

To Determine the Correlation between Acute Appendicitis and Positive Family History

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Abstract

Morbidity and mortality are significantly associated with perforated appendicitis as compared to the non-perforated. The complications can be decreased if preventable measures are taken to avoid the delay in reporting patients to the health care services. To conclude, the correlation between acute appendicitis and family history is strong for the first and second degree, and clearly, it is more significant in patients who are below 30 years old. Clinically, it is believed that the family history of appendicitis may help the physicians or doctors in raising the index of suspicion of acute appendicitis.

Keywords: Laparoscopy; Peritoneal dialysis catheter; Urachus

Introduction

Background

Acute appendicitis is one of the most prevalent abdominal surgical emergency and its prognosis depends on the accuracy and early diagnosis [1]. Appendicitis occurs most frequently in the second and third decades of life.

The incidence is approximately 233/100,000 population and is highest in the 10 to 19-year-old age group [2]. The diagnosis of acute appendicitis and the required investigation modalities depends mostly on clinical judgment. The presence of the disease is not accurately predicted by any aspect of clinical presentation but the diagnosis can be supported well by the combination of different signs and symptoms. We have observed that many of the patients who were diagnosed with acute appendicitis were accidentally noticed to have a positive family history of the same disease. Family history is not usually accounted for during the initial evaluation of patients with suspected appendicitis.

Unfortunately, the diagnosis of acute appendicitis is still difficult and misdiagnosis is not uncommon in the emergency department. In addition to that, postoperative complications can be seen as a result of unwanted appendectomies, such as adhesion or infection. Moreover, appendix perforation and its consequences can be observed as a result of a lag in careful and accurate detection.

Therefore, the notion that appendicitis is familial, is not only important for understanding the etiology of the condition but might contribute substantially to the diagnosis and thus provide an indication for early surgical intervention. The desirable aspect for earlier and accurate diagnosis is to improve the accuracy. Presence of acute appendicitis can be detected by performing various tests.

In the etiology of acute appendicitis genetic factors have been involved. According to Basta et al., in a retrospective analysis of families of 80 patients with appendicitis when compared to families of matched controls a familial aggregation and polygenic transmission pattern were observed. They found the comparative risk is 10.0 (%95

Ci: 4.7-21.4): in other words, the chance of appendicitis was 10 times more in a child with at least one relative with a reported appendectomy, compared with that in a child with no affected relatives.

They also found that the proportion of relatives with appendicitis varied directly with the degree of relationship: 21% in first generation relatives, 12% in second generation relatives, and 7% in third generation relatives. A retrospective study dating 2007, on 2670 patients found that the increase in the relative risk of acute appendicitis is 3-15 times with a positive family history [3].

Firstly at 1937, Baker represented a family pedigree in which 50% of the members were operated for appendicitis [4].

Andersson et al. and also Arnbjorns- son showed a high rate of appendicitis among immediate family members [5,6].

Hiraiwa et al. found, in their large-scale study in Japanese families, that about 40% of children with both parents affected, and about 20% of children with one parent affected may develop acute appendicitis during childhood [7].

Environmental factors can explain the ancestral tendency to acute appendicitis, these factors include:

- Genetic difference in resistance to bacterial infection
- Certain food habits
- Specific bacterial infection

Importance

The diagnosis of acute appendicitis and the required investigation modalities relies heavily on clinical judgment. No single aspect of the clinical presentation can accurately predict the presence of the disease but a combination of various signs and symptoms may support the diagnosis. If it can be shown that family history increases the likelihood for the disease in adults as well as children, it will enhance the ability of the clinician to make the diagnosis on clinical grounds more confidently.

Purpose

In this study, we aimed to determine whether a positive family history of acute appendicitis would aid in diagnosing it clinically. The main aim is to find if there is a correlation between acute appendicitis and positive family history in our community.

Patients and Methods

The study was conducted at the Specialty Hospital in Amman, Jordan. Retrospective observational study. The medical records of the patients who underwent an appendectomy for the symptoms and signs of acute appendicitis and the appendix that was sent to histopathology were reviewed dating from 31/12/2012 till 31/12/2017.

The inclusion criterion includes:

- Patients who have undergone an appendectomy and had a histopathology report for the appendix
- Acute suppurative or early inflamed appendix on the histopathology report

The exclusion criterion includes:

- The absence of a histopathology report
- The absence of inflammatory evidence on the histopathology report
- Patients who did not respond to calls

Patients admitted to the Specialty hospital diagnosed with acute appendicitis were 650 in number and patients who have met the criteria of having a histopathology report for the appendix with acute appendicitis was 205. In conclusion, 205 cases were used in this study. The patients' group comprised of 147 patients, <30 years. And 58 patients, >30 years.

