

Detection of kala-azar among children in Al Muthanna province

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Zahraa Abd ALHamza Abbass

University of Al Muthanna / college of Medicine

E mail: zahraaabbas_msh@yahoo.com

Abstract:

The current study was conducted in Al Muthanna province to detect the Kala-azar infection among children. Result showed that the total infection rate of kala-azar was 17.75%. The age showed the higher infection rate in age (1- <2) year and the lower infection rate in age (4 – 5) year ,The difference was statistically significant ($p<0.01$).Result appear higher infection rate in male 55.26% than female 44.37% , There is no significant difference ($p<0.01$). distribution of kala-azar by region showed the infection rate in rural area 65.78% is higher from urban area 34.21% , The difference was significant between rural and urban area ($p<0.01$). prevalence kala-azar by months of year appear that higher infection rate in march 35% then November 27.27% then January 26.66% and decreases infection in July, The difference was significant among month year ($p<0.01$).

Key word :Kala-azar ,visceral leishmaniasis ,*Leishmania donovani* , Phlebotomine sandflies.

Introduction

Visceral Leishmaniasis or kala-azar is a systemic protozoan disease that is caused by obligate intracellular protozoan parasite of genus *Leishmania donovani*, that is transmitted by Phlebotomine sandflies (9).VL is a worldwide distribution and fatal if left untreated, clinical signs and symptoms include prolonged fever, hepatosplenomegaly, substantial weight loss, progress anemia even death.(2,1) VL is an endemic disease in Aegean Mediterranean basin, in Iraq is usually detected in infants and children and considered infantile type World health at (2002) (17,19).distribution of *Leishmania* depend on presence vector (sand fly) that's depend on presence favor condition for growth and proliferation and domestic animals or rodent as reservoir host (9).accurate diagnosis is an important tool in the control of disease the diagnostic method of Leishmaniasis is microscopic examination ,culture, direct agglutination test (DAT),Enzyme linked immune sorbent assay(ELISA),Immuno –fluorescent antibody test (IFAT) and polymerase change reaction (PCR),These Techniques require a wealth technical expertise ,time consuming expensive and the result are potentially biased because of the isolation and in vitro maintenance procedures (10,18) .sensitivity is low and highly variable , in intended use SD bioline *Leishmania* Ab test is an one step in vitro immun-chemtographic assay designed for qualities' determination of anti *Leishmania* in human serum or plasma .this test strip contains a membrane which is precoated with the recombenent *Leishmania donovani* rK39 antigen on test line region , Antibodies to *Leishmania* in the specimen react with the recombenent *Leishmania donovani* rK39 anti gen colloidal gold The SD bioline *Leishmania* antibody rapid test can detect anti *Leishmania* in the serum or plasma specimens with the high degree of sensitivity and specificity (8,16).

Material & Methods

Blood sample collected from al Muthanna province and then centrifuge to get serum specimen and examined by using Leishmania rapid test

A: Specimen collection: 214 samples were collected during the period from January 2012 until January 2013. then the serum collect. The whole blood stored in the collection tube (not containing anticoagulant) by veiny puncture leave to settle for 30 mint to blood coagulation and then centrifuge blood to get serum specimen of supernatant

B: The specimen examined by use the Leishmania rapid test

Procedure:

1. all kit components and specimen allowed to room temperature prior to testing
 2. 3 drops (approximately 100 ML) of assay diluent were added in to the test tube
 3. 20 ml of drawn serum with the 20 ml capillary pipette were added in to the test tube
 4. the test strip Removed from the foil pouch prior to use
 5. Holding the strip vertically insert the test strip in to the test tube containing diluted specimen
 6. As the test began to work, appear purple color move across the result window in the center of the test strip
 7. Interpret test result at 10-15 mint
 8. A positive result will not change once it has been established with in 15 mint , whoever in order to prevent any incorrect result
 9. The test result should not be interpreted after 15 mint
- Depending on Prenciple of Kit manufactured by Stander diagnostic (SD Leishmania antibody)

statistical analysis

The statistical analysis was performed by the chi square (signification level $p < 0.01$).

Results:

A total of 214 blood sample collected from children suspected of visceral Leishmaniasis.

Table (1) total infection rate of kala-azar in children in Al-Muthana province

| No. of all samples | No. of infected samples | Infection rate% |
|--------------------|-------------------------|-----------------|
| 214 | 38 | 17.75 |

Results showed the total infection rate of kala-azar 17.75% in table (1)

Table (2) Distribution of kala-azar according to age among children in Al-Muthana province

| Age group | No. of infected samples | Infection rate% |
|-----------|-------------------------|-----------------|
| <1 year | 6 | 15.78 |
| 1-<2 | 14 | 36.84 |
| 2-<3 | 7 | 18.42 |
| 3-<4 | 7 | 18.42 |
| 4-5 | 4 | 10.52 |
| Total | 38 | 100% |

$\Sigma X^2=20.5$, $df= 4$, $P\leq 0.01$

Table (2) showed distribution of kala- azar by age among children the higher infection rate in age group (1- <2) year and the lower infection rate in age group (4 – 5) year ,The difference was statistically significant ($p<0.01$).

Table (3) Distribution of kala-azar according to Gender among children in Al-Muthana province

| Gender | No. of infected samples | Infection rate% |
|--------|-------------------------|-----------------|
| Male | 21 | 55.26 |
| Female | 17 | 44.73 |
| Total | 38 | 100% |

$\Sigma X^2=1.00$, $df= 1$, $P\leq 0.01$

Table(3) showed distribution of kala- azar by gender the higher infection rate in mal 55.26% than female 44.37% , There is no significant difference ($p<0.01$).

