International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 13, No. 12, December 2024 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_13.12.2024.126

Original Research

An Epidemic Investigation Of Acute Encephalitis At Paddhari Taluka, Rajkot District

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Received Date: 22 November, 2024 Accepted Date: 21 December, 2024

Abstract

Abstract: Acute encephalitis is life threatening condition characterized by acute onset of fever, mental deterioration and further can lead to death**.** It is caused by infections or autoimmune process. In India, encephalitis has caused over 44,000 cases and around 6000 fatalities between 2008 and 2014, mostly in Uttar Pradesh and Bihar. Current epidemic in early June and August 15, 2024, with 82 fatalities having CFR 33%. This has caused significant burden on public health systems, including case management, monitoring, infection prevention and control, and laboratory capability for diagnosis. So on reporting of such case in Rajkot district, the team has been sent from Medical college to further observe and analyse the situation for further actions on date 19/07/2024. House of deceased, nearby environment, nearby house survey, village survey, concerned authority meetings and villagers meeting was done as part of RRT. Necessary recommendations were given to those who were concerned.

Keywords: Encephalitis, Epidemic, Environment survey , Entomological survey

Background

Acute encephalitis is life threatening condition characterized by acute onset of fever, mental deterioration and neurological symptoms**.**[1] It is caused by infections like virus, bacteria, parasites which may cause altered sensorium, seizers or neurological deficit. Further worsening of the condition may lead to death also. Poor housing conditions, compromised sanitation, open breeding places, seasonal favourability, human vector contact may contribute to transmission of the disease. In India, encephalitis has caused over 44,000 cases and ar6000 fatalities in the year 2008 and 2014, mostly in Uttar Pradesh and Bihar. Moreover in 2016, in Gorakhpur, one hospital reported over 125 deaths consequently.[2] The Government of India, Ministry of Health and Family Welfare recorded 245 instances of acute encephalitis syndrome (AES) between early June and August 15, 2024, with 82 fatalities having CFR 33% recently. Among them, 64 instances have been confirmed as Chandipura encephalitis. [3] In India, CHPV is prevalent, and outbreaks have happened often in the past. The present epidemic, however, is the biggest in the previous 20 years.[3]Usual diagnosis of encephalitis depends on clinical findings and sometimes laboratory supports eg, blood, serum, CSF.[4] A comprehensive diagnostic approach including clinical history taking, examination, neuroimaging would be more important in such cases.[5] In spite of the much of the advancement, many encephalitis cases gone undiagnosed or unknown origin sometimes, [6,7] which further raise question for continue monitoring and strict surveillance. A CHPV infection has a high case-fatality ratio (56–75%) and a quick start of symptoms. Management is symptomatic and there is no particular medication or vaccination available; prompt referral of suspected AES patients to approved institutions can enhance results. Epidemics caused by CHPV infection can place a significant burden on public health systems, including case management, monitoring, infection prevention and control, and laboratory

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capability for CHPV infection diagnosis. So the team has been sent from Medical college to further observe and analyse the situation for further actions.

Call for investigation:

A two years old child (Name: X) came to Hadmatiya village with his family on 06/07/2024. Native place of this family was at village Sheer, Santarmpur, Mahisagar district. Family migrated to Paddhari before three months. The child started experiencing fever, breathing difficulties, altered consciousness and brownish vomiting from 06/07/2024. For this illness, he was taken to private practitioner on 09/07/2024 from where he was referred to CHC, Paddhari. From CHC, he was referred to P.D.U. Civil Hospital Rajkot for further treatment. Family decided to get discharge against medical advice (DAMA) on 15/07/2024 and after discharge, child died on the same day. Later on scattered distributed such events noted which were admitted to CHCs, Private hospitals and government hospitals.

