in appendicitis, Mason[11] emphasized the limitations of a few studies on nonoperative management of acute appendicitis. These studies referred to were either retrospective or non-randomized with minimal standardization and small numbers of patients. He also concluded that a randomized, prospective trial of nonoperative management versus early appendectomy in acute uncomplicated appendicitis supported by radiologic imaging is needed. From this point of view, ours is the first such study in the English literature, as a randomized prospective study with a considerable number of patients concluding successful results of a nonoperative approach.

In conclusion, our study and Swedish studies suggest that, regarding complications of appendectomy, medical therapy may be an alternative to gold standard appendectomy in acute appendicitis with reasonably low recurrence rates; however, further prospective studies with higher numbers of patients are needed.

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