Original paper

Antibiotics Use in Patients Underwent Appendecectomy at North Middlesex Hospital/ London: A Retrospective Analysis

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Abstract

Background: Appendicitis is a common condition that affects patients of all ages. Appendecectomy has been the mainstay for the treatment of acute appendicitis since first reported by McBurney in 1889.

Aim: To describe the effect and outcome of using antibiotics before appendecectomy, and assess whether antibiotic is being used appropriately in patients who have had appendecectomies. The study has also draw conclusions around the impact of inappropriate antibiotic use.

Method: This is a retrospective study at North Middlesex University Hospital 'NMUH' in London over the period of one year .100 patient notes, those had appendecetomies, were collected on this study between April 2012 and March 2013. The following systems were approached: Admission clerking, Histopathology system, Patient Admission System, Radiology system (PACS), Anesthetic chart, Operation note, Drug chart, and Discharge summary.

Results: 22% of patients had histologically normal appendix and 13% of patients had histologically inflamed appendix were received no prophylactic antibiotics (Augmentin or Clarithromycin if allergic to penicillin + Flagyl). Also 13% of those had histologically proved gangrenous / perforated appendix received no course of antibiotics postoperatively. On the other hand, 11% of those had histologically normal appendix and 30% of patients who had histologically proven mild appendicitis were received unnecessary course of antibiotics after surgery.

Conclusion: 10% of patients had appendecectomies received no prophylactic antibiotic at all. Patients who developed postoperative complications (such as ileus, pelvic collection and surgical site infection) were mainly those who had no antibiotics before surgery. An agreed protocol for antibiotic use is needed to avoid erratic prescription of antibiotic. Also Patients should be followed up after discharge to assess for complication and review histology.

Introduction

Appendecectomy has been the mainstay for the treatment of acute appendicitis since McBurney first reported it in 1889 [1] and the general assumption since the 19th century has been that in the absence of surgical intervention the disease often progresses from uncomplicated to perforated appendicitis [1, 2]. The advent of laparoscopic surgery and the low threshold for operative intervention have led to a reduction in the risk of negative appendecectomy rates with unnecessary surgery related morbidity [3-5]. Only 20% of patients present with complicated appendicitis, and non-operative management with antibiotics and supportive treatment has been explored as a therapeutic option for patients with early-uncomplicated appendicitis, with resolution in most of them [6-9]. Antibiotic treatment was often considered as a bridge to surgery in patients with suspected appendicitis but no clear indications for appendecectomy such as signs of

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perforation or peritonitis. However, the routine use of antibiotics in patients with uncomplicated acute appendicitis was not well supported, owing to inherent pitfalls in the quality and design of individual studies [10]. The role of antibiotic treatment in acute uncomplicated appendicitis may have been overlooked mainly on the basis of tradition rather than evidence, considering that other intra-abdominal inflammatory processes such as colonic diverticulitis are primarily managed non-operatively.

Some other studies stated that without any pre- or perioperative antibiotic prophylaxis, wound infection rates in patients undergoing appendecectomy are 10% or more when appendix is normal, increasing to 30% when appendix is phlegmonous or gangrenous [11-13]. In the USA a predilection to treat acute appendicitis with antibiotics alone followed by an interval appendecectomy contrasts sharply with UK model.

The accepted practice in the UK is that the surgeon decides on the use of antibiotics pre and post operatively. Most surgeons will give a prophylactic dose just before knife to skin, and depending on findings decide on the type and duration of the course to follow. The range of findings differs from normal appendix to gangrenous /perforated appendix with peritoneal contamination.

Methods

163 Appendecectomies were performed between April 2012 and March 2013 in our unit (NMH), of these 100 sets of notes accessed. There were no exclusion criteria. We collected data from the admission clerking, NMH Pathology system, Patient Admission System, PACS web, anesthetic charts, operation notes, drug charts and discharge summaries.

We collected data on age, sex, duration of pre-admission pain, inflammatory markers (WCC+CRP), urine dip results, imaging results, time from admission to operation, length of stay and post-operative complications.

We also recorded from the operation note the macroscopic appearance of appendix, stump buried or not, peritoneum closed and if a drain was inserted.