A call and mail from CDHO office received at medical college to investigate such cases to know the exact reasons for the same. A Rapid response team (RRT) consisted of community medicine expert, physician, pediatrician and microbiologist was sent to event place on 19/07/2024 to further investigate the case. Survey team has prepared preliminary definition of encephalitis to survey nearby households. A basic proforma of geographic information, demographic information, environmental observation, sign symptoms, migration was prepared and used while surveying the population.

Geographic area of case and places visited

- Hadmatiya vadi vistar, Hadmatiya village, located approximately 20 km away from CHC Paddhari, Taluka Paddhari, Rajkot District
- Hadmatiya village, Taluka Paddhari, Rajkot District

House visit of deceased family

After reaching to the Hadmatiya Village, local health workers were contacted for further details. We were led to vadi vistar to further investigate the case. At the time of visit child's family has already left to their native after death of child. A detailed observation of house and nearby area was done to find out any favorable condition for vector breeding.

House was having one room and lobi. It was kutcha type of house, roofed with metal plates, floored with cow dung and walls with bricks. Major cracks and crevices were observed on the walls. House was full of dampness and no sunlight or window in the room. Outside the room there was a lobi, which was used as kitchen. Cow dung cakes, dried tree branches were used as fuel to cook. They were full of cockroaches and other insects.

Adjacent brick walls of room, there was animal habitation in which one buffalo, two cows were observed. Habitat was dumpy and unclean. Ticks were observed on the animal. Habitat was also having many cracks and crevices.

Outside of the both premises, water collections and mosquito breeding places were observed. There was a big square open water collection tank, full of water, having algae, larva in it. Nearby places were full of green grass with water clogging in it.

Survey of nearby house hold in Vadi vistar

Vadi vistar, home build in farms, were about 500-600 meter away from each other. Total 12 such house s were visited to explore further such cases. A total of 13 children were checked during this visit.(table .1)

Photo; 1 Deceased home at farm: Home assessment and environmental assessment.

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Photo; 2 Talk with village people regarding awareness, strict vigilance and reporting

Photo; 3 Visible cracks, crevices, cattle shed and room attached in the home at farm

Photo; 4 : Water collection, health worker emptying water

Table 1. Showing survey of houses near vadi vistar, Paddhari.

Total house visited	Total population covered	Total children checked	Age range (years)	H/o traveling in last 3 months	s/s fever, vomit, diarrhea, altered sensorium, convulsion	Practice of outside sleeping, play with animals, bare foot in farm
12	48	13	1-14	0	0	13

A sample of deceased child was taken for Chandipura virus during hospital stay and sent to NIV, Pune for confirmation. All routine investigations of dengue, malaria, routine heamogram were also done during its stay to hospital. Other children surveyed at visit time were not having any sign and symptoms for the same so sample were not taken from them.

Environmental survey of nearby vadi vistar

As deceased house was found potential breeding place for mosquitos, sand flies, house flies and many other insects, nearby vadi vistar was also examined for the same. Almost all houses have animal habitats attached to their home only. Animals were found infested with ticks. Dampness and cracks in house structures were

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found. Open water collection ponds, small pits filled with water, frequent and unusual rains, presence of mosquitoes, houseflies, collection of open manure nearby home were observed.

Entomological survey of vadi vistar

Suspected insect's photos were taken with due precautions. But RRT h has no entomologist so conclusion was difficult. On some animal, hard tick was also seen**.(table 2)**

Table2. Showing entomological survey in vadi vistar

Total house found open	Total people surveyed	Dusting and indoor spray	Total container checked	Container having larva	Breeding places managed
12	48	12	72	2	2

Survey in the village

A rapid survey of the households in the village was done on the same day. Total population covered near about 1020. No adults and children were found having similar signs and symptoms. community leaders, choraha people were met at the end of survey and were given information regarding the disease. They were informed to stay vigilant and report any of such cases, migration cases or abnormal pattern of disease observed in the village. They were also educated for preventive measures for the diseases.

Meeting with concerned MO, THO, EMO

At the same day MO PHC, THO and EMO has come to village to see the situation in the field. A meeting was held including all of them at Primary health center. Detailed discussion of deceased case was done with them. Further surveillance strategies were discussed. All the control and preventive measures were discussed with them.

