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Outbreak of Japanese Encephalitis in Sangli District India

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Abstract:

A survey study of Japanese Encephalitis was conducted in Sangli district during the years 1997 to 2004. Five cases of JE have been reported during the year 1997 and one case in year 2002. However adopting various control measures such as spraying, fogging, biological control, piggary control and sanitization etc has controlled the disease of the region. No incidence of Japanese Encephalitis was noticed after the year 2002. Details of outbreak of Encephalitis, its control measures have been discussed in the paper.

Key words - *Japanese Encephalitis, Sangli district,*

Introduction:

Sangli district is situated in western Maharashtra, 395 km away from Mumbai. The area of the district is 8577 sq. km divided into 9 talukas and population is 2581835 (2001sensus). In the district natural environment includes annual rain fall varies from 500 to 900 mm much precipitation during the month May to September, temperature varies 14^{0c} to 38^{0c} and relative humidity varies from 40 to 70. The man made environment includes 120320 hector-irrigated area and major and minor 60 irrigation project and unprotected water reservoirs favors the vector breeding.

It causes acute inflammatory disease of short duration involving parts of brain, spinal cord and meninges. The disease affects central nervous system and can cause severe complications. The fatality rate of this disease was high, 20 to 40%; children suffer the highest attack rates because of lack of cumulative immunity due to natural infection. The

incubation period in the man varies from 5 to 15 days. The average period between the onset and death is about 9 days.

Indian strain of Japanese encephalitis virus (JEV) is GP78, which is phylogenetically closer to the Chinese SA14 isolate. JE is a zoonotic disease and generally maintained in natural cycle involving mosquitoes as vectors and ardeid birds as reservoirs. Pigs act as amplifier host i.e. reservoirs, they do not manifest the disease; they develop very high titers of virus in circulating blood and infect mosquitoes. Man is "dead end" host because of transient and low levels of viraemia. After 5 to 15 days virus invades the central nervous system and cause the disease.

JE virus has been isolated from 10 species of the genus *Culex*, 2 species of *Anopheles* and 3 species of *Mansonia* in India (Gajanana and Reuben, 1997). Majority of isolates are from *Culex vishnui* group comprising of *Cx. tritaeniorhynchus, Cx. vishnui, Cx. pseudovishnui*. Most of the JE virus isolations have come from *Cx. Tritaeniorhynchus*. The vector mosquitoes are mainly outdoor resters and the density of mosquito shows a rising trend from August, reaching the peak during September.

Material and Methods:

Study area: The Sangli district contributes the Valley of river Krishna and its tributaries are one of the greenest and irrigated area and other hand Jath Atpadi and Kavathe Mahankal talukas were the drought prone area. Four patients admitted in Civil Hospital, Sangli showed the symptoms of JE. The fever mass surveillance was carried out in 53 wards of Municipal Corporation and 16 villages from rural area. The serum sample of these suspected cases were collected and examined for JE. 7 to 10 ml blood was collected and serum was separated and tested to Mac Elisa IgM, IgG for antibodies reaction. Those who were suspected and found positives of JE shifted to isolation ward in Civil Hospital. The survey of private hospitals for tress out the suspected JE patients was carried out. To detect the early warning signals for an outbreak and effective control measures epidemiological, entomological, laboratory and veterinary-based surveillance was monitored.

Results and Discussion:

During the survey studies (1997 to 2004) 49 suspected cases have been reported, out of which 43 were in 1997 and 6 in 2002. Positive cases for JE reported were 5 and 1 in the years 1997 and 2002 respectively. The patients of age group 5-14 were more suspectible for JE and 1-4 was less suspectible. There was no death observed in the outbreak. The following control measures for JE have been suggested for appropriate control of JE.

1. District Level review committee was established to handle the situation.
2. The control room was established in District Malaria Office, Sangli and one isolation ward was reserved for management of JE patients.
3. Action plan has been prepared and responsibilities were handed over to regional officers and staff for

surveillance. Rapid fever mass survey was carried out to detect the JE patients, simultaneously the blood smear for malaria detection were collected, total 762 blood smears were collected and examined for malaria all of them are found to be negative.

