Practical issues in treatment of appendicitis
van Rossem, C.C.

Citation for published version (APA):
van Rossem, C. C. (2016). Practical issues in treatment of appendicitis

General rights
It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations
If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: http://uba.uva.nl/en/contact, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.
CHAPTER 8

Laparoscopic appendectomy for chronic right lower quadrant abdominal pain

Charles C. van Rossem
Kaij Treskes
David L. Loeza
Anna A.W. van Geloven

International Journal of Colorectal Disease
2014; 29: 1199-1202
CHAPTER 8

ABSTRACT

Purpose | The appendix can be a rare cause for chronic right lower quadrant abdominal pain (RLQAP), even though no objective disorder can be determined to the appendix. This condition can be described as chronic appendicitis or (neurogenic) appendicopathy. After careful selection, elective appendectomy is performed in our centre for this group of patients.

Methods | All patients that underwent an elective appendectomy between 2006 and 2013 were prospectively analyzed. Inclusion criteria were chronic RLQAP without abnormalities seen on imaging. Exclusion criteria were pain after conservative treatment of (complicated) appendicitis or an abnormal appendix on imaging like a mass, mucocele or faecolith. Primary outcome was the effect on the pain postoperatively.

Results | In the period of the study 10 patients met the inclusion criteria and underwent an appendectomy for chronic RLQAP. Average preoperative pain score assessed with visual analogue scale (VAS) was 8.6. Pre-operative work-up showed no abnormalities. No macroscopic abnormalities were seen during surgery in any of the patients. Histopathological analysis was obtained and showed limited abnormalities in 8 of 10 patients, mostly suspicion of previous inflammation. Postoperatively, no complications occurred and at revision after 3 weeks average VAS was 1.0. Long-term follow up showed that patients remained free of symptoms, average VAS after a median of 33 month was 1.0.

Conclusions | A significant reduction of pain was achieved after an appendectomy in all patients suffering from chronic RLQAP in this series. Seven out of ten patients were completely free of pain.
INTRODUCTION

An appendectomy for acute appendicitis is a frequent emergency surgical procedure. Elective appendectomy is normally only performed for appendiceal abnormalities like an appendiceal mass or if a patient remains symptomatic after conservative treatment of (complicated) appendicitis. However, patients with chronic right lower quadrant abdominal pain (RLQAP) without objective abnormalities of the appendix can still benefit from an appendectomy. This often misdiagnosed or unrecognized condition can be described as chronic appendicitis\(^1,2\) or (neurogenic) appendicopathy\(^3,4\).

One randomized controlled trial reports that an appendectomy can be beneficial for patients with chronic RLQAP\(^5\). Also in our centre, patients with chronic RLQAP are considered for appendectomy. These patients were prospectively analysed to review the result of a laparoscopic appendectomy on the chronic pain.

MATERIAL AND METHODS

All adult patients who underwent an elective laparoscopic appendectomy between 2006 and 2013 were prospectively analyzed for the presence of chronic RLQAP. Tergooi hospital is a general community teaching hospital in Hilversum in the centre of The Netherlands.

Patients were referred to the gastrointestinal surgeon by a general practitioner or a consultant from another specialty (gastroenterologist or gynaecologist). Medical history was obtained and physical examination was carried out. Laboratory tests in the blood, namely leucocytes count and C-reactive protein were obtained. Subsequently, additional imaging (ultrasound, computed tomography scan or magnetic resonance imaging and colonoscopy) was performed and if necessary, another specialty like a gastroenterologist or gynaecologist was consulted to rule out other pathology.

Criterion for inclusion were chronic RLQAP for more than two months without abnormalities seen on imaging. Exclusion criteria were a history of non-operative treatment of appendicitis or an abnormal aspect of the appendix on imaging like a mass or faecolith.

Before anaesthetic induction, patients received one intravenous dose of cephalosporin and metronidazole as prophylaxis. The laparoscopic appendectomy was performed by a gastrointestinal surgeon using 3 trocars and the base of the appendix was closed using a stapling device. The removed appendix was analysed for histopathological abnormalities.

