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Original Research Article

Evaluate The Cytokine IL-1α as an Inflammatory Indicator against Isolated Fungi From Patients with Abdominal Pain

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Abstract

Acute abdominal pain generally refers to previously undiagnosed pain that arises suddenly and is of less than 48 hours. Fungal infections are considered as one of the most common causes in gastrointestinal disease, but virtually all fungi have been reported to cause infection in immune competent persons as well. Microbiological study was carried on 94 patients having abdominal pain by taking stool and blood from them. At periods from 9-2013 to 2-2014 in General Teaching Hilla Hospital..

This study is done to determine the pathogenesis of fungi and the type of immune statue for abdominal pain caused by fungi by estimating concentrations of IL-1α as an immune marker and immuonoglobulins IgG and IgM . The rate of samples that gave positive results for fungal isolate was 60% , while 40%were negative , also the total number of isolated fungi was 12 genera.

Cl.cladosporides have a highest rate of isolated fungi was 39.36%,another fungi also appear in stool samples were*Cl.nacrosporum*20.2% , *Al.alternata 13.82% , Candida spp. 11.7%, Cryptococcus 5.31% ,Penicilum2.12% ,Candida albicanus2.12% ,Aspergillus flavas,Aspergillus fumigates ,Candida trubicalis , Candida crusi and Aurobasidium pull* in rate 1.06% for each one. Immunological tests to sera of patients with abdominal disorder refer to significance increasing in the concentration of IL-1α for all patients at different age groups, compared to control and the highest concentration of them in the age group 19-26 years (51.371 ± 1.813pg/ml), The immunological study also included measuring the concentrations of each of the serum immunoglobulin IgG and IgM, the concentrations of highest 329 ±83.007, 1388.5 ± 391.645, mg / dL respectively, for different age groups and no significant difference compared with control for IgG while their present in IgM , This study refers to the role of both cellular and humeral immune response through fungal infection with different fungi.

Distribute the fungal infection appear in both sex at female60% and male40% .

Key words:IL-1α indicator, Abdominal pain, fungi isolation.

الخلاصة

يعد الم البطن من الاعراض التي يصعب تشخيصها وبتصاعد حدة الألم بصورة مفاجئة خلال 48 ساعة. الاصابات الفطرية هي احدى المسببات الأكثر شيوعا لأمراض الجهاز الهضمي , لاسيما لدى الاشخاص قليلي المناعة. جمعت 94 عينة خروج ودم من اشخاص يعانون من الآم البطن للفترة من 9-2013 إلى 2-2014 في مستشفى الحلة التعليمي العام .

اجريت الدراسة الحالية لتحديد الانواع الفطرية المسببة لآلام البطن وتحديد نوع الاستجابة المناعية من خلال تقدير تراكيز الانترلوكين-1 ألفا كمؤشر مناعي اضافة الى تحدي تراكيز الأجسام المضادةIgG , IgM

كانت نسبة العينات التي أعطت ايجابية للفطريات المعزولة 60٪، في حين أن 40٪ سلبي, كان إجمالي عدد الفطريات المعزولة 12جنس واكثر الفطريات شيوعا عند العزل كانت

*Cl.cladosporides*39.36% , *Cl.nacrosporum*20.2% , *Al.alternata 13.82% , Candida spp. 11.7%, Cryptococcus 5.31% ,Penicilum2.12% ,Candida albicanus2.12% ,Aspergillus flavas,Aspergillus fumigates ,Candida trubicalis ,* *Candida crusi and Aurobasidium pull* in rate 1.06%.لكل واحد. الاختبارات المناعية لمصول المرضى الذين يعانون من آلم البطن تشير إلى أهمية زيادة في تركيز IL-1 لجميع المرضى في مختلف الفئات العمرية، مقارنة مع سيطرة وأعلى نسبة منهم في الفئة العمرية 19-

26 عاما ، وتشير هذه الدراسة إلى دور الاستجابة المناعية الخلوية والخلطية من خلال وجود فروق معنوية للضد IgM وانعدامها للضد IgG للصابة الفطرية المختلفة .

تظهر الدراسة الحالية الى تنوع الاصابة الفطرية لدى كلا الجنسين وقد بلغت اعلى نسبة لها لدى الاناث بمعدل 60% في حين بلغت 40% لدى الذكور.

الكلمات المفتاحية:انترلوكين 1 الفا, الم البطن, عزل الفطريات.

