

Acute Appendicitis Still a Surgical Emergency? Treating Appendicitis without Surgery

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Abstract

Acute appendicitis is the most common emergency presented in the general surgical services although its incidence has been declining since 1970s. For over 100 years, the surgical removal of the appendix has been the gold standard in the treatment. The current surgical literature relates the efficacy of non-operative strategy in the treatment of acute appendicitis and several trials and systemic reviews have been published recently about this topic. In the 2020 updates of the Jerusalem Guidelines it is concluded that the majority of patients with uncomplicated appendicitis can be treated with “antibiotic first strategy” but the success of the new approach requires careful selection of the patients and exclusion of all situations with gangrenous appendicitis, diffuse peritonitis and presence of appendicolith (statement 2.1). The APPAC randomized trial reported an initial success rate of 99.6% and NOM with antibiotics achieves a significantly lower overall complication rate at 5 years and shorter sick leave compared to surgery.

Keywords: Acute Appendicitis, Treating without surgery, Literature review

Appendectomy has been the standard treatment for acute appendicitis for over 100 years being one of the most frequently abdominal surgical emergencies: one in 10 persons develops acute appendicitis in the course of his life. [1] Statistically, more than 300 000 appendectomies are annually performed in the United States, whereas in the UK the number reaches more than 40000 annually. [2]

Ever since Fitz and Mc Burney, appendectomy has been regarded as surgical emergency considering the fact that the appendix can burst and cause infection in the abdominal cavity if the condition goes untreated. [3, 4] From a traditional perspective, the acute appendicitis is caused by intra luminal obstruction with fecoliths, distention, bacterial overgrowth, endoluminal hyperpressure with parietal ischemic alteration, gangrene and consecutive perforation.[5]

EBM Data

Although acute appendicitis is regarded and assimilated with minor pathology that can be done most of

the time by young surgeons, a recent survey in PubMed regarding the volume of medical literature on “Acute Appendicitis” published in the last 30 years reveals an increase in the number of articles (almost 900 published works in 2019), which demonstrates that it is still considered to be a major health problem. (Fig.1)

Recently, the epidemiological studies have shown constant values in the incidence of complicated cases of appendicitis (death rate 1.5-5%), while the minor cases decreased with 14-20%. [6]

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In Europe, the number of appendectomies, with reference to 100 000 persons, are still significantly different (Fig.2). Austria, Germany and France (Haute Autorité de

Santé – Service evaluation des actes professionnels - avril 2011), for example, are placed on top positions.

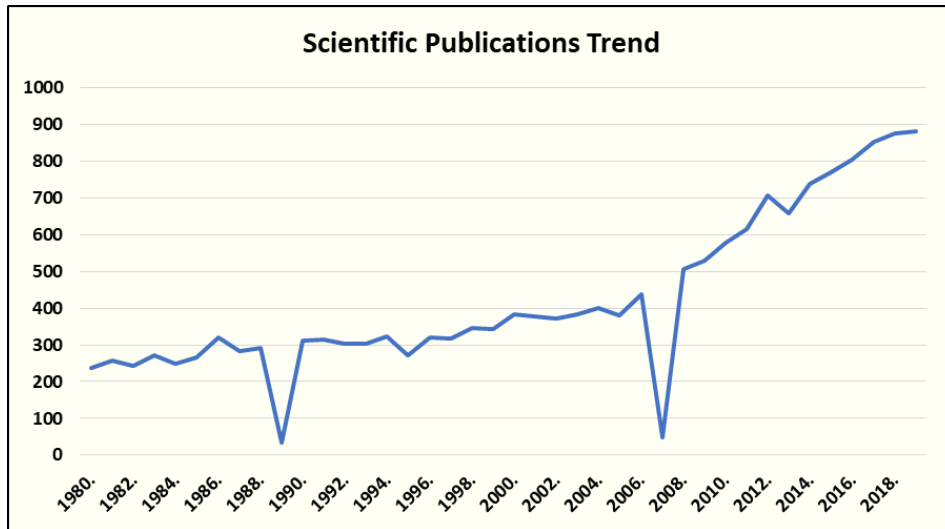


Fig.1 Acute Appendicitis – Scientific Publications Trend in PubMed

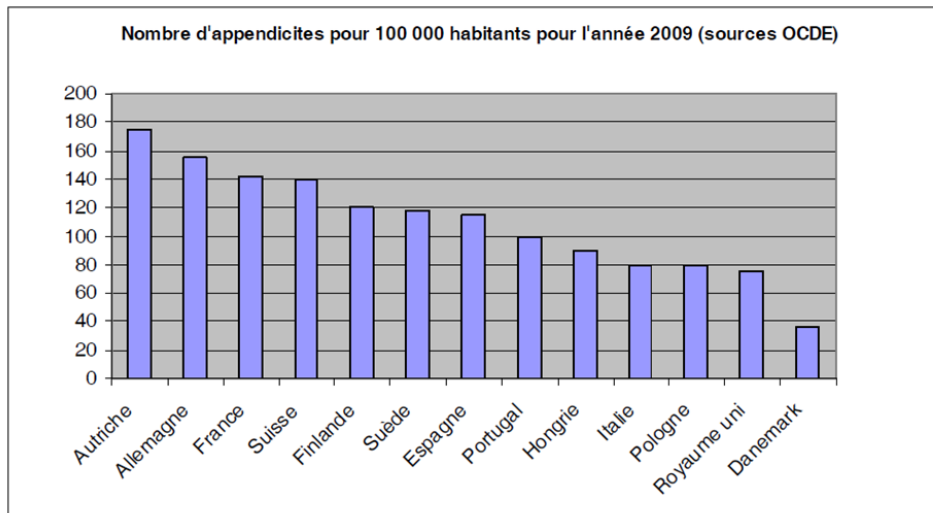


Fig. 2 – Incidence rate of appendicitis in European countries (2009)

