Assessment of IL-6 , IL-23 and Serum amylase Levels in Patients with Enteric Fevers

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Abstract

The study was carried out during the period of March 2019-January 2020 for the detection of Salmonellosis in 102 suspected patients with age group ranged from 17 - 69 years, who attended Baghdad teaching hospitals, that had been examined and defined as suspected cases by a specialized physician with the recording of clinical manifestation. The diagnosis is done by the immunochromatography method, a blood sample was taken from each patient as well as other 30 healthy control matching in age and gender. The study included measurement of the level of interleukin -6,23 and Amylase activity in sera of patients and healthy control. The result indicated that anti –salmonella IgM positive in 54 cases, anti- salmonella IgG positive in 50 cases, and 18 positive cases with both IgM and IgG. The Level of interleukin 6,23 increased significantly while the serum amylase activity decreased significantly in patients sera in comparison with healthy control.

Key Words: *salmonellosis , IL-6, IL-23 , amylase, enteric fevers*

Introduction

Salmonella typhoid and paratyphoid are transmitted mainly by the fecal-oral route. In most cases an asymptomatic carrier of *S.typhi*, or an individual who has recently recovered from the infection, continues to excrete large numbers of organisms in the stool and contaminates food or water, either through direct food handling, through transfer of bacteria by flies and other insects, or by contamination of potable water and raw frozen chickens meat [1-4]. Patients with enteric fever present with a non-specific gradual onset of an influenza-like illness although *Salmonellatyphi* infection can present with fever and a bewildering array of signs and symptoms ranging. The clinical features of typhoid and paratyphoid fever are generally similar, although paratyphoid tends to be a more mild infection [5].

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Most from non-metastatic central nervous system syndromes including psychosis and cerebellar ataxia [6] through to focal involvement of bone [7], liver [8], spleen [9], testes [10], menninges [11], vascular prostheses, atheromatous plaques etc, [12].

In general the enteric fevers are sub-acute infections with an incubation period of approximately 7 - 14 days (range days) following exposure. The illness begins insidiously with non-specific signs and symptoms of fever , headache, muscle and joint aches, malaise, lassitude, anorexia, often a dry (cough sometimes associated with a sore throat [13]. The spleen enlarges, but lymphadenopathy is not usually prominent. Relative bradycardia is considered common in typhoid although in many series this has not been a feature of the disease. Some abdominal complaints are usual although either diarrhea or constipation may occur.

There is usually some abdominal discomfort, and even in the first week of the disease the patient may notice passage per-rectum of a small amount of blood

or melena. Normal bowel habit is unusual in typhoid diarrhea [3, 14].

Most salmonellae induce an acute inflammatory response, which can cause ulceration. They may elaborate cytotoxin that inhibits protein synthesis and contribute to the inflammatory response or to ulceration However, invasion of the mucosa causes the epithelial cells to synthesize and release various proinflammatory cytokines, including: IL-1, IL-6, IL-8, TNF- α, IFN-α, MCP-1, and GM-CSF. These evoke an acute inflammatory response and may also be responsible for damage to the intestine. Initial host responses involve neutrophil infiltration, followed by the arrival of Lymphocytes and macrophages. Occasionally, diffuse colitis occur mimicking inflammatory bowel disease [15].

Material and Methods

The study carried out during the period from (March 2019- January2020), studied group were involved Suspected patients their age range between 17-69 years. Blood samples were obtained from a total of 102 patients clinically suspected with Salmonellosis that had been examined and defined as suspected cases by specialized physician with the recording of clinical manifestation

Blood Samples

Five mL of venous blood was obtained from each patients and collected in sterilized screw cap plastic tube, blood samples were left for 30 min. at room temperature, then centrifuge at

3000 rpm for five minute, then the serum for each sample was collected in eppendorf tubes and then test for Salmonellosis (IgM and IgG) and stored in deep freeze at -20 °C until the time for using

Immunochromatographic assay

About 100 µl of serum from each sample was added to the sample hole of the kit. The colour density is proportional to the antibody titer. The complexes (appears in colour band after 10 minutes) confirm that the test was performed correctly. This CerTest-salmonella kit, which is qualitatively, determines the salmonella in blood samples. Pre-coating was achieved to the membrane proceeding to test band region to the monoclonal antibodies of the mouse, it was achieved against salmonella antigens. Through test, samples were reacted with conjugated colors' (anti-salmonella of monoclonal mouse microsphere (red antibodies)), the samples were dried before that, the combination then travelled to reach membranes via the act of capillaries. While samples move via the membranes tests, tinted particle were migrated. In positive results, certain antibodies that have existed on the membranes captured these particles which lead to appearance of red tinted line that can clearly observed while the other result appears in a green tinted line (the negative results that represent the control samples.