4. **Vector control** - Because of the exophilic nature of the vector, residual spraying of insecticides and fogging operation may have only the limited role in JE.The Culex density per man hour of affected area of district is as follows, in area Kalikhan Adult Culex density 15.4, Gaonbhag 8.4, Khanbhag 4.00, Indiranagar 7.2, Kundal 5.6, Erandoli 6.0 and Budhgaon 8.4 was observed.

   A) **Fogging**: Malathion was used for fogging to cover 63619 populations. Three rounds twice in week was carried out to control the mosquitoes.

   B) **Spraying** : The spraying of D.D.T.50% was carried out in 10144 houses with coverage 74.5%.

   C) **Impregnation of Bed Nets** – Total 558 Bed nets were impregnated in synthetic pyrethroide flow.

   D) **Larval control** – Total 293 breeding sites were enumerated and introduced the guppy fishes, larvicidal activity and engineering methods.

5. **Cleanliness Drainage & Gutters**: Special drive was carried out to clean the gutters and drainage. The garbage collection campaign was carried out in the city during this period total 718 Metric tones garbage was collected & destroyed.

6. **Control of Pigs** - in the district there was no centralized pig rearing, the pigs were scattered, Municipal Corporation detect the 12000-pig density, but only 684 Pigs were collected & transferred them in Chandoli Forest by Corporation.

7. **Mass Approach** - the District Administration, General Hospital & Municipal Corporation wide Publicity were given about the sign & symptoms, preventive measures of J.E. through the Press Conference, Pamphlets & Handbills. Preventive measures for J.E. adopted in 2002 are as follows,

In Walwan village 30 blood smear were collected and examined for malaria, all of them were found negative. 6 serum samples were collected and tested for MAC Eliza. Two round of fogging of King fog was carried out and in 18 breeding places the guppy fish were introduced.

The capacity of vector to transmit the disease results from the interaction between the environment, both natural, man made, and genetically determined characteristics. Irrigation system have often led to a vast increase of malaria and arboviral vectors and enhanced disease transmission. Breakdown of social order has an impact on disease itself with increased vector breeding through

disruption of agriculture and water management increases in man vector contact through destruction of housing and cattle and increased inter mixing of both non immunes and reservoirs of infection. This belt is associated with unusual monsoon rains and other socio-economic factors, changing the scenario at regular interval. In endemic areas, sporadic cases may occur throughout the year due to congenial climatic conditions throughout the year.

The spraying mosquito habitats with insecticide was time consuming, expensive, it is difficult to cover all mosquito habitats, and causes environmental pollution Mosquitoes bite at dusk before people are in bed so there was no use of bed nets. Pig controls including segregating, slaughtering, or vaccinating pigs were economically not feasible and difficult also. Other animals, like birds, may also act, as amplifying hosts so even if pigs are eliminated JE will not disappear so above solutions were not the best solution to eliminate the JE. Human vaccination is the only effective long-term control measure against JE. JE vaccines currently available in 2 categories inactivated vaccines and Live, attenuated vaccine. Live attenuated vaccine has simpler schedule, better safety profile, longer duration of action and cheaper price.

In India a Killed JE vaccine is produced at the Central Research Institute, Kasuli from brain of suckling mice. Two doses of 1 ml (0.5 ml each) should be administered subcutaneously at an interval 7-14 days. A booster dose of 1 ml was given after four weeks or one year in order to develop full protection. In India, due to the limited production the cost of vaccine was high, requires cold chain to transport, requires 80-90% coverage and protects only those who were vaccinated.

In India, spending the colossal amount on JE vaccines the same amount should spent on environmental sanitization and drainage system will given the better results and it was helpful to eradicate Polio, Malaria, Gastroenteritis, typhoid, filariasis, dengue etc. However, many countries are making good progress towards control of JE by immunization.