Antibiotic usage as prophylaxis and / or treatment information was also recorded, along with the duration of usage and the final histology result.

Histology was divided into three categories:

1. Normal (macroscopically normal or found to be microscopically normal)
2. Inflamed (macroscopically inflamed appendix or found to be microscopically inflamed)
3. Gangrenous/Perforated

(macroscopically gangrenous or perforated appendix, including abscess and mass formation)

Results

We performed 163 appendectomies over the year 2012-2013. Hundred sets of notes were obtained. Of these 59 were male, 41 were female. 38% were aged between 11-20 years old, 21% between 21-30 years old and only 4% over 60 years old.(fig 1.) 77% of operations were open. 44% of patients were followed up. 59% of patients were male and 41% were female (fig 2).

The histology shows that 7% of male appendixes were normal contrasting to 12% of female case. Interestingly men were more likely to have a gangrenous / perforated appendix than women (36 % vs 22%) (Fig. 3). The age group of 61-70 had the highest number of normal appendices (33%). The Age group 0-10 and 31-40 had no false positive appendectomies (all inflamed or perforated) (Fig 4).

Seven macroscopically inflamed appendixes were found to be microscopically normal. Whereas four normal looking appendixes had microscopic inflammation.

22% of normal appendixes and 13% of

inflamed appendixes received no antibiotics. All perforated/gangrenous appendixes received prophylactic antibiotics with 87% receiving a full postoperative course. In total 10% of patients received neither prophylactic nor a course of antibiotics (fig 5). The average duration of treatment varied from 2 days for the normal group to 6 days for the gangrenous/perforated group.

The most common complication was a postoperative ileus that was seen in five patients. Following this, a surgical site infection occurred in three patients, as did pelvic collections. (Fig 6.)

