Evaluate the Cytokine IL-6 as an Inflammatory Indicator Against Isolated Parasites in Appendicitis Patients

Zeana sh. AL-Hindi  Abd alnabi J Abid
Dept. of biology  Coll. Of science for women  Univ. of Babylon
Zenn_4@yahoo.com  dr_almamory59@yahoo.com

Abstract
Appendicitis is one of most common abdominal pain requiring emergency surgery. Acute appendicitis is acute condition happened as a result of obstruction from parasites present. 114 blood sample were collected from patients who had undergone appendectomy operation at periods from 21-12-2010 to 1-4-2011 in General Teaching Hilta Hospital. This study is done to determine pathogenesis of parasites and determine type of immune statue for appendicitis caused by parasites by estimating concentrations of IL-6 as an immune marker. The rate of samples that gave positive for parasites isolate was 29.82%, while 70.14% parasitically negative, also the total number of isolated parasites was 7 genera.

The common isolated parasites were Entamebae histolotica 37.8%, Entrobius vermocalaris 35.1%, Schistosoma haematobium, Blantidium coli, Trichurus trichora,Giardia lamblia and Schistosoma mansoni in rate 5.4% for each one. Immunological tests to sera of patients with appendicitis refer to significance increasing in the concentration of IL-6 for all patients at different age groups, compared to control and the highest concentration of them in the age group 40-49 years (5.944 ± 0.004 pg/ml), the present study shows absence of parasite as causative for appendix infection in ≤10 age group. This study refers to the role of cellular immune response through appendix infection with different parasites incidence of appendicitis appear in both sex at same rate 50%. Appendicitis appear in all age groups the age period 10-19 show highly infection rate with parasite.

Keyword: cytokine IL-6, parasites in appendicitis, inflammatory indicator with appendixitis.

Introduction
Appendicitis is the most common abdominal emergency case and the most common cause of acute surgical abdomen associated with systemic inflammatory responses.(Smspo and Scholefield,2008). Appendicitis exhibits various clinical manifestation and therefore difficult in diagnosis (Fisher, 2000; Pasupati et al,2008), and also it occurs in approximately 7% of the population(Mowlavi et al, 2004). Appendicitis is triggered by a rise in the intraluminal pressure consequent upon obstruction (Wangensteen and Dennis,1985), microorganism, luminal mucus elaboration and inflammatory mediators all have roles in appendix inflammation , the
enteric parasites are one cause associated with appendix obstruction especially helminthes of common injury appendicitis (Martin and Gustafson, 1985), and the rate increases of intestinal parasites in the developing world, as observed in Nigeria, there is correlation between parasites and some appendicitis cases recorded a *Schistosoma spp.* a major cause in addition to the presence of some Protozoa (Pasupati *et al*, 2008; Oguntola *et al*, 2010).

The diagnosis of appendicitis is most commonly by detecting of immunological state of patients by evaluating some of cytokines concentration as a cellular immune response. Interleukine-6 one an important pro-inflammatory factor to acute appendicitis diagnosis through highest in its concentration and affected on other inflammatory factors as a systematic immune response and tissue damage in early time, as well as IL-6 have ability to estimated another cytokines secretion (Gurleyik *et al*, 2000; Almagor *et al*, 2005).

**Materials and methods**

1- The study included 114 patients with different ages undergoing appendicectomy at the General Teaching Hilla Hospital from 21-12-2010 to 1-4-2011, after recording information about patients.

2- Blood samples: 5ml of blood were taken from patient and isolated serum for immunological study. Swabs for inner surface of appendix were used for microscopic analysis and parasite diagnosis, after observing the appendix cavity macroscopically to ensure some helminthes infection.

3- Immunological test: The study contributed also measuring the concentration of interleukin-6 of infected and healthy by ELISA method according to the manufacturer's instructions.

**Statistical Analysis:**

Use the U.S. Census (spss 11) to perform statistical analysis, as analyzed the results using the design random full-scale analysis of variance and adopted the test less significant differences Least significant difference test (LSD) and table analysis of variance (ANOVA Table) below the level of significance 0.05 (Niazi, 2004).

**Results:**

Between December 2010 and April 2011 our study was carried out on 114 human patients with different ages and sexes, appendicitis appear in rate 50% for both sex (Figer 1). Also the study showed that the rate of samples that gave positive for parasites isolate 29.82% , while 70.14% piratically negative (figer 2).

**figer 1: Distribution of infection according to the sex**

**figer 2: percentage of parasites that diagnostic**
The total number of isolated parasites were 7 genera, was time, the common isolated parasites were *Entamebae histolotica* 37.8%, *Entrobius vermicalaris* 35.1%, *Schistosoma haematobium*, *Blantidium coli*, *Trichurus trichora*, *Giardia lamblia* and *Schistosoma mansoni* (figer 3).

**figure 3**: Types of isolated parasites

This study showed that parasites isolate appears in age ranged between 10-49 years, however, the incidence of inflammation increased in the rate 10-19 year, also all the parasite species presented in different shapes trophozoit, cyst or egg and adult (table 1),(figer3).

