Treatment of appendiceal mass: prospective, randomized clinical trial

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Background: Appendiceal mass may be treated in several ways. However, no randomized trial has been conducted to find the best option. Objective: To compare the three most commonly used methods for treating appendiceal mass. Methods: Over a three-year period, 60 consecutive patients with appendiceal mass were randomly allocated to three groups: Group A—initial conservative treatment followed by interval appendectomy six weeks later; Group B—appendectomy as soon as appendiceal mass resolved using conservative means; Group C—conservative treatment alone. Short-term outcome measures included operative time, operative difficulty, postoperative complications, length of hospital stay, and duration of time away from work. Long-term outcome measures were: number of hospital visits made, presence of severe incisional pain, scar appearance, and patients with recurrent appendicitis. Results: Baseline characteristics were comparable in the three groups. In patients in Group A, operative time was less, adhesions were encountered less frequently, the incision had to be extended less often and post-operative complications were fewer, as compared to Group B. Patients in Group C had the shortest hospital stay and duration of work-days lost; only 2 of 20 patients in this group developed recurrent appendicitis during a follow-up period of 24-52 (median 33.5) months. Conclusion: Of the three treatment modalities compared, conservative treatment without subsequent appendectomy appears to be the best. [Indian J Gastroenterol 2004; 23:165-167]

Key words: Interval appendectomy, vermiform appendix

Several treatment options are available for patients with post-inflammatory appendiceal mass without abscess formation. Of these, initial conservative therapy followed 6-12 weeks later by interval appendectomy is the most widely practised. In this approach, initial conservative treatment obviates the risk of complications of surgery during the acute inflammatory phase, whereas interval appendectomy eliminates the possibility of recurrence. However, other treatment options are also available. For example, early appendectomy (immediately after appendiceal mass resolution) may eliminate the risk of complications that may arise between the time of resolution of appendiceal mass and definitive surgery. Some other surgeons recommend interval appendectomy only if symptoms recur, since the risk of recurrence of appendicitis is low (up to 20%).

In view of lack of randomized clinical trials, the optimal treatment of patients presenting with appendiceal mass remains unclear. We therefore undertook a prospective, randomized clinical trial of three commonly used treatment options for this condition.

Methods

Patients with appendiceal mass were recruited between June 1998 and May 2001, and were followed up till December 2002. The diagnosis of appendiceal mass was suspected when there was (a) history of pain in the right iliac fossa of acute onset, with or without shift in site of pain from central abdomen, nausea and vomiting, and (b) presence of a tender, ill-defined right iliac fossa mass. Other diagnoses were ruled out by history, clinical examination and, if required, investigations. All patients underwent plain abdominal X-ray, ultrasonography, blood examination for total leukocyte count, and urinary examination for red blood cells and pus cells. Patients were excluded if free air in the peritoneal cavity (on plain films), pus collection in the right iliac fossa or pelvis, or colonic malignancy or ileocecal tuberculosis was suspected or demonstrated.

During the study period, 78 patients with probable diagnosis of post-inflammatory appendiceal mass were admitted. Eight patients with suspicion of appendiceal abscess were excluded and underwent open surgery. Ten patients were excluded because of suspicion of ileocecal tuberculosis (n=5), free air in the peritoneal cavity (3), ileo-ileal intussusception (1), and refusal to participate (1). The remaining 60 patients were randomized into three groups, after obtaining informed consent. Group A patients were treated conservatively followed by interval appendectomy six weeks later. Group B patients were treated conservatively followed by appendectomy (during same admission) as soon as appendiceal mass resolved. Group C patients were treated conservatively, without appendectomy. The study was approved by our hospital's ethics committee.

Treatment

Initial conservative treatment consisted of withholding oral feeds, intravenous fluids, intravenous antibiotics...
(ampicillin 1 g 6 hourly + gentamicin 5 mg/Kg daily in divided doses + metronidazole 500 mg 8 hourly, for 7-10 days) and diclofenac sodium 50-75 mg 6-8 hourly intramuscularly. Oral feeds were resumed when bowel activity returned. Patients in Groups A and C were discharged after the initial conservative treatment, when abdominal tenderness and tachycardia had subsided, oral feeds were tolerated, and appendiceal mass had resolved.

During the second admission, for interval appendectomy, Group A patients received a single dose of cefazolin 1 g pre-operatively, were generally allowed oral feeds by the 3rd postoperative day, and were discharged only after satisfactory wound healing, generally on the 7th to 10th postoperative day after suture removal (on the recommendation of our ethics committee). Thus, total hospital stay for Group A patients included a combination of the first and second admissions. In Group B, sutures were removed on the 7th to 10th postoperative day. However, patients were discharged from hospital only after complications, if any, settled.

Surgery was done using gridiron incision, which was extended if required. Resected tissues were examined by a pathologist.

Follow up

Group A and B patients were followed up for wound-related complaints (pain or scar appearance). Group C patients were followed up every three months; they were to undergo appendectomy if appendicitis recurred.

The following short-term parameters were compared between groups: operative difficulty (adhesions, need to extend the incision), duration of surgery, frequency of postoperative complications, duration of hospital stay, and number of work-days lost. In addition, number of follow up visits, number of patients with pain over the incision scar severe enough to warrant drugs, and number of patients expressing concern about the appearance of the scar were compared.

Statistical analysis

Analysis of variance with Tukey's test was used for numerical data (after Kolmogorov-Smirnov test had showed these to be normally distributed) and chi-squared test for categorical data; significance was taken at 5%.