Introduction

Acute abdominal pain generally defined as pain occur through less than one week's is a common presenting complaint among older patients [1], but not all microorganism which responsible about infection in about 10% of patients with chronic abdominal pain of unknown cause seen by gastroenterologists, this condition has received little research and clinical attention [2].

Complicated and diagnostic intra-abdominal infections and their pain problems in some patients might be affected by hospital resources, such as emergency department services, operating rooms, laboratory services and in hospital care of variable intensity [8], As well as the guideline which included diagnostic criteria for patients remaining not clear depending on symptoms, its interrupted with food allergy or other gastrointestinal disease, attacks less than few hours [9]. Associated gastrointestinal symptoms (e.g., nausea, vomiting, anorexia, diarrhea and constipation) often accompany abdominal pain, however, these symptoms are nonspecific and therefore may not be of great value in the differential diagnosis [10].

Fungal infections are not as easy to diagnose and treat as most bacterial infections. Both diagnostic and preparedness testing methods for fungi have not progressed as quickly as those for bacteria [3]. Fungal infections of the gastrointestinal tract can be divided into two categories: those caused by transmucosal invasion and those that disseminate following primary infection of another site [4].

Many researches referred to happen like this pain in all age groups, Chronic, recurrent abdominal pain occurs in 9-15% of all children and adolescents, in spite of the infections are limited recognition of among clinicians can be explained, Children with recurrent abdominal pain are typically referred to gastroenterologists, where organic causes are explored and it is considered as a rarely case [5]. Continuous or constant pain is pain that is present for hours or days without any period of complete it is more common than intermitted pain [6].

Acute abdominal pain is a common presenting complaint in older patients, It may reflect a major problem with one of the organs in the abdomen, such as appendicitis or a perforated intestine, or it may result from a fairly minor problem, such as excess buildup of intestinal gas [7].

Exploit the vulnerability microbes species when excess blockage to cause inflammation after infection and evidenced by divergent changes when testing in patients with immune appears clear changes in the standards of the humeral and cellular immune, also the diagnosis of abdominal pain may by detecting of immunological state of patients by evaluating some of cytokines concentration as a cellular immune response.Interleukine-1α one an important pro-inflammatory factor to diagnosis through highest in its concentration and affected on other inflammatory factors as a systematic immune response[11].

Materials and Methods

The study included 94 patients with age range (11-42) years of age , male and female, who have an abdominal pain at the General Teaching Hilla Hospital from 9-2013 to 2-2014. Swabs from patients stool were cultured to isolate fungi.

The isolation of fungi was done with Potato Dextrose Agar media, after isolation of all

fungal colonies in pure culture, all of them were visually examined for phenotypic characters like color, texture, exudates, growth zones, aerial/submerged hyphae, and macroscopic structures such as ascocarps, pycnidia, sclerotia, sporodochia, and synnemata. The final identification of fungi was performed by morphological examination of microscopic structures, particularly the spores and the conidia, using lactophenol and cotton blue[12,13].

Immunological study were contributed also will measuring the concentration of interleukin-1 alpha of infected and healthy by ELISA method according to the manufacturer's instructions. As well as measure the concentration of serum Immunoglobulins (IgG and IgM) quantitatively by Single Radial Immunodiffusion (SRID) or Mancini method.

Statistical Analysis

Using the U.S. Census (SPSS11) 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 [14].

Results

Between September 2013 and February 2014 our study was carried out on 94 patients with different ages and sexes, abdominal pain appear in rate 60% for female and 40% for males (Figure 1). Also the study showed that the rate of samples that gave positive results for fungal isolate were 60%, while 40% were negative (figure 2).

