

Assessment of Renal Function Tests in Sudanese Patients with Recurrent Typhoid Fever in Kassala State, Sudan

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Abstract:

Background: *Typhoid fever is caused by Salmonella typhi bacteria. Typhoid fever is rare in industrialized countries. However, it remains a serious health threat in the developing world, especially for children. Typhoid fever spreads through contaminated food and water or through close contact with someone who's infected. Signs and symptoms usually include high fever, headache, abdominal pain, and either constipation or diarrhea. Most people*

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with typhoid fever feel better within a few days of starting antibiotic treatment, although a small number of them may die of complications. Vaccines against typhoid fever are available, but they're only partially effective.

Materials and Methods: *This is case control study aimed to measure of RFT (renal function test) urea and creatinine in fifty patient (50) with recurrent typhoid fever. People involved in this study aged (25-50) years Sudanese in Kassala state. The study period extended from march to November (2018), investigation were performed by using spectrophotometer. This assessed the measure of urea and creatinine in serum sample among (25) recurrent typhoid patient as study group and non typhoid patient as control group by using spectrophotometer.*

Results: *The study reflect that the mean and stander deviation of urea(5.39 mg/dl) and creatinine (0.135 mg/dl) in recurrent typhoid patient and the result obtained from control group revealed that the mean and stander deviation of urea (5.29 mg/dl) and creatinine (0.178 mg/dl) the mean conclusion derived from this study. There is significant effect in urea related to recurrent typhoid patient . And insignificant effect in creatinine level with p value (<0.05) .*

Key words: renal function tests, recurrent typhoid fever, Kassala State, Sudan

INTRODUCTION

Typhoid fever, also known simply as typhoid, is a bacterial infection due to *Salmonella typhi* that causes symptoms ⁽¹⁾. Which may vary from mild to severe and usually begins six to thirty days after exposure ^(2 ; 3). Often there is a gradual onset of a high fever over several days ⁽²⁾. Weakness, abdominal pain, constipation, and headaches also commonly

occur ⁽³⁾. Diarrhea is uncommon and vomiting is not usually severe ⁽³⁾. Some people develop a skin rash with rose colored spots ⁽³⁾. In severe cases there may be confusion ⁽³⁾. Without treatment symptoms may last weeks or months ⁽³⁾. Other people may carry the bacterium without being affected; however, they are still able to spread the disease to others ⁽⁴⁾. Typhoid fever is a type of enteric fever along with paratyphoid fever ⁽¹⁾.

The cause is the bacterium *Salmonella typhi*, also known as *Salmonella enterica* serotype typhi, growing in the intestines and blood ⁽³⁾, Typhoid is spread by eating or drinking food or water contaminated with the feces of an infected person, ⁽⁴⁾. Risk factors include poor sanitation and poor hygiene, ⁽¹⁾. Those who travel to the developing world are also at risk ⁽³⁾, and only humans can be infected, ⁽³⁾. Diagnosis is by either culturing the bacteria or detecting the bacterium's DNA in the blood, stool, or bone marrow ^(3,5). In 2013 there were 11 million new cases reported worldwide ⁽⁶⁾. The disease is most common in India, and children are most commonly affected ⁽¹⁾. Rates of disease decreased in the developed world in the 1940s as a result of improved sanitation and use of antibiotics to treat the disease ⁽⁴⁾. About 400 cases are reported and the disease is estimated to occur in about 6,000 people per year in the United States ^(3,7). In 2013 it resulted in about 161,000 deaths – down from 181,000 in 1990 (about 0.3% of the global total), ⁽⁸⁾. The risk of death may be as high as 25% without treatment, while with treatment it is between 1 and 4%. ⁽⁴⁾, Many studies said that typhoid fever can cause illness and abnormality in kidney. One of them suggest typhoid fever is likely important cause of acute renal failure. Also in 1992 in India one study said this disease is the causes of 16% of patients with

renal dysfunction ⁽⁹⁾. In 1998 Khan M et al show typhoid fever complicated by both oligourea and acute renal failure, suggest that disease cause glomerulonephriti ⁽¹⁰⁾, Hayashi M et al in 2005 reported that few cases in Japan was reported about acute nephritic syndrome associated with acute renal failure ^(10,11). Also Jhawar M et al 2010 reported typhoid fever associated with number of complication in India including acute renal failure ^(11,12).

MATERIALS AND METHODS

Case control study was conducted at in Sudan, Kassala locality (kassala hospitals) during the period from March to November 2018, 50 subject, divided into (25 patient with typhoid) and (25 normal) as control.