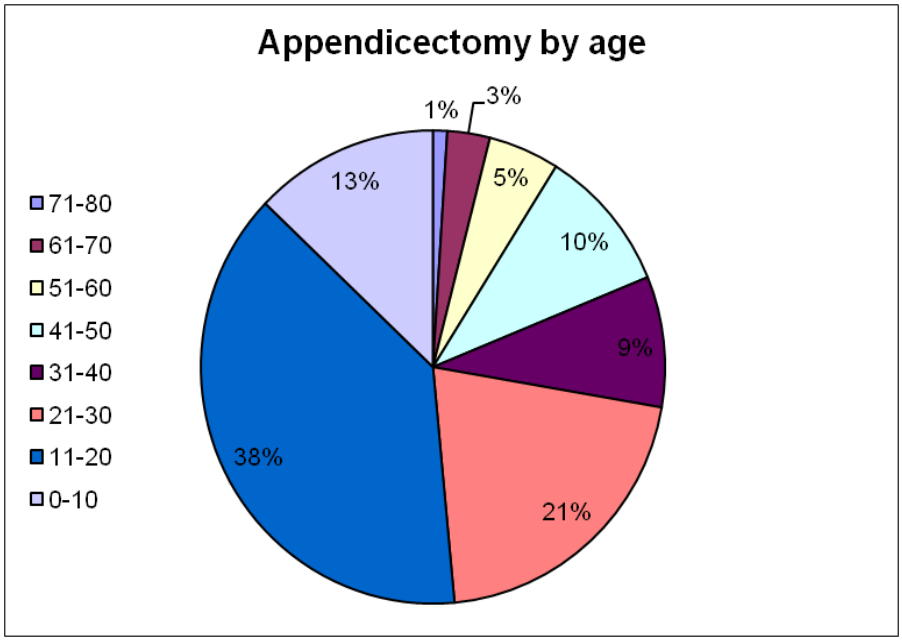

Fig 1. Appendecectomy by Age

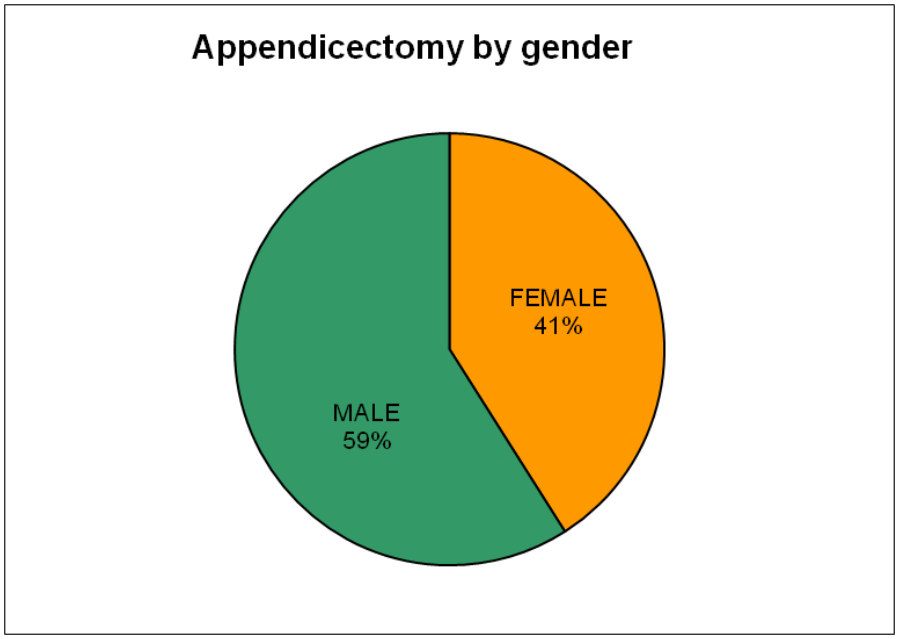

Fig 2. Appendectomy by gender

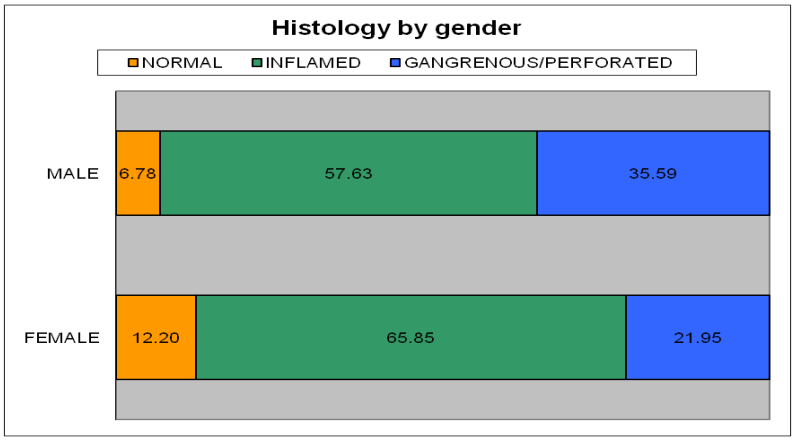

Fig 3. Histology results

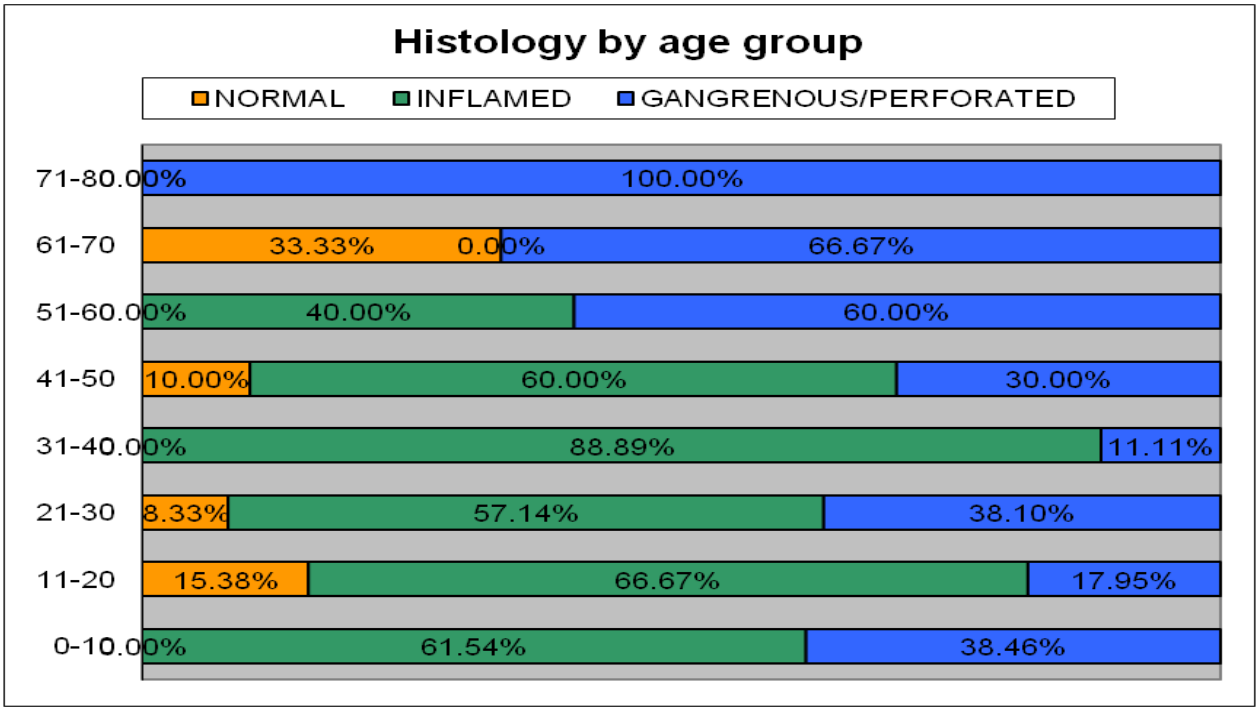

Fig 4. Histology by age group

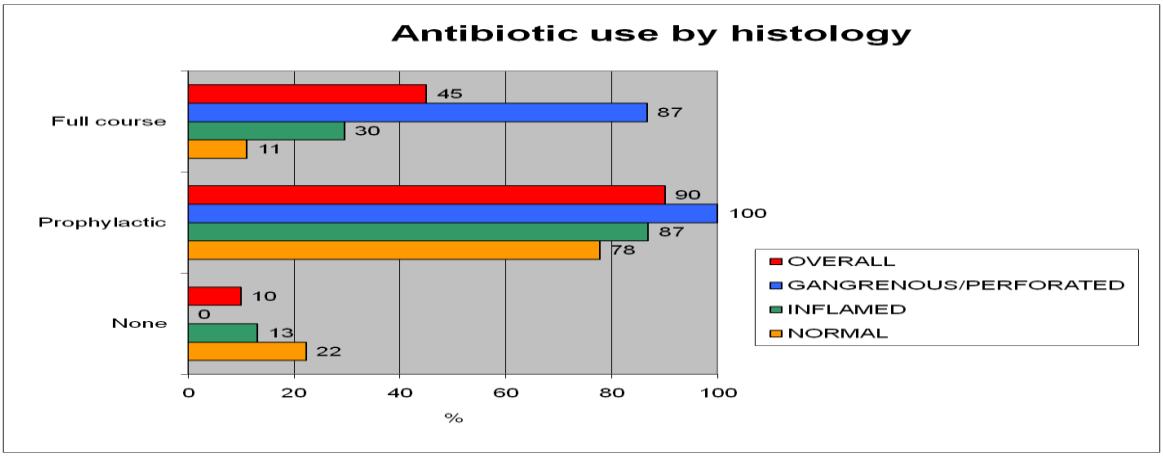

Fig 5. Antibiotic usage

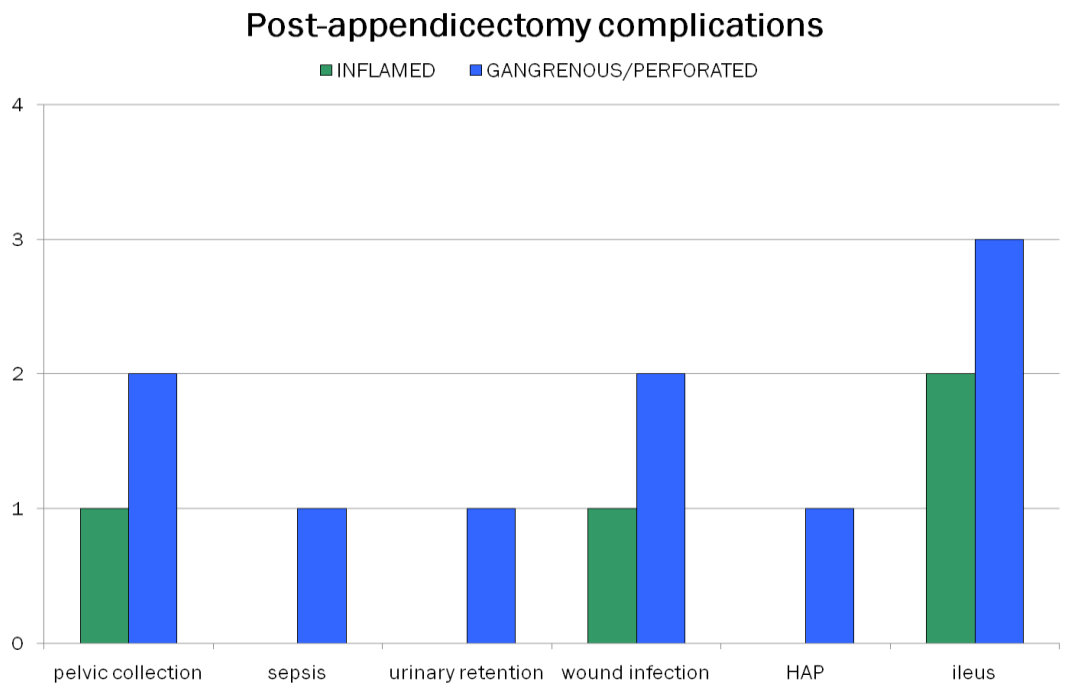

Fig 6. Complications during inpatient stay

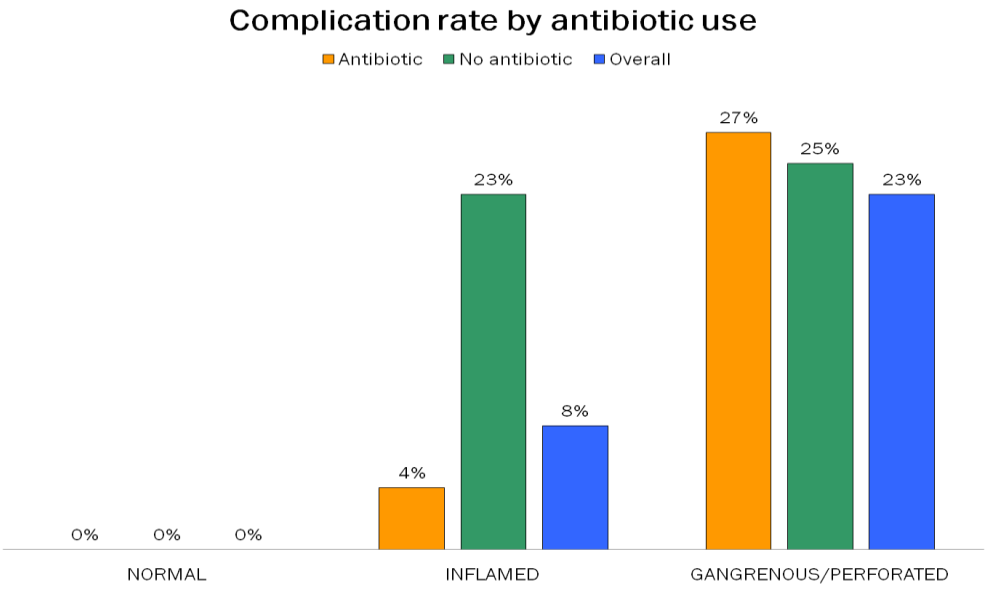

Fig. 7. Complication rate by antibiotic use

Discussion

Prophylactic antibiotics are widely used during surgery, for all clean-contaminated or contaminated procedures.

in an article review of 131 articles reporting clinical trials using systemic antibiotics for prophylaxis, it was found that systemic antibiotics were shown to be of value in reducing wound infections after abdominal and vaginal hysterectomy, cesarean section, biliary surgery, total hip replacement, and micro-neurosurgical craniotomy [14]; However, The use of prophylactic antibiotics in non perforated appendicitis has been questioned by some authors because of the relatively minor degree of bacterial inoculation in these patients and the relatively low incidence of infection [15]. In fact, a large number of

reports indicate that despite a positive peritoneal culture in less than 20%of these patients, the infection rate is significant, and ranges from 10-20% [16-20].

