

SEROLOGICAL STUDY OF RIFT VALLEY FEVER IN CERTAIN PROVINCES OF EGYPT

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ABSTRACT

A total of 300 blood samples were collected from patients oh fever and eye hospitals of certain localities (Alexandria, El-Beheira and Kafr-El-Sheikh provinces) during the period of 2002/2003 and screened by means of ELISA for the detection of IgM and IgG antibodies of Rift Valley fever. The obtained results revealed that the overall incidence of RVF antibodies was 9.66%. Moreover, RVF antibodies were detected in males (10.83%), females (7.21%) , Patients below and over 20 years (10.17 and 9.54%), in rural area (11.63%), in peri-urban areas (4.7%), among abattoir workers (27.27%), Veterinarians (16.16%), laboratory workers (13.04%), farmers (9.16%), in autumn (14.66%), summer (13.33%), winter (6.66%), spring (4%), in febrile patients (11.55%) and retinitis cases (4%). The public health importance of RVF among human beings as well as the suggestive control measures was discussed.

INTRODUCTION

Rift Valley fever is an important zoonotic viral disease that affects domestic animals and humans. In humans, Rift Valley fever causes a flu-like disease but occasionally leads to high morbidity and mortality (Morens, 1979). In addition, RVF causes great economic losses due to abortions and heavy mortalities in young animals (Digoutte and Peters, 1989). The disease is generally known in the African continent. In Egypt, Iman and Darwish (1977) mentioned that the RVF disease was reported for the first time in October (1977) in Sharkia Governorate as an extensive epizootic resulting in abortions and high mortality rate in animals with extensive human illness. In addition, Arthur et al. (1993) recorded that RVF disease has been recovered in man and domestic animals in Egypt (started in Aswan Governorate) after 12 years absence of human infection. However, cases of epidemic RVF were recognized in Saudia Arabia and Yemen in mid September

2000 amongst livestock animals and human beings causing severe illness (Jup, et al., 2000).

Gerard, et al. (2002) reported that high viraemia, multiple vector species and broad host range result in a pathogen with high possibility of geographic spread. It has been recorded that RVF is transmitted to humans probably through mosquito-bites, exposure to infected blood, body fluids or drinking raw milk from infected animals (Balkhy and Memish, 2003).

FAO (2002) stated that RVF diagnosis by Enzyme linked immunosorbent assay (ELISA) systems which detect anti-RVF immunoglobulin M and G (IgM and IgG) have replaced the previous methods for the investigation of RVF. They added that IgM antibody may persist for up to nine months after the infection. Our study was conducted to investigate the distribution and the current status of RVF in Lower Egypt by detection of anti-RVF IgM and IgG among patients in fever and eye hospitals. In addition, the current study may contribute to the evaluation of the preventive measures available to overcome such hazard in order to promote human health.

MATERIALS AND METHODS

A total of 300 blood samples were collected from patients of fever and eye hospital located in Alexandria (80 patients), Behera (155 patients) and Kafr-Elsheikh (65 patients). The registration of the obtained data was based on the age, sex, occupation, animal exposure, season and mosquito prevalence beside the clinical syndrome (Table 1).

1 - Blood samples were collected by vein puncture from the forearm vein (5 Cm) using vacutainer tubes. The samples were allowed to clot at room temperature for 30 minutes. Sera were separated by 10 minutes centrifugation at 1000 rpm and kept in labeled vials at -20 until examined.

2 - Samples were examined using ELISA assay. ELISA has gained acceptance as a simple, safe, rapid and reliable diagnostic tool for the detection of anti-RVF IgM and IgG (Niklasson, et al., 1984, Meegan and Bailey, 1988). The detection of IgM antibodies (IgM M chain capture ELISA) and IgG antibodies (human RVF IgG ELISA) were performed according to Niklasson, et al., (1984) and Namru-3 (1998a, 1998b).

3 Statistical analysis : the data were analysed by commercially available computer soft ware (SPSS.9.0, Maxell). The ELISA IgG and IgM results were pooled together to indicate a positive diagnosis of RVF and the rates of infection (%) were compared for differences $P < 0.05$ according to season, occupation (t-test) and places of residence (F-ratio).

RESULTS AND DISCUSSION

Rift valley fever in animals showed 1-3 days incubation period with fever (40.5-41-5C). Young animals suffer from anorexia and listlessness which usually followed by collapse and death. In adult and older sheep, the fever is accompanied by raised respiratory and heart rate, occasionally colic, nasal discharge, hemorrhagic gastroenteritis followed by recumbence and death (FAO, 2002). In man, the incubation period of RVF is approximately 3-4 days followed by a sudden onset of malaise, fever, chills and headache. The involvement of additional organs may result in meningoencephalitis, retinitis, hepatitis and kidney dysfunction (Pittmann, et al., 2000).