Statistical Analysis

The total number of patients was 205. Results from patients with histopathology proven appendicitis were obtained and the Chi-squared test was performed, and 95% confidence intervals (95% CI) were used.

As shown in the table (Tables 1 and 2), there were 92 patients (44.9%) with positive family history. Among those patients with positive family history of appendicitis, we tried to see how significant is the relation between patients and their relatives, also we compared results of patients with positive family history and their age distribution (below and above the age of 30 years).

| Classification | N | % |
|----------------|-----|-------|
| Positive | 92 | 44.9 |
| Negative | 113 | 55.1 |
| Total | 205 | 100.0 |

Table 1: Frequency and percent for family history.

| Classification | N | % |
|-------------------|-----|-------|
| Less than 30 year | 147 | 71.7 |
| 30 year or more | 58 | 28.3 |
| Total | 205 | 100.0 |

Table 2: Frequency and percent for age.

The statistically significant p-value of less than 0.05 was considered. A significant correlation between patients who had acute and appendicitis with first and second degree regardless of the age ($p=0.000$). More analysis of data was according to the age distribution, either below or equal and more than 30 years, 147 (71.7%) patients of positive family history of appendicitis were below 30 years of age, which supports the age pattern of the disease.

Age of the patient, less than 30 years, in correlation with the family history of acute appendicitis was significant in first-degree relative ($p=0.003$). On the other hand, in a patient less than 30 years, whom second-degree relatives had acute appendicitis, the relationship was insignificant ($p=0.051$).

Outcome Measure

We measured whether the proportion of patients having appendicitis and a positive family history was larger than the proportion of patients having acute appendicitis with negative family history.

Results

We enrolled 205 patients, who had acute appendicitis by histopathology, 92 of whom had a family history of acute appendicitis and the percentage was 44.9 %, and 113 who did not be 55.1%. Brother of the patient constituted about 9.8% of the total relatives of having positive family history in comparison to the other first degree relatives as shown in the table (Table 3).

| Classification | N | % |
|----------------|-----|-------|
| Brother | 20 | 9.8 |
| Sister | 17 | 8.3 |
| Father | 18 | 8.8 |
| Mother | 15 | 7.3 |
| Negative | 135 | 65.9 |
| Total | 205 | 100.0 |

Table 3: Frequency and percent for family history (first degree).

The correlation of acute appendicitis and family history in the first and second degree is clearly significant as shown in the following tables (Tables 4-6).

| Classification | N | % |
|----------------|-----|-------|
| Aunt | 8 | 3.9 |
| Grandmother | 3 | 1.5 |
| Negative | 171 | 83.4 |
| Uncle | 23 | 11.2 |
| Total | 205 | 100.0 |

Table 4: Frequency and percent for family history (second degree).

| First degree | Classification | Family history | | Total |
|--------------|----------------|----------------|----------|--------|
| | | Positive | Negative | |
| Brother | N | 17 | 3 | 20 |
| | % | 8.3% | 1.5% | 9.8% |
| Sister | N | 17 | 0 | 17 |
| | % | 8.3% | 0.0% | 8.3% |
| Father | N | 17 | 1 | 18 |
| | % | 8.3% | 0.5% | 8.8% |
| Mother | N | 15 | 0 | 15 |
| | % | 7.3% | 0.0% | 7.3% |
| Negative | N | 26 | 109 | 135 |
| | % | 12.7% | 53.2% | 65.9% |
| Total | N | 92 | 113 | 205 |
| | % | 44.9% | 55.1% | 100.0% |
| Chi-Square | 106.01 | | | |
| p-value | 0.000* | | | |

Table 5: Relationship between family history and family history (first degree).

| Second degree | Classification | Family history | | Total |
|---------------|----------------|----------------|----------|--------|
| | | Positive | Negative | |
| Aunt | N | 8 | 0 | 8 |
| | % | 3.9% | 0.0% | 3.9% |
| Grandmother | N | 2 | 1 | 3 |
| | % | 1.0% | 0.5% | 1.5% |
| Negative | N | 60 | 111 | 171 |
| | % | 29.3% | 54.1% | 83.4% |
| Uncle | N | 22 | 1 | 23 |
| | % | 10.7% | 0.5% | 11.2% |
| Total | N | 92 | 113 | 205 |
| | % | 44.9% | 55.1% | 100.0% |
| Chi-Square | 40.99 | | | |
| p-value | 0.000* | | | |

Table 6: Relationship between family history and family history (second degree).