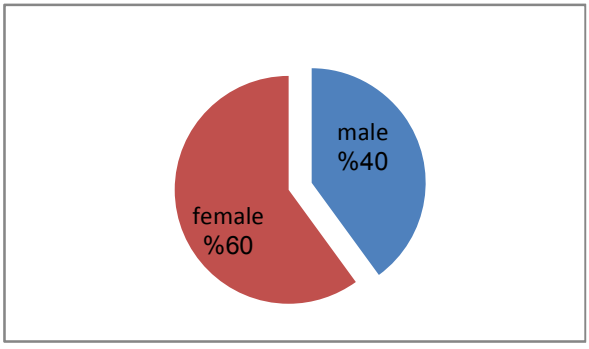

Figure 1: Distribution of infection

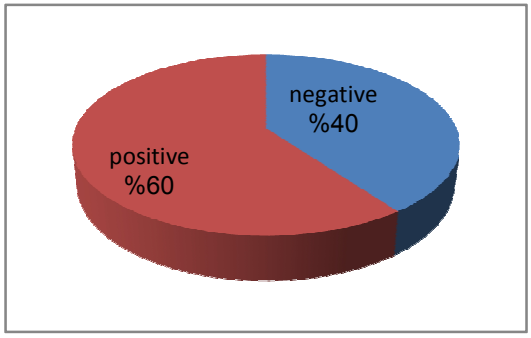

Figure 2: percentage of fungi that according to the sex diagnostic

The total number of isolated fungi were 12 genera, The most commonly isolated fungi were *Cl.cladosporides*39.36%, *Cl.nacrosporum*20.2%, *Al.alternata 13.82%, Candida spp. 11.7%, Cryptococcus 5.31%,Penicilum2.12% ,Candida albicanus 2.12%,Aspergillus flavas, Aspergillus fumigates, Candida trubicalis, Candida crusi and Aurobasidium pull* in rate 1.06% for each one(figure-3).

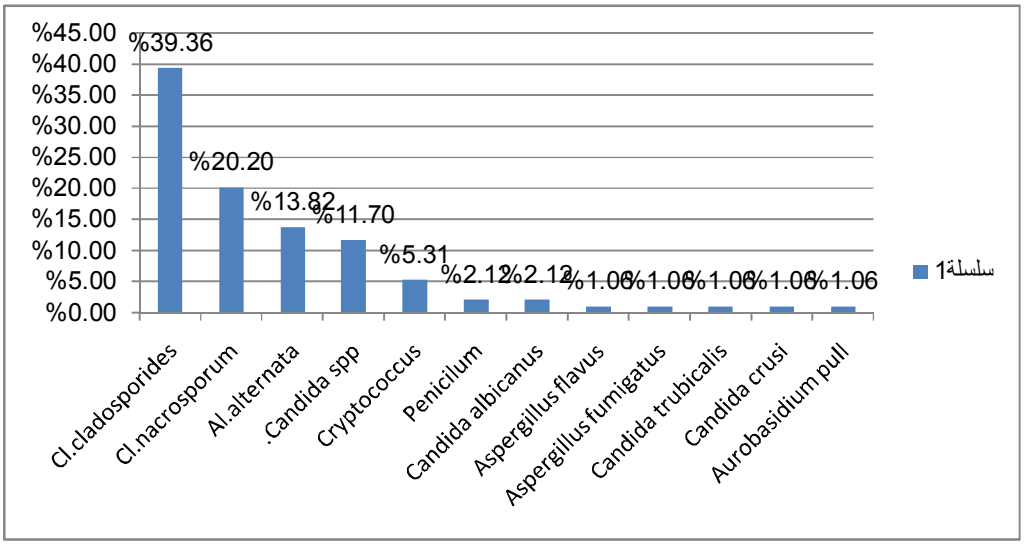

Figure 3: Types of isolated fungi

There is no significant difference between the age groups below the level of significance (P <0.05) for the concentration of immuonoglbulinsin serum for patients with abdominal pain when measured, has reached the highest concentration of IgGat the age group of 35-42,in the mean IgM level reported to present statistically significant difference under (p>0.05) between all age group, with the highest concentration at the age group of 19-26 (Table 1).

Table 1 : Effects of fungi infection on serum immunoglobulins

Age group	Group	Concentration of IgG* (mg/dl) M ± S.D	Concentration of IgM (mg/dl) M ± S.D
11-18	control	1927.95±375.827	274.4±53.598
	infection	1095.3±534.51	262.066± 80.178**
19-26	control	2519.366±759.428	240.95±100.904
	infection	939.1±403.029	329±83.007**
27-34	control	1821.1±907.412	65.633±44.672
	infection	1335.33±284.168	290.066±53.159**
35-42	control	1990.45±1127.481	140.65±40.941
	infection	1388.5±391.645	266.566±40.255**

*no statistically significant difference under (p>0.05)
** L.S.D under (p>0.05)=77.876

The results of the current study increased significantly (P <0.05) in the level of concentration of IL-1α 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), and the highest its levels appear at the age group of 19-26 (table 2).