**Table (1): Total number of parasites isolates from appendix**

<table>
<thead>
<tr>
<th>Age group</th>
<th><em>E.vermicalaris</em></th>
<th><em>E.histolatica</em></th>
<th><em>Sch.haematobium</em></th>
<th><em>B.coli</em></th>
<th><em>T.trichora</em></th>
<th><em>G.lamblia</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>≤10</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10-19</td>
<td>2 adult</td>
<td>2trophozoite</td>
<td>1 egg</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3 egg</td>
<td>3 cyst</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-29</td>
<td>3 egg</td>
<td>2 cyst</td>
<td>1 egg</td>
<td>1 cyst</td>
<td>1 egg</td>
<td>1 trophozoite</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30-39</td>
<td>2 adult</td>
<td>2trophozoite</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 trophozoite</td>
</tr>
<tr>
<td></td>
<td>3 egg</td>
<td>2 cyst</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-49</td>
<td>0</td>
<td>2trophozoite</td>
<td>1adult+1 egg</td>
<td>1 cyst</td>
<td>1 egg</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>14</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

The results of the current study significantly increased (P <0.05) in the level of IL-6 and for all age groups of patients compared to control its subsidiaries through the use
of technology calibration absorbance linked immunoassay Enzyme - Linked Immunosorbent Assay (ELISA) (table 2).

Table (2): The level of IL-6 in patients with appendicitis:

<table>
<thead>
<tr>
<th>age group</th>
<th>Groups</th>
<th>Concentration of IL-6 pg/ml</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean ± S.D</td>
</tr>
<tr>
<td>10-19</td>
<td>Control</td>
<td>3.761 ± 0.816</td>
</tr>
<tr>
<td></td>
<td>infection</td>
<td>5.942 ± 0.005 *</td>
</tr>
<tr>
<td>20-29</td>
<td>Control</td>
<td>4.449 ± 0.761</td>
</tr>
<tr>
<td></td>
<td>infection</td>
<td>5.868 ± 0.179*</td>
</tr>
<tr>
<td>30-39</td>
<td>Control</td>
<td>2.578 ± 0.462</td>
</tr>
<tr>
<td></td>
<td>infection</td>
<td>5.942 ± 0.001*</td>
</tr>
<tr>
<td>40-49</td>
<td>Control</td>
<td>3.276 ± 0.428</td>
</tr>
<tr>
<td></td>
<td>infection</td>
<td>5.944 ± 0.004 *</td>
</tr>
</tbody>
</table>

*L.S.D under (P<0.05)= 4.348

Discussion:

Appendicitis, which affects about 10 percent of the population, is the most common reason for general emergency medical surgery. Our study has shown that parasite infection is a possible cause of acute appendicitis. Although the number of positive cases was not large enough to make a significant association, an incidence of 29.82%, while the highest rate was 70.14% act a negative parasitically. Recognizing that appendicitis is a complex disease that involves mechanical obstruction of the lumen, ischemia, thrombosis and bacterial overgrowth (Fernando et al, 2004; Preidt, 2010). The present study demonstrated that appendicitis was distributed in both human sexes at same rate 50% comparted to other studies, the same study also demonstrated that there was no large rate for parasite test with appendix infection (Pranesh et al, 2006; Pasupati et al, 2008).

Appendicitis appears in all age groups and the age period 10-19 show highly infection rate with parasite in time that absence of parasite as a causative for appendix infection in ≤ 10 years, can be attributed to eating food from variety sources whichmay be unhealthy while the child food already under housing control.

The prevalence of infection is related to several factors including nutritional habits, contact with soil, age, rural or urban settings and frequency of contact with domestic animals and climatic condition such as humidity (ALmusay, 2004).

Our study shows the parasite examination supported the diagnosis and explain inflammation state in appendix .Intestinal parasite such as worms persist and grow in all intestine sites that lead to full appendix cavity causing damage in its tissue, the high
prevalence of intestinal parasites in the developing world could also account for some cases of appendicitis, as it has been noticed to be initiated by or associated with them (Hill, 2000; Oguntola et al, 2010 ), although some study refer to presented parasite in appendicitis condition is very rare especially in developed countries (Terada, 2009).

Although the immune response in some parasite infection has been well characterized, the mechanisms involved in reactivation in humans are still unclear. Knowledge of the anti-parasite immune response is important. We addressed this issue by examining the specific human cellular responses by evaluation IL-6 concentration. Serum levels of IL-6 have a role in discerning the extent of disease in this condition (Yoon et al, 2002). The present study appears a significant increasing in the concentration of IL-6 for all patients with different age groups, compared to control and the highest concentration of them for the age group 40-49 years . Several studies have focused on the diagnostic value of IL-6 concentration in suspected appendicitis, comparing with patients of a normal control group (Erkasap et al, 2000; Yoon et al, 2002).

It has been shown that concentrations of serum IL-6 and IL-8 were elevated in adults with acute appendicitis, especially with perforation; and the serum IL-6 level is a valuable tool in diagnosing advanced appendicitis. But some findings had shown there was no correlation between IL-6 serum concentrations and the severity of appendicial inflammation(Almagor et al, 2005; Groselj et al, 2007). Many studies have investigated the value of raised IL-1 α levels in improving the diagnosis of appendicitis which aggregate with present study (Paajanen et al, 2002; Dalal et al, 2005). IL-6 have an important role in stimulating Th22 ,Th17 that secrete another set of cytokines that share in stimulating neutrophils and NK cells which provides extracellular microbes at the end by activity of macrophage (Kelso, 1995).

References


Preidt ,R. (2010). Study Questions Need for Emergency Appendectomies Appendicitis may have viral origins, researchers suggest. University of Texas South-western Medical Center, news release, Jan.18.


