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RESEARCH ARTICLE

CLINICAL FEATURES AND HEMATOLOGICAL PARAMETERS IN SOME CHIKUNGUNYA PATIENTS, YEMEN

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Abstract

During march – May 2020, chikungunya (CHIK), an arboviral infection, has spread throughout the all area of Aden and Lahj governorate, infecting thousands of people.
The study investigated haematological parameters and Clinical features of CHIK virus infected patients attending outpatient clinic at Al-shafa and Algamaheer medical center, Aden and Lahj, Yemen. 50 selected patients within the age of 14- 60 years were involved in the study according to the clinical features. The most common feature of the CHIKV infection was arthralgia and high fever. Other clinical manifestations reported as, headache, joint pain, redness of joints , swelling of joints vomiting and Fatigue Blood samples were collected and analyzed using Sysmex automated haematology analyzer for CBC test.Results showed the emergence of lymphopenia (15.7 ± 6.18%) , neutrophils (73.8 ± 6.98%) and the complete white blood cell (WBC) counts was 4.8 ± 1.4 10^3/µL in patients. The platelets (PLT) counts ranged from 92-244 10^3/µL (mean: 160 ± 47.4x10^3/µL). The hemoglobin decreased in 30 % of cases and was about (10 ± 1.2 g/dl) in children. By day 5 of illness the neutrophil and lymphocyte count had recovered to normal range, but the arthralgia and joint pain was continued for weeks. In addition of Clinical features, the neutrophils and lymphopenia was the main hematological indices of CHIK, in lack of CHIK antigen detection.

Keywords: Chikungunya, Clinical Features, Hematological Parameters.

1. Introduction

Chikungunya virus (CHIKV) is an arthropod-borne virus that belongs to the Alphavirus genus which is transmitted to human by mosquitoes (*Aedes aegypti*). With a risk to spread globally, it is a re-emerging virus given the expanding dissemination of its mosquito vectors **[1]**. It was first recognized as a human pathogen during an outbreak of debilitating arthritic disease in 1952 in present-day Tanzania, after it was isolated from the serum of an infected patient **[2, 3]**.
Chikungunya disease is characterized by vast majority of symptoms including an acute illness notable for rapid onset of fever, incapacitating polyarthralgia and arthritis, rash, myalgia, headache, and polyarthralgia which is sometimes associated with rash. These symptoms intolerable usually resolve within weeks, but may last for months **[4]**.

The Acute CHIKV disease symptomatically resembles dengue fever, and retrospective case reports suggest that CHIKV outbreaks occurred as early as 1779 but were inaccurately attributed to dengue virus. Dengue and chikungunya are both vector-borne diseases found mostly in the tropical regions of Africa and Asia for decades. However, unlike dengue, a distinguishing feature of CHIKV disease is a recurring musculoskeletal disease primarily affecting the peripheral joints that can persist for months to years after acute infection **[5]**.
There are many factors that influence the geographical spread of both viruses, including vector distribution (both are spread by Aedes mosquitoes), human travel, urbanization, and climatic changes. Now, these two diseases can be found in many countries and challenge many clinicians because different clinical management is required for both of them even though their manifestations can be similar **[6]**.

In some cases, Chikungunya is asymptomatic – where people do not experience any symptoms. Those who do experience symptoms usually remain ill for 3-12 days after being bitten by an infected mosquito. Symptoms include sudden fever, severe muscle, joint pain, headache, fatigue, nausea, vomiting, and a rash. Although most patients fully recover, chronic joint pain may last for several weeks or months. Other persistent problems may include eye, gastrointestinal, neurological, and heart complications. People with chronic health conditions, a weakened immune system, infants, and the elderly are at a higher risk of developing infection complications. Chikungunya is rarely fatal and its treatment includes supportive care of symptoms. However, there is no antiviral treatment available **[4]**. The general laboratory diagnosis of Chikungunya often reveals lymphopenia, neutrophils and thrombocytopenia, an elevated creatinine, and elevated hepatic transaminases **[7, 8, 9]**.
An outbreak of CHIKV fever was poorly documented in Eastern Mediterranean Region of the World Health Organization (EMRO/WHO). Evidence of CHIKV in the region came from a serological survey done in 1983 in Pakistan and in 2005 from Sudan. In Yemen, the CHIKV was first confirmed in Al-Hodeida governorate in early 2011 with approximately 15, 000 cases including 104 deaths, and in 2012 was reported in the first outbreak of Chikungunya fever in Southern Yemen **[10, 11]**.

