

**A COMPARATIVE STUDY OF IGM CAPTURE ELISA
AND PARTICLE AGGLUTINATION ASSAY FOR THE
DIAGNOSIS OF JAPANESE ENCEPHALITIS AMONG SOME
NEPALESE PATIENTS**

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ABSTRACT

Japanese encephalitis (JE) is one of the serious public health problems particularly in the Terai regions of Nepal. At present, diagnosis of JE in Nepal is particularly based in the clinical diagnosis. Laboratory diagnosis is made with IgM-capture ELISA in few referral centres, which require sophisticated equipment, costly and time consuming. Recently, a simple particle agglutination assay (PA) had been developed to diagnose JE, which can be done anywhere, does not require sophisticated equipment and can be done at room temperature. This study was conducted to evaluate the particle agglutination assay as a diagnostic method to detect anti-JEV antibodies in human serum samples.

In the study, a total of 279 serum samples were collected. PA was compared with IgM-capture ELISA in 263 serum samples of suspects of Acute Encephalitis Syndrome (AES) and viral fever. Of these 138(52.5%) serum samples showed positive result for JE by PA among which 106 serum samples (77% of PA positive) were also positive by IgM-capture ELISA method. Among 263 serum samples, three of the serum samples were JE negative by PA while positive by IgM-capture ELISA. One hundred twenty two samples were JE negative by both PA and IgM-capture ELISA.

PA showed 97% sensitivity and 79% specificity in comparison with IgM-capture ELISA for diagnosis of JE. A positive predictive value of 0.77 and negative predictive value of 0.98 was observed in comparison with IgM-capture ELISA. The result was compatible in comparison with IgM-capture ELISA. To know the cross reactivity, sixteen laboratory confirmed samples of Dengue, Malaria and other infectious diseases were examined for JE by PA. Maximum cross reactivity against dengue was observed with qualitative assay by PA. However with quantitative assay for JE and dengue by PA far greater titre was observed with dengue. Both PA and IgM-capture ELISA showed cross reactivity with Malaria. Since IgM-capture ELISA also showed cross reactivity with Malaria, there is a chance of mixed infection of JE with Malaria. This study showed that particle agglutination assay could be used in rural areas of Nepal for laboratory diagnosis of JE.

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LIST OF ABBREVIATIONS

ABC	Avidin biotin system
AES	Acute encephalitis syndrome
AFP	Acute flaccid paralysis
Cx.	<i>Culex</i>
CDC	Centre for Disease Control and Prevention
CF	Complement fixation
CFR	Case fatality rate
CI	Case incidence
CNS	Central nervous system
CSF	Cerebrospinal fluid
DoHS	Department of Health Services
E	Envelope protein
EDCD	Epidemiology and Disease Control Division
ELISA	Enzyme Linked Immunosorbent Assay
Ha-Ny beads	Hydroxyapatite- coated nylon beads
HI	Haemagglutination Inhibition
hMDF	Human macrophage derived factor
HMIS	Health management Information System
IFA	Indirect fluorescent antibody
IgG	Immunoglobulin G
IgM	Immunoglobulin M
IPD	Immunization preventable diseases

JE	Japanese encephalitis
JEV	Japanese encephalitis virus
MAb	Monoclonal antibody
MAC-ELISA	IgM antibody capture ELISA
MoHP	Ministry of Health and Population
NS	Non-structural protein
NTA	Neutralization assay
PA	Particle agglutination assay
PCR	Polymerase chain Reaction
PHK	Primary Hamster Kidney
PrM	Pre-membrane protein
PRNT	Plaque reduction neutralization test
RT-PCR reaction	Reverse transcriptase polymerase chain
SEARO	South East Asian Regional Office
SLE	St. Louis encephalitis
UTR	Untranslated region
WDR	Western Development Region
WHO	World Health Organization
WNV	West Nile Virus

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