In the last two decades, as a consequence of the high incidence rate in using the preoperative imagistic exploration in diagnosis (CT scan, Ecography) [7], thus differentiating the non-complicated cases of appendicitis from the severe ones, and in order to have a better knowledge of the local inflammation, a large variety of

randomized clinical trials (RCTs) and systematic reviews analyzing the necessity of using antibiotic therapy alone in non-complicated appendicitis have been published in the medical literature. [8, 9.10 11, 12, 13] The concept “antibiotics first – strategy” is not a new one.

Management of penetrating cardiac injuries: literature review

In 1956, Coldrey [14] published a list of 137 patients with acute appendicitis who had been treated with antibiotics more than 24 hours, as opposed to medical dogma (surgery in emergency), with a low death rate (0.2%) and a recurrence of 14.4%. In 1977 a Chinese medical team reported a success rate of 92.9% with reference to a group of 425 patients that developed acute appendicitis and had been treated with traditional therapeutic procedures. [15] Other arguments in favor of the non-interventional approach in a pathology considered as surgical emergency are: the complete resolution under antibiotics of the appendicitis to navigators and the ones working in hostile conditions without any hospital logistic support, or the non-operative management of the appendicular mass with optional surgery at a distance. [16]

In the medical literature (PubMed, Embase, Cochrane Controlled Trials Register), between January 1970 – December 2015, we can retain 5 Randomized Clinical Trials that compare the outcomes of antibiotic therapy versus appendectomy, with reference to the patients that have developed non-complicated appendicitis and have been screened one year after first hospital admission. [8, 9, 10, 11, 12] The publications as pediatric series, bibliographic reviews, observational studies, non-randomized clinical trials and the ones referring to complicated appendicitis (perforated, appendicular mass or abscess) have not been included in the analysis. The 5 studies have been conducted on a sample of 1430 patients; 727 of them followed the “antibiotic first-line” strategy, while the rest of 703 patients underwent appendectomy. (Table1).

| Study | Number of Patients | | Age (years) | | Successful Treatment (n) | | Complication (n) | |
|-------------------|--------------------|---------|--------------|--------------|--------------------------|---------|------------------|---------|
| | Atb | Surgery | Atb | Surgery | Atb | Surgery | Atb | Surgery |
| 1 Eriksson (1995) | 20 | 20 | Mean: 27 | Mean: 35 | 13 | 17 | 0 | 2 |
| 2 Styrud (2006) | 128 | 124 | Range: 18-50 | Range: 18-50 | 97 | 120 | 4 | 17 |
| 3 Hansson (2009) | 202 | 167 | Mean: 38 | Mean: 38 | 83 | 142 | 51 | 55 |
| 4 Vons (2011) | 120 | 119 | Mean: 34 | Mean: 38 | 81 | 119 | 3 | 12 |
| 5 Salminen (2015) | 257 | 273 | Median: 33 | Median: 35 | 181 | 221 | 8 | 28 |
| Total | 727 | 703 | | | 455 | 619 | 66 | 114 |

Tabel 1 – Summary of outcomes (updated from Varadhan K et al – BMJ 2012)

The subgroup treated exclusively with antibiotics (RR 0.52, 95% CI 0.36-0.75, $p=0.0005$) indicated a lower rate of complications. Regarding the length of stay in hospital, all the 5 trials have shown that there are no significant differences between the 2 therapeutic subgroups. Four out of the 5 trials [8, 9, 11, 12] have demonstrated that the subgroup of patients initially treated with antibiotics and who underwent surgery due to the lack of therapeutic effect, did not develop more complications than the ones with surgery performed in emergency (10.9 vs 17.9%). In this analysis, 123 patients from a sample of 602, who were initially administered antibiotics, were readmitted in surgery being diagnosed with appendicular recurrence (120 patients underwent appendectomy and 3 were treated with a new non-operative protocol). In terms of the sick leave, analyzed in only 4 trials, Salminen and Hansson remarked a significant decrease in the number of the days off in favor of the subgroup treated with antibiotics (7 days vs 19 days, $p<0.001$) [12], while Vons and Styurd find the values roughly equivalent. [9, 11]

Discussion

Analyzing the 5 randomized trials, it is clearly obvious that the therapy with antibiotics alone, used in non-complicated appendicitis, is associated with a decrease of 39% in the risk of getting complications when compared to

the subgroup that underwent surgery. In this meta-analysis, 587 (84%) patients out of 695 were treated successfully with antibiotics, and only 21% were readmitted for appendicular recurrence during 1 year follow-up. From them, appendectomy was performed in 98% of cases but only 10.8% of recurrences were proved as complicated appendicitis; 7.5% showed that the cecal appendix was histologically normal.