Follow-up was carried out after several weeks postoperatively, the primary outcome was the result on pain assessed by VAS (visual analogue scale)\(^6\). Secondary outcome was a complication of the performed surgery. Long term follow-up was carried out by telephone consultation.
RESULTS

Between January 2006 and November 2013 an elective appendectomy was performed in 30 patients at Tergooi hospital. The indication for this planned surgery was because of recurrent or chronic appendicitis or persistent complaints after non-operative treatment of an acute appendicitis in nine patients and because of abnormalities of the appendix or an appendiceal mass in 11 patients.

Ten patients met the inclusion criteria for chronic RLQAP without objective abnormalities of the appendix on imaging. Mean age was 35 years (range 19-51), eight patients were female. Seven patients had a blank medical history, one patient was earlier diagnosed with endometriosis, one patient had a cholecystectomy and one patient had spine surgery in medical history. All patients had local tenderness on physical examination and average pain score assessed with the visual analogue scale before surgery was 8.6 on the scale of 10 (range 5-10). The laboratory results were normal in all patients on pre-operative outpatient assessment, in one patient C-reactive protein was recently before 67 mg/L and in one patient leucocytes count was recently before 14.4x10^9/L. All patients underwent an ultrasound of the abdomen, nine patients underwent a computed tomography scan, two patients a magnetic resonance imaging scan and nine patient a colonoscopy. There were no abnormalities seen on the pre-operative imaging and no other pathologies were found when consulting a gastroenterologist in three patients or a gynaecologist in two patients.

<table>
<thead>
<tr>
<th>Patient</th>
<th>Sex</th>
<th>Age</th>
<th>Surgical findings</th>
<th>Histopathological findings</th>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>F</td>
<td>41</td>
<td>No abnormalities</td>
<td>Endo-appendicitis</td>
<td>None</td>
</tr>
<tr>
<td>2</td>
<td>F</td>
<td>23</td>
<td>No abnormalities</td>
<td>No abnormalities</td>
<td>None</td>
</tr>
<tr>
<td>3</td>
<td>F</td>
<td>20</td>
<td>Long appendix, left sided ovarian cyst</td>
<td>Suspicious for previous inflammation</td>
<td>None</td>
</tr>
<tr>
<td>4</td>
<td>F</td>
<td>19</td>
<td>No abnormalities</td>
<td>Suspicious for previous inflammation</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>F</td>
<td>46</td>
<td>No abnormalities</td>
<td>Faecolith</td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>F</td>
<td>45</td>
<td>No abnormalities</td>
<td>Suspicious for previous inflammation</td>
<td>None</td>
</tr>
<tr>
<td>7</td>
<td>M</td>
<td>51</td>
<td>No abnormalities</td>
<td>Endo-appendicitis</td>
<td>None</td>
</tr>
<tr>
<td>8</td>
<td>F</td>
<td>22</td>
<td>No abnormalities</td>
<td>Sana, obliterated tip</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>M</td>
<td>33</td>
<td>No abnormalities</td>
<td>No abnormalities</td>
<td>None</td>
</tr>
<tr>
<td>10</td>
<td>F</td>
<td>49</td>
<td>Long appendix, right sided ovarian cyst</td>
<td>Suspicious for previous inflammation</td>
<td>Haematoma (no intervention)</td>
</tr>
</tbody>
</table>

*F female, M male*
All ten patients underwent a laparoscopic appendectomy, no conversions to open surgery was necessary in any of the patients. During surgery, no macroscopic abnormalities were seen besides a long appendix and an ovarian cyst in two patients. With pathological analyses the appendix was considered abnormal in 8 patients and these findings were mostly suspicious for a previous inflammation. Details of surgical and histopathological findings are displayed in Table 1.

In nine patients hospital stay was 1 day; in one patient hospital stay was 4 days because of suspicion of postoperative bleeding that resolved by itself without re-intervention.

Short term follow up was carried out at the outpatient clinic after a median of 18 days (range 8-48 days) resulting in an average VAS of 1.0 (range 0-6) and six out of ten patients being completely free of pain. No complications occurred within the follow-up of the patients.