2. Materials and Methods

Among the suspected Chikungunya suffering disease cases, who diagnosed in Al-shafa medical center (Aden) and Al-Gamahir medical center (Lahj),Yemen during April- Maj 2020, 50 positive cases we selected (14- 60 years age). Haematological parameters were studied in such patients, 3 ml of blood was drawn in day 2 of illness and in day 5 from some patients (n= 5).The blood was collected into EDTA tubes and the blood count (CBC) was evaluated three times for the selected patients, using Sysmex automated haematology analyzer.

3. Statistical analysis

The resultant values were subjected to descriptive statistics and presented as mean ± standard deviation was using Microsoft Excel 2010.

4. Result and Discussion

4.1. Symptoms and clinical features

The symptoms of patients infected with CHIKV are presented in (table 1). arthralgia and high fever (about temperature: 38-39˚C) were the most common features of the CHIKV infection was, which found to be present in all selected patients. The arthralgic pain and continuous fever were more frequently reported during the first 2 days of infection in the infected persons. In adult patients (25-60 years) were suffering myalgia accompanied by arthralgia after 3 days of infection (table 1). The previously published reports have indicated that the combination of fever and severe arthralgia (present in more than 95% of cases) **[12, 13]**. Other clinical manifestations reported as, headache, joint pain, redness of joints , swelling of joints vomiting and fatigue for 3 to 5 days. In children reported rash on face, hands and legs. Several studies reported that, the fever lasts from several days up to a week is about 76-100 % of symptomatic patients, it can be continuous or intermittent with mild fever **[14, 15, 16, 17, 18]**.The headache, muscular pain, and joint pain of both upper and lower limbs were reported in previous studies associated by chikungunya infection **[19, 12]**.

Table 1: Symptoms of patients with Chikungunya infection

symptoms	Adult (25-60 yrs) N= 42	Children (14-22 yrs) N= 8
Fever	++	++
arthralgia	++	+
myalgia	++	
headache	++	++
joint pain	++	
redness of joints	+	
swelling of joints	++	
Vomiting	++	++
Rash		++

4.2. Hematological parameters:

During the day 2 of illness, the results of CBC showed, that a change in the rate of differential WBC level. We observed the rise of neutrophil percentage and decreasing in percentage lymphocytes and MXD (monocyte, basophil and eosinophil) table (2). These results are consistent with previous studies, which indicated that the emergence of lymphopenia and neutrophils in patients who were suffering with Chikungunya in America, Asia and Africa **[14]**.

The result of selected studied cases showed that, the complete white blood cell (WBC) counts ranged from 3 to 7.6 $10^3/\mu L$ (mean: 4.8 ± 1.4 $10^3/\mu L$), of which neutrophil (NTP) counts ranged between 46.8–87.3% (mean: 73.8 ± 6.98%) and lymphocyte (Lymp) counts ranged between 8-28.9% % (mean: 15.7 ± 6.18%) and MXD (monocyte, basophil and eosinophil) counts ranged

between 4.8- 19.1% (mean: 9.92 ± 4.5). The similar findings were reported by **[21]**, the neutrophils increased to 76.1% and lymphocytes decreased to 10.9% compared to normal range. The platelets (PLT) counts ranged from 92-244 10^3/µL (mean: 160 ± 47.4x10^3/µL) (table 2). By day 5 of illness the neutrophil and lymphocyte count had recovered to normal range (table 3), but the arthralgia and joint pain was continued for weeks **[4]**.

Among the studied cases, that shown a Chikungunya had significantly lower mean hemoglobin(10 ± 1.2 g/dl) in 30 % of cases, especially in children and the mean of hemoglobin was 12.39 ± 1.4 g/dl in 70% cases were within the recommended ranges (table 2). Ron et al **[20]** has shown that the lower mean hemoglobin presented in Chikungunya infected patients. The RBC count and percentage of hematocrit (Hct) in all cases were within the recommended ranges. Previous studies **[21, 22]** showed, that the differences that are most apparent at presentation are neutrophilia, lymphopenia and myalgia/arthralgia which were more likely to be present in chikungunya cases, while neutropenia, lymphopenia and thrombocytopenia were more likely to be present in dengue cases.