Immunological and Clinical biochemical tests

The level of interleukin 6, and interleukin-23are examined by Enzyme Linked Immunosorbent Assay (ELISA). Serum amylase Concentration determined according to manufactures instructions of Biosystem(Spain)

Statistical Analysis

The results were analyzed using statistical system SPSS version -18 (T-testing).

Result Serological tests

Serum level anti –salmonella IgM present in 54 cases with a percent of 52%, also, the level of anti – salmonella IgG present in 50 cases with a percent of 49 %.While the level of both IgG and IgM present in 18 cases with a percent of 17% (Table-1).

Table 1: Distribution of anti-Salmonella IgG and IgM antibodies using immunochromatography method

Anti-salmonella antibodies	Total	N	Positive %	N	Negative %
IgG	102	50	49	52	51
IgM	102	54	52	48	48
IgG+IgM	102	18	17	84	83

Interleukin-6

The level of IL-6 Increased siginifigantly($p \leq 0.05$) in patients with Salmonellosis in comparison with healthy control the value 23 pg ml for patients and 14.50pgmlfor healthy control respectively (Table 2).

Table 2: Concentration of Interleukins-6 pg ml in patients with Salmonellosis and healthy control

Groups	IL-6 Pg ml
Patients	23.0 ± 48.0
Control	14.50 ± 2.80

Interleukin-23

The level of IL-23 Increased siginifigantly($p \leq 0.05$) in patients with Salmonellosis in comparison with healthy control . the value 321 pg ml for patients and168pg ml for healthy control respectively (Table 3).

Table 3: Concentration of IL-23 pg/ml in patients with Salmonellosis and healthy control

Group	IL-23
Patients	321.0 ± 37.0
Control	168.0 ±18.0

Amylase activity

The activity of amylase decreased significantly ($p \leq 0.05$) in patients in comparison with healthy control (Table 4).

Table 4: Serum amylase activity in patients with Salmonellosis and healthy control

Groups	Amylase Uml
Patients	30.0+4.0
Control	67.0 +3.0

Discussion

Salmonella can both colonize and cause infections in humans and animals. Of interest, some Salmonella species appear to be better adapted to humans, and vice versa. For example, *S.typhi* does not have an animal reservoir and is solely transmitted by humans.

Most human cases of Salmonella involve ingestion of a contaminated food item, in particular, eggs, poultry, ground beef, or dairy products [16]. Salmonella can be acquired by direct personal contact, nosocomial transmission, or contaminated drugs/solutions [17].

The result indicated anti-salmonella IgG was 50 (49%) of cases while IgM was 54 (52%) cases by immunochromatography method (Table 1). Generally, the prevalence of infection is related to several factors including nutritional habits [18]. The increasing level of IL-6 in patients with Salmonellosis in comparison with healthy control(Table-2) may be due to ability of salmonella to up regulate of Th2 and down regulate of Th1 [18] INF- ɣ involved in clearance of infection and correlated with the protection from Salmonellosis infection [19, 20].

The increasing level of IL-23 may be produced mainly by activated antigen-presenting cells (APC) including dendritic cells (DC). The activation of DC plays a pivotal role in shaping the immune responses. Following the detection of microbial products , for example via TLRs, activated DC can provide signals to prime naïve T cells to mount appropriate adaptive immune response .in a general, Lps of Gram-negative bacteria prime DC for enhanced IL-23 expression Via production of prostaglandin E2 to induced both the expression of IL-23p19 and IL-12p40 without affecting IL-12p35 expression in DC [21]. The result show statically decreasing in serum amylase activity in patients with E.histolytica in comparison with healthy control (Table-4) may be due to the patients presenting dysentery –like infectious diarrhea and upper abdominal pain associated with pancreatitis or with loss of appetite [22].

Conclusion

The Levels of interleukin 6,23 increased significantly while the serum amylase activity decreased significantly in patients sera in comparison with healthy control.

Conflict of Interest: The authors declare that they have no conflict of interest

Source of Funding : Self –funding

Ethical Clearance: The researchers already have ethical clearance from [2]Biology Department, College of Science, Mustansiriyah University, Baghdad, Iraq

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