The outcome was single dose of preoperative antibiotics is adequate for prevention of postoperative infective complications in patients with non-perforated appendicitis undergoing open appendecectomy. Prolonging the use of antibiotics can lead to unnecessary antibiotic related complications [21].

A prospective, multicenter observation study was conducted by kock A and et al to 4968 patients underwent appendecectomies and concluded that antibiotic prophylaxis should be given before every appendectomy, whether by laparoscopy or conventional methods [22].

Martin and et al analyzed the incidence of postoperative infections in children undergoing appendectomy for suspected appendicitis to evaluate critically the effectiveness of prophylaxis. He stated that The results figures of post-operative wound infection are clearly lower than those reported from an adult population, indicating that results from adults cannot be transferred to children, and that general recommendations concerning antimicrobial prophylaxis must be considered carefully for this age group [23].

In a prospective, double blinded-randomized, multicenter Danish study run on 1735 patients undergoing appendecectomy. The patients were divided into three groups: patients with a normal appendix, patients with an acutely inflamed appendix, and patients with a gangrenous appendix. The study showed for each group a significant reduction of the incidence of wound infection in patients receiving prophylaxis. However, intra-abdominal abscess formation was not influenced by preoperative antibiotic prophylaxis. Consequently, routine preoperative prophylaxis is recommended before appendectomy [24].

After reviewing our data on this study, it was clear that antibiotic use post-appendecectomy is incomplete with 10% of patients receiving no antibiotic at all. However, the results have confirmed the compatibility with the previous studies mentioned above with a clear message that complications are more on those patients who received no antibiotics prior to their operation.

The bulk of our patients were aged 11-20 year (38% of all cases) with slight tendency towards male gender (59% male compare to 41% female). As an expected with early productivity and gynecological emergencies the diagnosis over female gender can be missed diagnosed as an appendicitis. This has led to find normal appendecectomies double the number of male ones. Interestingly perforated appendix was found more in men then woman; this can be hardly explained although it can be related to the patients' pain threshold and other social issues. The other interesting point is that seven macroscopically inflamed appendixes were found to be microscopically normal whereas four normal looking appendixes had microscopic inflammation. This can raise the issue where appendecectomy should be done laparoscopically when a normal looking appendix was found with the currently practice supported by the National Institute for Clinical Excellence (NICE).

Guidelines that surgeon decision based on clinical and laparoscopic background is the main issue and cases should be treated individually.

With the main aim of this study, it was found that 22% of normal appendixes and 13% of inflamed appendixes patients have received no antibiotics. All perforated /gangrenous appendixes received prophylactic antibiotics with 87% receiving a full postoperative course. In total 10% of patients received neither prophylactic nor a course of antibiotics (fig 5). The average duration of treatment varied from 2 days for the normal group to 6 days for the gangrenous/perforated group.

The most common complication was a postoperative ileus that was seen in five patients. Following this, a surgical site infection occurred in three patients, as did pelvic collections. (Fig 6.) From the figure, we conclude that postoperative complications were mainly happened over the perforated cases and over those who had no antibiotics before surgery.

Conclusion

Prophylactic antibiotic use in appendecectomy was incomplete, as 10% of patients had appendecectomies received no antibiotic at all. Patients who developed postoperative complications (such as ileus, pelvic collection and surgical site infection) were mainly those who had no antibiotics before surgery.

Recommendation

An agreed protocol for antibiotic use is needed to avoid erratic prescription of antibiotic. Also Patients should be followed up after discharge to assess for complication and review histology.

Limitations

Small data set
Incomplete data set for time period
No standard follow-up to fully assess complication.

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