Table 2: Hematological Parameters of Chikungunya infected patients

Parameters	Mean ± SD	Normal Ranges
WBC	4.8 ± 1.4	4-10 x10^3/µL
RBC	4.74 ± 0.64	3.9- 6.00 x10^6/µL
Hb	12.39 ± 1.4	11- 16 g/dl
Hct	39.3 ± 3.8	34-51 %
NTP (%)	73.8 ± 6.98	40 – 70 %
Lymp (%)	15.7 ± 6.18	20 – 45 %
MXD (%)	9.92 ± 4.5	4 – 17 %
PLT	160 ± 47.4	150 – 450 x10^3/µL

Table 3: Comparison between Hematological Parameters in the Day 2 and Day 5 of illness

Parameters	Day 2 of illness	Day 5 of illness	Normal Ranges
	Mean ± SD	Mean ± SD	
WBC	6.41 ± 1.4	5.05 ± 1.24	4-10 x10^3/µL
RBC	4.62 ± 0.38	4.64 ± 0.6	3.9- 6.00 x10^6/µL
Hb	12.85 ± 0.85	12.28 ± 0.8	11- 16 g/dl
Hct	38 ± 3.5	35.42 ± 2.7	34-51 %
NTP (%)	76.6 ± 7.16	56.86 ± 5.8	40 – 70 %
Lymp (%)	14.23 ± 6.2	30.04 ± 6.14	20 – 45 %
MXD (%)	10.07 ± 3.84	13.3 ± 2.59	4 – 17 %
PLT	217.88 ± 52	296.4 ± 64.69	150 – 450 x10^3/µL

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مقالة بحثية

المظاهر السريرية و المؤشرات الدموية لبعض مرضى الشيكونجونيا، اليمن

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الملخص

خلال شهر مارس – مايو 2020 انتشرت الشيكونجونيا وهي عدوى فيروسية في جميع مناطق محافظتي عدن ولحج، مما ادى اصابة الالاف الاشخاص.
بحثت الدراسة الظواهر السريرية والمؤشرات الدموية للمرضى المصابين بفيروس الشيكونجونيا (Chikungunya) الذين حضروا العيادات الخارجية في مركزي الشفاء (عدن) والجماهير (لحج) الطبيين، اليمن. تم اختيار 50 مريضا تتراوح اعمارهم بين 60-14 سنة مصابا لهذه الدراسة وفقا المظاهر السريرية، كانت المظاهر الاكثر شيوعا لمرض التشيكونجونيا هي الالم المفصلي والحمى الشديدة، بالإضافة الى اعراض اخرى تم الابلاغ عنها: الصداع، احمرار المفاصل، تورم المفاصل، التقيؤ والتعب. تم جمع عينات الدم وتحليلها باستخدام جهاز تحليل الدم الالي لاختبار CBC. اظهرت النتائج انخفاض معدل خلايا الدم البيضاء اللمفاوية (6.18% ± 15.7) وزيادة في معدل خلايا الدم البيضاء المتعادلة (6.98% ± 73.8). بلغت خلايا الدم البيضاء الكلية (10^3/µL 1.4 ± 4.8) في المرضى. تراوحت اعداد الصفائح الدموية بين (10^3/µL 92-244) بمعدل.(mean: 160 ± 47.4x10^3/µL). انخفض الهيموجلوبين في 30% من الحالات وكان (g/dl 1.2 ± 10) عند الاطفال. في اليوم الخامس من المرضى تعدلت مستويات كريات الدم اللمفاوية والمتعادلة الى المعدل الطبيعي، لكن استمرت الألم المفاصل لأسابيع او شهور. تعد المظاهر السريرية، زيادة خلايا الدم اللمفاوية وانخفاض عدد خلايا الدم اللمفاوية مؤشرات رئيسية في الدم للتحري عن مرض التسيكونجونيا في ظل غياب الكشف المستضد (الانتيجيني) لمرض الشيكونجونيا.

الكلمات الرئيسية: الشيكونجونيا، الظواهر السريرية، المؤشرات الدموية.