Table 2: level of interleukin-1 alpha IL-1α in people with abdominal disorder

Age group	Group	concentration of IL-1α mg/dl M ± S.D
11-18	control	25.666 ±5.859
	patient	50.773 ±2.125
19-26	control	19 ±7.81
	patient	51.371 ±1.813
27-34	control	16.666±6.110
	patient	48.941±4.072
35-42	control	29.5±0.871
	patient	50.886 ±1.994

L.S.D under ($p>0.05$) = 7.518

Discussion

Abdominal pain appears as continuous or constant pain that is present for hours or days without any period of complete relief, it is more common than intermittent pain and certain types of pain are generally held to be typical of certain pathologic states [6]. Our study has shown that fungal infection is a possible cause of abdominal pain according to patients with deep fungal infection as it was found that 60% had gastrointestinal infection, other studies have reported a much lower overall fungal infection in such patients. The incidence of fungal infections has markedly increased in recent years. Several factors have contributed to this increase rate. These include greater use of immunosuppressive drugs; prolonged use of broad-spectrum antibiotics; widespread [15].Various infection rate and agent specific toxicity may occur, including super infection and organ toxicity or as apposite result for drug-resistant organism and selective pressure for resistance within unit or place [16.The present study demonstrated that pain with infection was distributed in both human sexes at 60% for female compared to other studies, because some fungi is a naturally occurring organism in the intestinal tract of the human body especially candidiasis occurs everywhere infects more than 30% of the world population, especially females [17]. Consider abdominal aortic aneurysm in the older patient with back or abdominal pain, particularly if they are male or have a history of tobacco use [7].

Abdominal pain with fungal infection appears in all age groups from (11-42) years in time that absence of fungi as a causative agent for infection in ≤ 10 years, can be attributed with chronic recurrent abdominal pain have a high utilization of healthcare resources especially in children. As is observed with other chronic pain syndromes, recurrent abdominal pain leads to significant disability, including interference with family, school, and social activities [18]. In older patients with intestinal infection diagnosis is correct only one half of the time, and there are increased rates of perforation and mortality when compared with younger patients, in spite of morbidity and mortality among older patients presenting with acute abdominal pain are high, and these patients often require hospitalization with prompt surgical consultation [7].

Our study shows, that the fungi examination supported the diagnosis and explain this state in abdominal pain by appearance of various fungi species with different patients, An important finding is that the pain may be so sharply localized that a patient can cover the tender spot with a fingertip, since intra-abdominal pain is usually not as sharply localized [18].Results of the present study indicated that Candida species have a highest rate with infection, that reveals *Candida* species are part of the normal flora in humans. They are commonly found on skin and throughout the gastrointestinal (GI) tract [19].While the *Aspergillus* lowest rate with

infection because Aspergillosis may be a fatal infection in immunocompromised patients, such as patients undergoing therapy for lymphoma, leukemia, carcinoma, or transplantation. Since *Aspergillus* spores are usually ingested by inhalation through a respiratory route, lung and cranial sinuses are common target organs. Moreover, organisms may invade adjacent vasculatures, resulting in hematogenous secondary dissemination to diverse organs, includingbrain, heart, eye, intestine, and bone [20].

Until recently developed diagnostic criteria were published, the existence immunological state with fungal infections was controversial, and therefore prevalence data were rare, after all that some studies introduced a comprehensive guideline which included valuable exclusionary criteria for patients with the following features: mild symptoms not interfering with daily activities, abdominal pain, symptoms consistent with food allergy or other gastrointestinal disease [9].Thus our study explore the immune response in patients serum by measuringimmunoglobulin concentration such as IgG and IgM . Serum concentrations of most antifungal agents are not routinely monitored. The relationship between clinical efficacy, susceptibility results, and plasma concentrations for fungi is not known[7].

Present studies pointed that IL-1α often form the initial and ineffective Precursor form and function and its effectiveness begins when you get infections require the intervention of cytokine activity vital to the immune response and thus unfolds IL-1α on the surfaces of cells and is prescribed in conjunction with the membrane and increases the amount of excreted with case inflammatory to protect Body [21]. IL-1 α have important role in stimulating Th17 that secrete another set of cytokines that share in stimulating neutrophil cells which provides extracellular bacteria at the end by activity of macrophage[22].

References

1. Di Lorenzo C. Chronic abdominal pain in children: A technical report of the American Academy of Pediatrics and the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition: AAP Subcommittee and NASPGHAN Committee on Chronic Abdominal Pain. J Pediatr Gastroenterol Nutr. 2005;40:249 261.