The results presented in Table (2) showed that the incidence of RVF antibody was 10.83 and 7.21% in examined male and female patients respectively. In addition, IgM and IgG were detected in males at percentage of 4.92 and 5.91 while in females were 2.06 and 5.15% respectively. The higher proportions of infection in males than females are in agreement with those recorded by Madkour (1979) and Naguib (1993). In the other hand, these results disagree with MOH (1993) who reported the similarity in RVF incidence in both sexes. This difference in the incidence between male and female might be due to the male occupations (veterinarians, abattoirs, workers, laboratory workers and farmers) which increase the frequency of contact with infected animals and infectious materials.

RVF antibodies were detected in age group below 20 years and over 20 years old at percentage of 10.17 and 9.54 respectively (Table 3). While the incidences of IgM and IgG in patients below 20 years were 5.08 and 5.08% respectively, while for those over 20 years were 3.75 and 5.81 % respectively. Although the current results revealed the similarity between the two age groups, these results disagree with those reported by MOH (1993) and Naguib

(1999) who found that more than 80% of the positive samples occurred among 20-60 years of age.

In addition, the RVF infection in humans was found to be significantly higher in rural area (11.63%) than in peri-urban area (4.7%) (Table 4). These differences between the two groups might be due to the nature of the rural areas as the people of these areas are at more risky factors (contact with infected animals and infectious materials, exposure to mosquito bites and sleeping outdoors). This confirm the report by Swanepoel (2002) who suggested that RVF disease in Egypt is a rural and semi-rural disease and does not cause problems in towns and cities.

The data presented in Table (5) showed the incidence of RVF antibodies in relation to occupation in which among abattoir worker (27.27%), followed by veterinaries (16.66%), laboratory workers (13.04%), farmers (9.16%) and housewives (4.68%). These results suggest that occupation as well as the nature of the living area (mosquito population and farm animals) is two important factors in the incidence of RFV disease.

Based on the season, the results presented in Table (6) showed that significant higher incidence of RVF in autumn (14.66%) and summer (13.33%) than other seasons which might be attributed to the weather temperatures and mosquito prevalence. In addition, this kind of weather enhances the people of these areas (rural and peri-rural) to sleep outdoors which considered being a risk factor for the disease occurrence. These results were nearly similar to the results obtained by Naguib (1999).

The results in Table (7) stated that RVF antibodies were detected in febrile patients at percentage of 11.55% which include persistent fever (9.33%), encephalic syndrome (1.33%) and hemorrhagic syndrome (0.89%) and in patients with retinitis (4%). However, FAO (2002) revealed that RVF clinical syndromes were not found typically as described in 1977 or 1993 epidemic in Egypt. This may be due to genetic variations in the genome circulating virus. On the other hand, Mostafa, et al., (1996) described only three clinical syndromes of RVF infection, febrile, ocular and encephalitis.

From the obtained data the following recommendations are suggested to avoid public health hazards. These recommendations include regular vaccination of the animals, immunization of high risk people, vector control, and quarantine of imported animals and keeping of livestock in mosquito-proof stables.

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Table (1): Number of blood samples collected from patients distributed across different factors under investigation.

Locality	Season				Sex		Age (Years)		Occupation				Clinical picture				Sampling area				
	Autumn	Winter	Spring	Summer	Male	Female	> 10 - 20	> 20 - < 60	Farmer	Housewives	Veterinarians	Laboratory	Butchers	other	Fever	Encephalitis	Haemorrhage	Eye Lesions	Rural	Peri-urban	
Alexan- dria	Fever Hospital	8	5	8	9	17	13	3	27	11	8	3	2	0	6	0	0	0	30	18	12
	Eye Hospital	13	11	16	10	36	14	8	42	17	7	4	6	3	13	37	10	3	0	32	18
Behera	Fever Hospital	24	32	26	28	74	36	22	88	58	21	3	8	5	15	84	20	6	0	91	19
	Eye Hospital	14	10	10	11	29	16	6	39	18	10	0	2	0	15	0	0	0	45	29	16
Kafir Eshsheikh	Fever Hospital	16	17	15	17	47	18	20	45	27	18	2	5	3	10	49	8	3	0	45	20
Total	300	75	75	75	75	203	97	59	241	131	64	12	23	11	59	175	38	12	75	215	85

Table (2): Incidence of IgM and IgG to Rift valley fever virus in relation to sex.