Samples collection

About 5 ml blood specimen was taken, centrifuged at 3000 rpm for 10 min and serum stored at -20°C until utilized. Ethical approval was obtained from Kassala university faculty of medical laboratory, informed consent was taken from each participant after the full explanations about the study.

Ethical consideration

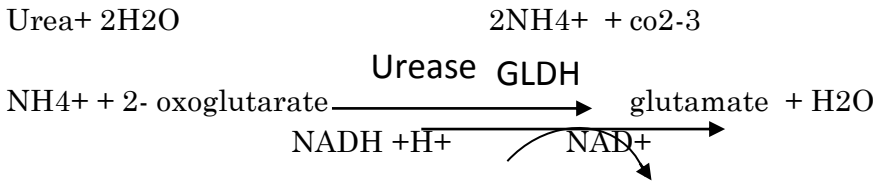
An ethical clearance of this study was approve by ethical committee of kassala university. In form consent was obtain from each participant and hospitals before taking the sample.

Measurement of Blood urea and Creatinine

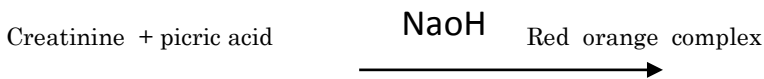
Use of enzymatic method to measure urea, and Jaff reaction method to measure creatinine.

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Principle of Urea : enzymatic method (berthelote reaction) :-



Principle of Creatinine : by Jaff reaction :-



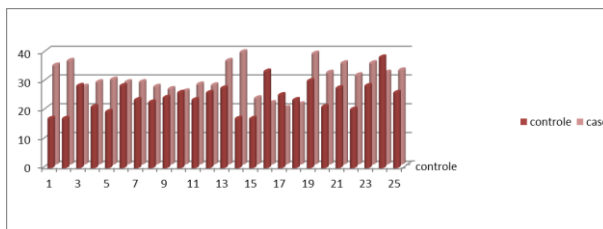
Statistical analysis

Data from all patients were presented as percentage and (mean±SD), differences between means of patients and control groups were considered statistically significant with p-value threshold <0.05 using independent T-test. Significant correlation (r) was calculated using linear correlation test.

Table (1): Concentration of urea level in patients with recurrent typhoid fever versus control group.

Variables	Case	Control	P value
Urea	Mean ± SD 29,7± 5,3	Mean ± SD 24,7± 5,2	.02

Result expressed as mean ± SD significant different concenter as p value <0.05.

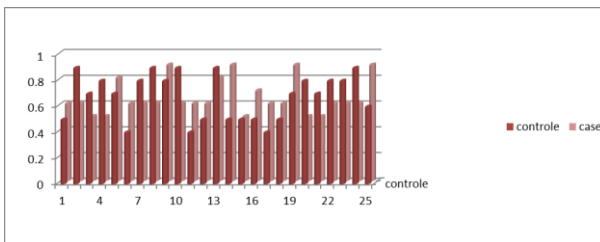


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Table (2): Concentration of creatinine level in patients with recurrent typhoid fever versus control group .

Variables	Case	control	P value
Creatinine	Mean ± SD ,648± ,135	mean ± SD ,676± ,178	,536

Result expressed as mean ± SD insignificant different concenter as p value <0.05.



DISCUSSIONS

When Salmonella penetrates the intestinal wall and enters the blood stream, it can trigger a potentially life-threatening disease. While many strains of Salmonella can cause invasive disease, typhoid fever due to Salmonella typhi is a classic example. About 2 to 3 percent of patients with typhoid fever develop kidney complications, according to a 2005 case report in Internal Medicine. Renal damage can occur in many ways: The toxins can cause direct injury to the kidneys' delicate filtering units; antibodies and other immune molecules can accumulate within the organs; or proteins from damaged skeletal muscles can plug the kidney tubules and damage them. Blood urea and Creatinine are useful biomarkers used in assessing specific function and integrity of the glomeruli. An increase level in these biochemical parameters in the plasma are linked to Glomerular damage. This study was done to evaluate Renal

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Function Tests among Sudanese patients with typhoid fever, (50 subjects were tested for RFTs, to assess their renal status during the onset of illness, as Blood urea, serum Creatinine mean+ SD obtained as (29.7 ± 5.3) , $(.648 \pm .135)$ respectively.

CONCLUSION

From this study it concluded that: In patients with typhoid fever the plasma level of serum urea are significantly increase within the normal rang and serum creatinine and all biochemical parameters used to evaluate the renal function.

Recommendations

From the results of this study, it is recommended that;

1. Renal function test should be investigated for patient with typhoid fever.
2. Further study should be done with high sample size to get more reliable and applicable result.

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