Long term follow-up was performed by telephone consultation after a median period of 33 months (range 5-85 months), average VAS was still 1.0 (range 0-5) and seven out of ten patients were completely free of pain. Detailed results on pain scores assessed with VAS are displayed in Table 2. All patients were satisfied with the result of the surgery and would make the same choice again for this treatment.

### TABLE 2 Outcome on pain

<table>
<thead>
<tr>
<th>Patient</th>
<th>Preoperative pain (VAS)</th>
<th>Short term pain (VAS)</th>
<th>Long term pain (VAS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>9</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>9</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>9</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>10</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>9</td>
<td>6</td>
<td>0</td>
</tr>
</tbody>
</table>
DISCUSSION

In this study, the patients with chronic RLQAP had an excellent result on the chronic pain after a laparoscopic appendectomy. The patients that underwent an appendectomy were mainly young women under 50 years of age; only two men were diagnosed with chronic RLQAP and were considered for surgery. Before considering surgery we performed thorough examination with imaging such as an ultrasound, a CT- or MRI-scan and a colonoscopy to exclude other pathologies like inflammatory bowel disease or malignancy.

Strict criteria were pursued including only patients with typical localized pain but without objective abnormalities of the appendix, because in this small group of patients the indication for surgery is often indistinct. In patients with RLQAP who do have objective abnormalities of the appendix on imaging, there is no doubt that there is an indication for an appendectomy.

The pre-operative pain assessed with the visual analogue scale was very high in all patients, this high score can be explained because most patients were desperate because of the often progressive, persisting pain they were suffering from.

The possible benefit of the procedure has to be weighed against the possible complications of an appendectomy. In acute appendicitis these complications are mainly wound infections (3.6% for laparoscopic surgery and 7.3% for open surgery) and intra-abdominal abscesses (1.6% for laparoscopic surgery and 0.6% for open surgery)\textsuperscript{7}. In this cohort no infectious complications were seen in any of the patients. Long term complications of an appendectomy can be adhesions resulting in small bowel obstruction; however the laparoscopic approach results in fewer adhesions compared to open surgery\textsuperscript{8,9}.

In the histopathological findings of the macroscopic normal apparent appendices a suspicion of previous inflammation was seen in most cases. In fact, only two specimens were considered histological normal. We don’t know if manipulation of the appendix during surgery can also explain these findings but hypothetically it can also be a good explanation for the chronic pain.

During laparoscopy for suspicion of acute appendicitis, a non-inflamed appendix can be well distinguished from a non-inflamed appendix\textsuperscript{10}. The Dutch guideline\textsuperscript{11} advises not to remove the appendix when it is not inflamed because of studies\textsuperscript{12,13} that report it is safe to leave the appendix in place and because of the morbidity of removing a normal appendix\textsuperscript{14}.

However, discrepancies can be seen between the surgeon’s diagnosis and the histopathological findings\textsuperscript{15}, and there are also studies that advise to perform an appendectomy even if the appendix looks normal\textsuperscript{1,16}.

Roumen et al. performed a randomized clinical trial including patients with chronic right lower quadrant pain and reported that patients who underwent an appendectomy had significantly less pain in comparison with patients who underwent a diagnostic laparoscopy alone\textsuperscript{5}. Forty patients were included in this study in a period of ten years. Also in our centre, the prevalence of chronic RLQAP is low;
only 10 patients were selected for surgery in 8 years. However, the incidence of this condition might be higher. Because of the unfamiliarity with this entity, appropriate referral does not occur or there can be a resistance to perform surgery for the subjective complaints without objective abnormalities.

In conclusion, after careful selection patients with chronic RLQAP benefit from a laparoscopic appendectomy in this study.
REFERENCES


Phillips AW, Jones AE, Sargen K. Should the macroscopically normal appendix be removed during laparoscopy for acute right iliac fossa pain when no other explanatory pathology is found? *Surg Laparosc Endosc Percutan Tech* 2009; 19: 392-394.