Measures to control mosquitoes, pig reservoirs, environmental sanitization, use of mosquito nets and vaccination of the susceptible population will go long way in prevention of JE. Control of JE requires coordinated efforts of Panchayat Raj, Muncipal administration and Urban development for environmental sanitation; Agricultural department for convincing the farmers to follow the alternate wet and dry methods of irrigation system; Medical and health department for prevention of the disease and care of the patients; Information department and mass media like news paper, TV channels for health education. Unless every individual feels his responsibility to keep the environment clean and takes personal care.

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References:

Dhanda, V. and Kaul, H. N.(1998): Mosquito vectors of Japanese *encephalitis* virus and their bionoics in India. *Proc. Indian Nati Sci Acad* 46 B, 759.

Gajanana, A. and Arunachalam .N. (1980): Mosquito transmitted flavivirus infection in India, *Adv. Med. Entomol & Human Welfare,* 89-100.

Gajanana, A., Rajendran, R., Philip Samuel, P., Thenmozhi, V., Tsai, T.F., Kimura-Karuda, J. and Reubean, R. (1997): Japanese encephalitis in South Arcot district, Tamilnadu : A three years longitudinal study of vector abundance and infection frequency. *J Med Entomol* 34, 651

Halstead SB, Grosz CR. (1962): Subclinical Japanese encephalitis. Infections of Americans with limited residence in Korea. *Am J Hyg*,75, 201.

Mahendra Jagtap,T. V. Sathe (2008): Role of Intensified mass surveillance campaign in malaria problematic area of Sangli district. *Perspectives in Animal Ecology & Production* (ISBN10 81-7035-563-X) 5 14 -17.

M. B. Jagtap., L. S. Sale., A. S. Bhosale., Asawari Sathe and T. V. Sathe. (2009): Incidence of Dengue and shifting trend to rural in Kolhapur district, India. *Int. J. bio. Forum* 1 : 2 60.

Pant, C.P. (1979): Vectors of Japanese encephalitis and their bionomics. *WHO/ VBC/79* 732, l 8.

P. Nagabhushana Rao. **(2000):** Japanese Encephalitis for doctors, Health Workers and parents 1-43

Phukan,A.C.,Borah,P.K.,Mahanta,J. (2004): Japanese encephalitis in Assam northeast India. *Southeast Asian J. Trop .Med. Public Health* 35, 622.

Rodrigues, F.M. (1984): Epidemiology of Japanese encephalitis in India: a brief overview. *Proc. Nat. Conf*. Japanese Encephalitis, New Delhi, ICMR, 9

Sathe T. V. and Mahendra Jagtap. (2008): Three decades trend of malaria from Sangli district of Maharashtra, India. *Perspectives in Animal Ecology & Production* (ISBN10 81-7035-563-X) 5 14 - 17

Sathe, T.V. and Girhe, B.E. (2001): Biodiversity of Mosquitoes (Order : Diptera) in Kolhapur district, Maharashtra. *Riv. Di. Parassitologia*, 18 (LXVII-3) 189.

Sathe , T. V. and Girhe, B. E. (2002): *Mosquitoes and Diseases*, (Daya Publ. House, New Delhi.) 1-96.

Sathe , T. V. and Tingare, B. P. (2010): *Mosquitoes and Diseases*, (Daya Publ. House, New Delhi.) 1-200.

U. Suryanaryana Murty, D. V. R. Satyakumar, K. Sriram, K. Madhusudhan Rao, T. Gopal Singh, N. Arunachalam and P.Philip Samuel. (2002): Seasonal prevalence of *Culex vishnui* sub group, the major vector of *Japanese encephalitis* virus in an endemic district of Andhra Pradesh, *Journal of the Americal Mosquito Control Association* 18(4), 293.

V. A. Vijayan. **(1998):** Impact of agricultural development on a Japanese encephalitis vector, *Adv. Med. Entomol & Human Welfare* 45 -49.