The percentage of patients who were less than 30 years constituting about 71.7 had an increased incidence of acute appendicitis in comparison to patients who were more than 30 years constituting 28.3.

Furthermore, the correlation of age which was less than 30 years and family history of acute appendicitis was significant in the first-degree relative and was insignificant in the second-degree relatives as shown in tables (Tables 7-9).

| First degree | Classification | Age | | Total |
|--------------|----------------|-------------------|-----------------|--------|
| | | Less than 30 year | 30 year or more | |
| Brother | N | 9 | 11 | 20 |
| | % | 4.4% | 5.4% | 9.8% |
| Sister | N | 12 | 5 | 17 |
| | % | 5.9% | 2.4% | 8.3% |
| Father | N | 16 | 2 | 18 |
| | % | 7.8% | 1.0% | 8.8% |
| Mother | N | 15 | 0 | 15 |
| | % | 7.3% | 0.0% | 7.3% |
| Negative | N | 95 | 40 | 135 |
| | % | 46.3% | 19.5% | 65.9% |
| Total | N | 147 | 58 | 205 |
| | % | 71.7% | 28.3% | 100.0% |
| Chi-Square | 15.69 | | | |
| P-Value | 0.003* | | | |

Table 7: Relationship between age and family history (first degree).

| Second degree | Classification | Age | | Total |
|---------------|----------------|-------------------|-------------------|--------|
| | | Less than 30 year | Less than 30 year | |
| Aunt | N | 7 | 1 | 8 |
| | % | 3.4% | 0.5% | 3.9% |
| Grandmother | N | 3 | 0 | 3 |
| | % | 1.5% | 0.0% | 1.5% |
| Negative | N | 116 | 55 | 171 |
| | % | 56.6% | 26.8% | 83.4% |
| Uncle | N | 21 | 2 | 23 |
| | % | 10.2% | 1.0% | 11.2% |
| Total | N | 147 | 58 | 205 |
| | % | 71.7% | 28.3% | 100.0% |
| Chi-Square | 7.78 | | | |
| p-value | 0.051 | | | |

Table 8: Relationship between age and family history (second degree).

| Age | Classification | Family history | | Total |
|-------------------|----------------|----------------|----------|---------|
| | | Positive | Negative | |
| Less than 30 year | N | 72 | 75 | 147 |
| | % | 35.10% | 36.60% | 71.70% |
| Less than 30 year | N | 20 | 38 | 58 |
| | % | 9.80% | 18.50% | 28.30% |
| Total | N | 92 | 113 | 205 |
| | % | 44.90% | 55.10% | 100.00% |
| Chi-Square | 3.53 | | | |
| p-value | 0.06 | | | |

Table 9: Relationship between family history and age of the patient.

Discussion

Physical examination, correct history taking, and laboratory tests are often used to diagnose acute appendicitis. History taking and physical examination plays a vital role in predicting the diagnosis and thus the need for surgery in those patients. On the basis of established association with a positive family history in positive appendectomy cases as detected in this study, routinely inquiring during history taking for the presence of first or second-degree family history of acute appendicitis may help physicians in deciding to eliminate acute appendicitis and so may increase positive appendectomy rates and lowers misdiagnosis rates. In this study, a significant percentage of patients diagnosed with positive appendectomy had a positive family history. Most patients with a positive family history had a presentation of the diseases before the age of 30 years [8].

However, the limitations in this study were: Firstly, we were not able to confirm a positive histopathology report of acute appendicitis in family members of a patient whom underwent appendectomy in other hospitals and we relied on those patients' knowledge of their diagnosis postoperatively. As a result, the diagnostic value of positive family history may not come out high enough in clinical application.

Secondly, we were not able to reach all patients who underwent

positive appendectomies during the retrospective time frame set for our study to gather a larger number of cases.

Conclusion

Morbidity and mortality are significantly associated with perforated appendicitis as compared to the non-perforated. Measures to avoid the delay in reporting of patients at expert health care facilities should result in decreasing the incidence of these preventable complications.

In conclusion, there is a strong correlation between acute appendicitis and family history for the first and second degree, and clearly, it is more significant in patients who are below 30 years old and their first-degree relative has acute appendicitis. Clinically, we believe that family history of appendicitis may aid primary emergency physicians in raising the index of suspicion of acute appendicitis.

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Conflict of Interest

None

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