Sex	No. of examined Samples	Seropositive					
		IgM		IgG		Total	
		positive	%	positive	%	positive	%
Females	97	2	2.06	5	5.15	7	7.21
Males	203	10	4.92	12	5.91	22	10.83
Total	300	12	4.00	17	5.66	29	9.66

Table (3): Incidence of IgM and IgG to Rift valley fever virus in relation age.

Age group (Years)	No. of Samples	Seropositive					
		IgM		IgG		Total	
		positive	%	positive	%	positive	%
<10 - 20	59	3	5.08	3	5.08	6	10.17
> 20- > 60	241	9	3.73	14	5.81	23	9.54

Table (4): Incidence of IgM and IgG to Rift valley fever virus in relation to sampling area..

Sex	No. of Samples	Seropositive					
		IgM		IgG		Total	
		positive	%	positive	%	positive	%
Rural	215	10	4.65	15	6.98	25	11.63
P-urban	85	2	2.35	2	2.35	4	4.70
Total	300	12	4.00	17	5.66	29	9.66

Table (5): Incidence of IgM and IgG to Rift valley fever virus in relation to occupation.

Occupation	No. of Samples	Seropositive					
		IgM		IgG		Total	
		positive	%	positive	%	positive	%
Abattoir workers	11	2	18.18	1	9.09	3	27.27
Farmers	131	4	3.05	8	6.11	12	9.16
Housewives	64	2	3.13	1	1.55	3	4.68
Laboratory workers	23	1	4.34	2	8.69	3	13.04
Veterinarians	12	1	8.33	1	8.33	2	16.66
Others	59	2	3.38	4	6.77	6	10.16
Total	300	12	4.00	17	5.66	29	9.66

Table (6): Incidence of IgM and IgG to Rift valley fever virus in relation to season.

Season	No. of Samples	Seropositive					
		IgM		IgG		Total	
		positive	%	positive	%	positive	%
Summer	75	4	5.33	6	8.00	10	13.33
Autumn	75	5	6.66	6	8.00	11	14.66
Winter	75	2	2.66	3	4.00	5	6.66
Spring	75	1	1.33	2	2.66	3	4.00
Total	300	12	4.00	17	5.66	29	9.66

Table (7): Incidence of IgM and IgG to Rift valley fever virus in relation to clinical picture.

Clinical Picture	No. of Samples	Seropositive					
		IgM		IgG		Total	
		positive	%	positive	%	positive	%
Febrile illness	225	12	5.33	14	6.22	26	11.55
Persistent fever	175	10	4.44	11	4.89	21	9.33
Encephalitis	38	1	0.44	2	0.89	3	1.33
Haemorrhagic fever	12	1	0.44	1	0.44	2	0.89
Eye lesion (retinitis)	75	0	0	3	4.00	3	4.00
Total	300	12	4.00	17	5.66	29	9.66

الملخص العربي

دراسة سيروولوجية عن مرض حمى الوادى المتصدع لبعض المحافظات فى مصر

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تم جمع عدد 300 عينة دم من مرضى مستشفيات الرمد والحميات بمناطق مختلفة (محافظات الإسكندرية / البحيرة / كفر الشيخ) خلال الفترة 2002 / 2003م . فحصت العينات باستخدام إختبار الإمتصاص الإنزيمى المناعى للكشف عن وجود الأجسام المناعية المضادة لفيروس حمى الوادى المتصدع. وقد أسفرت نتائج الفحص أن نسبة 9.66% من العينات تحتوى على الأجسام المضادة لفيروس حمى الوادى المتصدع. ولقد وجدت الأجسام المناعية فى الذكور (83 و10%)، الإناث (21 و7%)، المرضى أقل وأكثر من 20 سنة (17 و10 & 54 و9%)، فى المناطق الريفية (63 و11%) وشبه الحضرية (7 و4%)، عمال المجازر (27 و27%)، البيطريين (16 و16%)، فنيين معامل (4 و13%)، مزارعين (16 و9%)، فى الخريف (66 و14%)، الصيف (33 و13%)، الشتاء (66 و6%)، الربيع (4%)، فى الحالات المصابة بالحمى (55 و11%) والتهاب العين (4%). هذا وتم مناقشة النتائج من حيث الوبائية والأهمية الصحية لمرضى حمى الوادى المتصدع وكذلك الإجراءات التى يجب اتباعها لتجنب الإصابة بهذا المرض.
