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Antibiotic as First Line Treatment for Uncomplicated Appendicitis

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ABSTRACT

INTRODUCTION

The most common abdominal surgical emergency in the United States is appendicitis with the standard of care being laparoscopic appendectomy. Current research is evaluating whether antibiotic therapy is a comparable method of treatment for uncomplicated appendicitis. The bulk of this research concludes that antibiotic therapy is a safe and effective alternative to surgery. [1, 5, 7-10, 14, 15- 20] This disease was first described in 1886 by Reginald Fitz and antibiotics, on the other hand, were not discovered until 1928 by Alexander Fleming. Nevertheless, the treatment for appendicitis has remained surgical and has not evolved in the past century, even while treatments have changed for similar diseases.

There are other diseases with similar pathologies to appendicitis that have embraced conservative non-operative management including uncomplicated diverticulitis, salpingitis, and neonatal enterocolitis.[13] Research even suggest a common underlying pathogenesis of diverticulitis and appendicitis, but the treatments remains different.[6] Current research on diverticulitis is even reevaluating the need for surgery in recurrent cases, which is the standard of care today.[2] Even with advancements in surgical techniques such as laparoscopic surgeries, it is still preferred to treat diverticulitis medically then to risk surgical complications. Even though non-operative treatment has been proven safe and effective for diseases with the same pathogenesis the standard treatment for uncomplicated appendicitis remains surgical.

If antibiotic therapy were to be accepted in the US there are several likely benefits. The most obvious benefit would include a lower healthcare cost burden. The cost of surgical intervention compared to medical management is higher, and this cost places a higher financial burden on the patient and their family. Medical management would provide a safe and effective alternative for those who are at high risk for anesthesia complications or for those who are pregnant. There are also many rural facilities that may benefit if the area is not equipped with tools for surgery. It could provide a comparable alternative for

those who may not want to undergo surgery due to religious beliefs. Other benefits include less disruption of patient's day-to-day life and less stress on their families. Considering this, the goal of this article is to help determine whether the use of antibiotics compared to surgery for uncomplicated appendicitis affects the complication rate.

I. DISCUSSION

When choosing a treatment for uncomplicated appendicitis it is important to consider the possibility of recurrence. Many studies use recurrence rates as a benchmark in the success of treatment. When educating patients on any treatment modality it is also a common point of concern for them and their families. In a current multicenter, open-label, non-inferiority randomized clinical trial conducted from 2009-2012 in Finland the researchers enrolled 530 patients from ages 18 to 60 to participate in the study with a 1 year follow up.[5] All patients were confirmed to have acute uncomplicated appendicitis by CT scan. The primary results from the study were focused on the resolution of appendicitis. The surgical group had a 99% success rate with all but one patient with a successful appendectomy which met preset assumptions. It is reasonable to expect success of appendectomy to have a low recurrence rate, but the rates for the antibiotic group are what is remarkable. The antibiotic group had a 27% recurrence rate by the 1-year mark. The researchers did not stop at the 1-year benchmark of the original study. The same group recently published a 5-year observational follow up assessment. [10] This final assessment showed a recurrence rate of only 32.4%. Although surgery is the definitive treatment for appendicitis as well as many other common disease states it is not the only option. Many other similar studies, showed similar success rates of 70-98% with medical management. [1, 5, 7-10, 14, 15, 18-24]

Two high quality meta-analyses of surgical versus non-surgical random controlled trials reported that although appendectomy is more effective, even laparoscopic surgery has a higher complication rate compared to medical management.[9, 15] The researchers speculated that some patients would prefer to avoid an appendectomy due to rare, but serious potential complications of spinal or

general anesthesia, acute and chronic pain, and potential effects on quality of life. An additional article reported on nine random control trials. It was concluded that surgery ranked best for treatment success and recurrence, but ranked below antibiotic therapy for overall complications. The results included 23-86% fewer complications with antibiotic treatment compared to appendectomy with a recurrence rate of only 18.2% for the antibiotic only group.