2. Di Lorenzo, C. (2005). Chronic abdominal pain in children: A technical report of the American Academy of Pediatrics and the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition: AAP Subcommittee and NASPGHAN Committee on Chronic Abdominal Pain. J PediatrGastroenterolNutr;40:249-261.

3. Srinivasan R, Greenbaum, DS.(2002). Chronic abdominal wall pain: a frequently overlooked problem. Am J Gastroenterol; 97: 824-30.

4. General Approach to Diagnosis of Fungal Infections of the Gastrointestinal

5. Russell G, Symon DN, Abu-Arafeh IA. (2007). The child with recurrent abdominal pain: Is it abdominal migraine? Br J Hosp Med;68:M110-M113.

6. Alex Nagle, MD. (2009). Acute abdominal pain.ACS Surg.; 10:1-17.

7. Diagnosis of Acute Abdominal Pain in Older PatientsCOREY LYON, LCDR, MC, USN, U.S. Naval Hospital Sigonella, Sigonella, ItalyDWAYNE C. CLARK, M.D., Fond du Lac Regional Clinic, Fond du Lac, WisconsinAm Fam Physician. 2006 Nov 1;74(9):1537-1544

8. Falagas ME, Barefoot L, Griffith J, Ruthazar R, Snydman DR. Risk factors leading to clinical failure in the treatment of intra-abdominal or skin/soft tissue infections. Eur J ClinMicrobiol Infect Dis 1996; 15: 913–21.

9. Dignan F, Abu-Arafeh I, Russell G. The prognosis of childhood abdominal migraine. Arch Dis Child. 2001;84:415-418.11.

10. Flasar, MH.; Goldberg, E. (2006). Acute abdominal pain. Med Clin North. Am.;90:481.

11. Paajanen, H.; Mansikka, A.; Laaaton, M.; Ristamaki, R.; Pulkki, K. and Kostiainen, S. (2002). Novel serum inflammatory markers in acute appendicitis.Scand. J. of Clin& Lab. Inves., 62(8): 579-584.

12. Finegold, S M.and Baron E J.(1986). Diagnostic Microbiology; 7th. Ed.;The C.V. Mosby Company U.S.A: 175-201.

13. Ellis, D.H. (1994). Clinical mycology. The human opportunistic mycosis.Pfrizer,New York.

14. Niazi, A.D. (2004). Statistical analysis in Medical Research. 2nd ed. Coll.of Med.,Nahrain Univ. Baghdad. P: 73-98.

15. Thomson W.H.F., Dawes R.F.H., Carter SStC. Abdominal wall tenderness test a useful sign in chronic abdominal pain. Br J Surg 1991;78:223- 225.

16. Wilton P, Smith R, Coast J, Millar M. Strategies to contain the emergence of antimicrobial resistance: a systematic review of effectiveness and cost-effectiveness. J Health Serv Res Policy 2002; 7:111–7.

17. Clinkscales, Cynthia. Healthy at Last: Solutions to chronic ill health, allergies and environmental illness. Arkansas: CECOM, 1990.

18. Enjoji M, Ohtsukasa S, Nagano H, et al. Localized small-bowel infarction caused by Aspergillus during chemotherapy for acute Fig. 1. (A) Histologic sections display dense neutrophilic infiltration in necrotic mucosa and muscularispropria. (B) *Aspergillus* fungi (inset) are stained with Gomorimethenamine-silver stain. Fungal hyphae are present in necrotic mucosa and ulcerative areas. A B 332 Bong-HeePark·JaeHeeSuh·HyeJeongChoi, et al. myeloid leukemia: report of a case. Surg Today 2008; 38: 449-52.

19. Noppadol, L.;Paisarn, B.; Wasana, K. (2013). Fungal appendicitis: A case series and review of the literature. 44(4);681.

20. Müller FM, Trusen A, Weig M. Clinical manifestations and diagnosis of invasive aspergillosis in immuno-compromised children. Eur J Pediatr 2002; 161: 563-74.

21. Baggiolini, M.; Dewald, B. and Moser, B. (1994). Interleukin-8 and related chemotactic cytokines-CXC and CC chemokines. Adv.Immunol ., 55: 97-179.

22. Kelso, A. (1995). Th1 and Th2 subsets: paradigms lost?. Immunol Today., 16:374–379.

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