Results

The three groups were comparable in mean age (Group A: 31.6 [SD 14.6], Group B: 26.0 [12.4], Group C: 25.2 [11.8] years), gender distribution (M:F 19:1, 18:2 and 20:0, respectively), and time to resolution of appendiceal mass (4.1 [1.4], 3.9 [1.4] and 3.9 [1.2] days, respectively).

Frequency of intraperitoneal adhesions, need to

Table: Comparison of various outcome measures in the three groups of patients with appendiceal mass undergoing different treatment

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Group A (n=20)</th>
<th>Group B (n=20)</th>
<th>Group C (n=20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients with significant adhesions*</td>
<td>8</td>
<td>20</td>
<td>NA</td>
</tr>
<tr>
<td>Number of patients in whom incision needed to be extended*</td>
<td>2</td>
<td>8</td>
<td>NA</td>
</tr>
<tr>
<td>Duration of surgery (min)*</td>
<td>38 (8)</td>
<td>33 (7)</td>
<td>NA</td>
</tr>
<tr>
<td>Number of patients with postoperative complications*</td>
<td>0</td>
<td>6</td>
<td>NA</td>
</tr>
<tr>
<td>Total hospital stay (days)**</td>
<td>14.7</td>
<td>21.4</td>
<td>4.9</td>
</tr>
<tr>
<td>(2.9)</td>
<td>(6.5)</td>
<td>(1.5)</td>
<td></td>
</tr>
<tr>
<td>Days patient remained off work**</td>
<td>20.0</td>
<td>25.0</td>
<td>11.7</td>
</tr>
<tr>
<td>(2.9)</td>
<td>(7.4)</td>
<td>(2.0)</td>
<td></td>
</tr>
</tbody>
</table>

NA: not applicable
*p<0.05, Group A vs. Group B
**p<0.05, Group C vs. Group A, Group C vs. Group B, and Group A vs. Group B

extend the incision for appendectomy, and duration of surgery was less in Group A than in Group B (Table). No patient in Group A and six patients in Group B had postoperative complications (p<0.05); these included wound infection in 4 patients, low-output fecal fistula that closed spontaneously by day 14 in one patient, and persistently discharging sinus due to retained catgut suture material needing wound exploration under local anesthesia in one patient. Mean duration of hospital stay and of absence from work were the shortest in Group C (Table).

Follow up

Patients in Groups A, B and C were followed up for 19-53 (median 33.0), 21-54 (33.5) and 24-52 (33.5) months, respectively; the number of follow-up visits in the three groups were 3.2 (1.7), 3.7 (1.8), and 2.0 (2.0), respectively (Group B vs Group C, p<0.05). Five Group A patients complained of severe incision-related pain at 1-13 mo postoperatively; in comparison, eight patients in Group B did so at 3-16 mo (p<ns). Two patients from Group A and five from Group B expressed concern about the ugliness of the appendectomy scar (p=ns). Only 2 of the 20 patients in Group C developed recurrent appendicitis; in both cases, it occurred within six weeks of initial symptoms and emergency appendectomy was done.

Resected appendices in all groups were small and shrunken and revealed acute or chronic inflammation on histological examination. Two patients in Group B had gangrenous appendix. In two patients (one each in Groups A and C), hookworms were found in the lumen of the appendix.

Discussion

Appendiceal mass develops in 2%-6% of cases following acute appendicitis. Pathologically, this may represent a spectrum ranging from phlegmon to abscess.
Immediate surgical drainage (percutaneous or open) is the treatment of choice for abscess formation. For phlegmon, a number of treatment options are available. We compared the three most popular ones.

Immediate appendectomy has advantages of being safe, elimination of risk of recurrent appendicitis and of the need for re-admission for interval appendectomy, and reduced total hospital stay. However, it has a high complication rate (36%), almost comparable to that for perforated appendicitis. It may also lead to dissemination of infection and fistula formation. Also, the inflammatory appendiceal mass may be mistaken at surgery for a malignant tumor, occasionally leading to right hemicolectomy. A malignant mass may be mistakenly under-treated by appendectomy.

Advocates of a conservative approach without subsequent appendectomy argue that only a small percentage (0%-20%) of patients have recurrence. However, this has not become popular, mainly because of lack of evidence supporting it.

The present study was aimed at finding the best treatment option for patients with appendiceal mass. Fewer operative difficulties in Group A resulted in less frequent need for extension of the incision. As a result, the operative time was significantly shorter in this group. Also, none of the patients in Group A had postoperative complications. In Group B, postoperative complications were mainly infective in nature, suggesting that sepsis may not have settled by the time of the surgery, despite resolution of the appendiceal mass. As a result, patients in Group B had significantly longer duration of hospital stay as well as time lost from work. Thus, it appears that interval appendectomy is preferable to early appendectomy.

In our study, the patients in Group C had the shortest hospital stay and time spent away from work, with only two patients developing recurrent appendicitis and needing emergency appendectomy. Our results are supported by a recent large retrospective study (n=233) that found interval appendectomy to be unnecessary. Further, interval appendectomy is associated with complication rates of 16% to 18%. However, this approach of not doing appendectomy may not be acceptable to many surgeons and patients. Also, the present study has two main drawbacks, viz., small sample size and a relatively short duration of follow up. Larger studies will be needed to study the risks and benefits of the conservative approach, especially in relation to laparoscopic appendectomy, before it can become widely accepted.

References

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