Measurements of secondary complications were also taken into consideration which further illustrates the difficulties that are inherent to surgical treatment. This included a 20.5% overall complication rate of the surgical group compared to 2.8% of the antibiotic group by the one year follow up. Overall complications included surgical site infection, incisional hernia, and abdominal/incisional/obstructive symptoms. The 5 year follow up showed the overall complication rate of the surgical group climbed to 24.4% and the antibiotic group to 6.5%. Although both values increased over the years the surgical group continues to be significantly higher. Hospital stays were also statistically shorter for the antibiotic group. The median length of sick leave for the surgical group was 19 days versus only seven days for the antibiotic group. These outcomes would have a significant impact on a patient's quality of life. If patients chose non-surgical therapy they would potentially experience less pain and be able to get back to their activities of daily living much sooner than if the surgery option was chosen.

Post-surgical complications, as mentioned above, are common and typically non-life threatening. The most concerning complication, and cause of morbidity and mortality of appendicitis, is a perforation. Risk of perforation is the reason why appendicitis is considered a medical emergency. A common concern is that if uncomplicated appendicitis is not treated then it will inevitably progress to a complicated appendicitis and perforate. This however has not been shown to be the natural progression of the disease. Perforation is more often a prehospital event and observational analysis suggest that uncomplicated appendicitis may have differing underlying pathophysiology altogether [12, 4]. Therefore the goal for the clinician is to be able to accurately differentiate between the two pathologies.

There are several reliable scoring systems including the Alvarado score[17] and the Appendicitis Inflammatory Response (AIR) score that can be used as a first important step to provide an accurate diagnosis of acute appendicitis. There are additional available scoring systems that combine clinical features with CT/US with a 95% accuracy in differentiating uncomplicated from complicated appendicitis.[16] These systems use predictors such as lower temperature, lower Alvarado score, and smaller appendicular diameter.[18, 19] If these scoring systems are used appropriately then clinicians should be able to identify acute appendicitis and determine whether the patient needs surgery or if antibiotics as first line treatment is more appropriate.

It is also important to remember that there can be a massive financial burden on a patient and their family when seeking medical care at the emergency department. This is always a difficult position to be in. When there are multiple options for the patient to consider many questions and concerns about money may arise. Having to be admitted to the hospital comes with all of the physician fees, labs, imaging, and hospital operating costs. Treatment with antibiotics first can reduce the cost of treatment for uncomplicated appendicitis by 50% for the patient and the hospital.[1] Even if the antibiotic treatment fails and the patients require surgical rescue the average cost per patient is still less than if they were all treated with surgery. Therefore, from a socio-economic perspective antibiotic therapy is a better choice.

CONCLUSION

In medicine it is standard practice to have a stepwise approach to the treatment of disease. This includes starting with the least invasive treatment and if this fails to move to more intense treatment. One of the great parts of the medical field is the constant progression and striving for improvement. Unfortunately for appendicitis treatment this has not been the case. Most patients and clinicians, for that matter, believe that surgery is the only option for uncomplicated appendicitis. This is why surgery has maintained its status as the first line treatment. Recent research shows that going directly to surgery as a first line treatment for appendicitis may not be the one-size-fits-all standard of care in the future. The

researchers show that antibiotics will not replace laparoscopic appendectomies for complicated cases, but results do support antibiotic treatment as a safe and effective alternative for uncomplicated appendicitis.

Patients must be informed of all options. Appropriate data should be given to make the decision of whether or not to have an invasive procedure like surgery. Antibiotic only therapy has the potential to increase a patient's quality of life by reducing pain, decrease the risk of complications, and returning back to daily life sooner. It is also important to remember that an antibiotic first treatment is also less of a financial burden on the patient and their families. In order to make antibiotic therapy a more acceptable option for appendicitis, more research should include American studies, inpatient vs outpatient treatment, RTC studies to evaluate best practice antibiotic regimens, follow up care to reduce recurrence, precision etiologies and to evaluate medical therapies including anti-inflammatories or dietary interventions.

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