In 2012, the meta-analysis conducted by Varadhan on randomized clinical trials [17], showed that 68/345 (20%) patients treated with antibiotics were readmitted with recurrence of symptoms during first year follow-up, while the trial conducted by Liu in 2011, using a sample of 120 patients treated non-operatively with antibiotics, showed a rate of recurrence of $14.2\pm 10.6\%$.

Most of the surgeons still assume that the acute appendicitis can perforate in all cases and develop gangrenous lesions if it goes untreated. At present there are serious debates on the existence of different types of appendicitis, considering that the cases of luminal obstruction with fecoliths and leading to perforation represent only 10%. As a consequence, it has been recently demonstrated [19] that the recurrence rate of non-complicated acute appendicitis varies according to the season, while the recurrence rate of complicated cases remains stable. (Fig. 3)

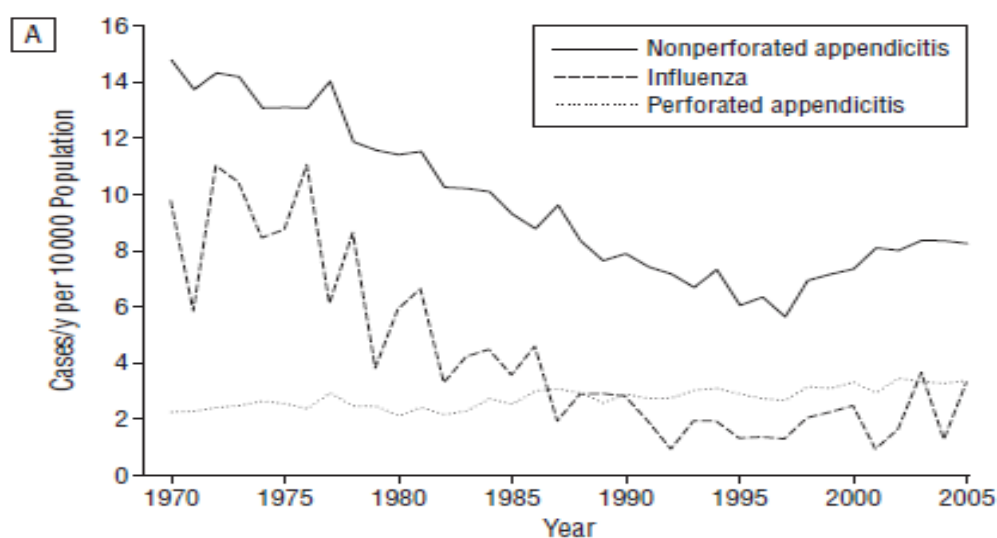


Fig. 3 - Annual incidence rates of nonperforated and perforated appendicitis

What we should not neglect is that, beyond the common systemic complications, appendectomy can lead to parietal or intra-abdominal complications. In 10 years, 21% of the patients who underwent appendectomy are readmitted for post-adhesive occlusive syndrome and 2.7% of them undergo surgery. [20]

The results of the surveys contain, nonetheless, some restrictive aspects. Most of them include patients who were diagnosed with appendicitis determined by clinical criteria and laboratory tests. Unfortunately, the imagistic explorations (CT scan) used for differentiating the complicated appendicitis from the non-complicated ones are not homogeneous and protocolized. With reference to antibiotic therapy alone can remark a great variability between studies regarding the type, dosage and administration [21]. Although there are many enthusiasts who advocate for laparoscopic surgery, open appendectomy is still highly performed, which, statistically, can have an impact on length of stay, morbidity, and postoperative recovery period.

Conclusion

Appendectomy, one of the most frequently abdominal operation, can cause a dramatic decrease in the costs of public health if the number of surgeries goes down.

Although appendectomy is still considered to be the standard treatment for acute appendicitis, the indication for a non-surgical strategy in a selection of cases can be considered one great step to understanding the changes in the epidemiologic pattern of pathology. One alternative strategy in the treatment of acute appendicitis can be the restriction of the surgical indication which can be approached in successive stages. Upon admittance, the antibiotic therapy can be used initially in all non-complicated cases. Surgical emergency can be done strictly in case of non-operative failure.

Given the circumstances, and the great interest manifested today for “antibiotic first-line” strategy, it is quite natural for the surgeon to ask himself the Shakespearean question: “To operate or not to operate an acute appendicitis?” Therefore, one cannot neglect the fact

that pathologies with obvious surgical indication such as duodenal ulcer or sigmoid diverticulitis have gone through crucial mutations of therapeutic strategy in favor of a non-operative management.

Until the international community of surgeons have reached a unitary and unanimous decision, the option for the antibiotic first line therapy for non-complicated appendicitis, already proved scientifically, remains a matter of personal decision.

Conflict of Interest

Authors have no conflict of interest to disclose.

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