Table (4) Distribution of kala-azar according to region among children in Al-Muthana province

| Region | No. of infected samples | Infection rate% |
|------------|-------------------------|-----------------|
| Rural area | 25 | 65.78 |
| Urban area | 13 | 34.21 |
| Total | 38 | 100% |

$\Sigma X^2=10.24$, $df=1$, $P\leq 0.01$

Table 4 showed distribution of kala- azar by region the infection rate in rural area 65.78% is higher from urban area 34.21% , The difference was significant between rural and urban area ($p<0.01$).

Table (5) Distribution of kala-azar according to months of year among children in Al-Muthana province

| Months of year | No. of collected samples | No. of infected samples | Infection rate% |
|----------------|--------------------------|-------------------------|-----------------|
| January | 15 | 4 | 26.66 |
| February | 20 | 5 | 25 |
| March | 20 | 7 | 35 |
| April | 38 | 6 | 15.78 |
| May | 20 | 4 | 20 |
| June | 10 | 1 | 10 |
| July | 13 | 0 | 0 |
| August | 16 | 1 | 6.25 |
| September | 15 | 1 | 6.66 |
| October | 13 | 1 | 7.69 |
| November | 22 | 6 | 27.27 |
| December | 12 | 2 | 16.66 |
| Total | 214 | 38 | 100% |

$\Sigma X^2=51.79$, $df=11$, $P<0.01$

Table 5 showed distribution of kala-azar by months of year appear that higher infection rate in march 35% then November 27.27% then January 26.66% and decreases infection in July, The difference was statistically significant among month year ($p<0.01$).

Discussion

The infection rate was 17.75% this rate showed decreased the infection in Al Muthanna province compared with study of Rashed for the period 1999-2003 that showed increase of visceral Leishmaniasis in the middle and southern governorates of Iraq (Wasit , Thiqr ,Mysan ,Basrah and Al muthanna)(15) and also disagreement with infection rate in Thiqr 47% and Babil 41.5% may be because presence of reservoir or domestic animal in addition to presence of sand fly (2,20) presence of domestic animal or rodent as reservoir for the Leishmania play a role in infection with the kala-azar (12, 5) , although the visceral Leishmaniasis is widely spread in the middle and south parts of Iraq is due to adaptation of the vector sand fly in these area but recorded lower rate in Al Muthanna province because decrease rain that lead to decrease in humidity therefore non-proliferation of sand fly . The infection rate of Leishmaniasis according to age group recorded incidence in age (1- <2) year was 36.48% and less rate in age (4-5) year was 10.52% ,this result agreement with (6) in Wasit 37.9% but disagreement with (6) in Baghdad , the increase of infection rate in age (1- <2) because the activity and movement of children that reach him to external environment may contain vectors in addition to the immune system not develop but the age (4-5) have develop immune system (12). The infection rate according to the gender showed nearly similarity of infection in male 55.26% and female 44.73% , this study recorded no relation between the infection rate and the gender (3,11) and agreement with the result of (6,4,13) , Because the infection depends on a person's exposure (male or female) for biting of sand fly(phlebotomus) carrier infective stage of *leishmania* and status of immune system of the host (10)

The infection rate according to region appear high incidence of infection in rural area 65.78% than 34.21% in urban area may be due to presence of sand fly in farm also humidity increase the growth and reproduction for sand fly (7), in addition to presence of domestic animals and rodent that played as reservoir for leishmania (13).

The distribution of visceral leishmania according to months of year showed high rate in winter (march 35% then November, January and February) 27.27% , 26.66% and 25 % respectively and decrease in July is 0 % because the infection related with favorable environmental condition such as humidity help to proliferation of sand fly (14,21).

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الكشف عن الكالا ازار بين الاطفال في محافظة المثنى

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زهراء عبد الحمزة عباس
جامعة المثنى / كلية الطب

E mail: zahraaabbas_msh@yahoo.com

الخلاصة :

اجريت الدراسة الحالية في محافظة المثنى للكشف عن الكالازار بين الاطفال. أظهرت هذه الدراسة نسبة الإصابة الكلية %17.75. بالنسبة للعمر كانت اعلى نسبة اصابة في الفئة العمرية (<2 - 1) سنة واقل نسبة اصابة في الفئة العمرية (5 - 4) سنة وكان هذا الاختلاف معنوي تحت مستوى احتمال ($p < 0.01$). اوضحت النتائج عدم وجود فرق معنوي تحت مستوى احتمال ($p < 0.01$) بين الذكور والاناث حيث كانت نسبة اصابة الذكور اعلى من اصابة الاناث وهي على التوالي %55.26 و %44.37. اظهرت النتائج انتشار مرض kala-azar في المناطق الريفية %65.78 وهو اعلى من المناطق الحضرية %34.21 هذا الاختلاف معنوي تحت مستوى احتمال ($p < 0.01$). اوضحت النتائج اعلى نسبة للإصابة في شهر تشرين الثاني %35 واقل نسبة في شهر تموز %0 وكان الاختلاف في النسب معنوي تحت مستوى احتمال ($p < 0.01$).

الكلمات المفتاحية: الكالازار، اللشمانيا الاحشائية، لشمانيا دونوفاني، ذبابة الرمل