Control measures taken by health department

Affected areas were surveyed by health care workers and checked for breeding places of vectors. Source reduction was done by health care workers. Affected households and nearby areas were dusted with Malathion or alpha cypermethrin as per availability. Whole of the village people were informed for reporting of same symptoms if there. Sarpanch and leaders were informed to keep watch over and reporting the migration and symptoms if any. Regular surveying till next double of Incubation period.

Discussion

The favourable housing, environmental, and vector factors make the case of acute encephalitis described here quite intriguing; nonetheless, the test results are still unclear. The possible causes of these inequivalent test findings as well as the consequences for diagnosis and treatment will be covered in this conversation.

It has been demonstrated that good housing and environmental circumstances, such better cleanliness and availability to potable water, greatly lower the prevalence of vector-borne illnesses and other infections that can cause acute encephalitis. In Uttar Pradesh, India, the incidence of acute encephalitis syndrome (AES) has decreased from 18.2 per million populations during 2005-2009 to 15 per million populations during 2015-2019 as a result of the implementation of public health measures, such as clean drinking water and improved sanitation.[8] Additionally, the case fatality rate (CFR) decreased from 33% in 1980–1984 to 12.6% in 2015–20191 as a result of these actions.[8]

Even with these favourable circumstances, encephalitis is still difficult to diagnose. According to current estimates, fewer than half of clinical cases of encephalitis have a recognized cause, even in settings with adequate resources.[9] The complexity of encephalitis, which can be brought on by a variety of diseases, and the limits of conventional diagnostic techniques are two of the reasons for this diagnostic gap. Even having many differential diagnosis and limitation of diagnostic technique at happening institute produces challenges to send samples to national institute. Sometimes due to that sample reached to national institute will be inadequate, improperly handled or may be late to diagnose the encephalitis.

This gaps identified in encephalitis investigations would need strong surveillance system, continue monitoring and strong lab support. So following recommendations were given to health authorities.

Conclusion

Deceased was showing symptoms of acute encephalitis. Housing and environmental conditions were favourable to host vector of encephalitis. Migration, poor insanitary living, human vector contact occasions and unawareness were related contributory factors. However, clinical history, environmental, environmental factors were correlated, must be confirmed with the lab test results.

Recommendations discussed to health staff

- **Continuous surveillance** of the affected area with notification and prompt management of all the new cases of acute febrile illness and acute encephalitis.
- **Vector control**: Insecticidal spray and dusting with Malathion should be done in affected area with covering surrounding areas. Other integrated measures of vector control should be used to prevent vector resistance.
- **Environmental aided measures**: cracks and crevices should be filled with cement. Regular

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spray of insecticide to keep vector population under control.

- Promote use of **personal protective equipment** such as repellents, full sleeve clothes, insecticide treated bed nets. Children should be restricted for outdoor activities without full sleeve clothes.
- **Community engagement:** Community should be made aware about symptoms of acute encephalitis. They are made aware of sign symptoms and prompt reporting at health care facilities.
- **Animal habitats** should be kept away from human dwellings habitat should be kept very clean, Spray of insecticide should be done at regular interval
- **Sensitization of field workers**: field workers should be trained about disease in details. They should be engaged in daily surveillance and monitoring activities. They are informed to keep watch over migration population for the same sign and symptoms.
- **Sensitization of health care workers and timely referral**: all medical and paramedical persons should be sensitized to timely admit, refer and manage patients effectively.
- **Borderline district and state alerts**: state guideline should be release for management and screening for encephalitis. Nearby district and talukas should be made aware regarding high alert for such cases. Risk assessment and preparedness practice should be done in each district.

Limitation of Investigation

1. As nobody showed similar sign and symptoms, any sample was not taken from field
2. Vector survey was done but, RRT was not having any Entomologist, so vector confirmation not done.

Declarations

Funding: None
Conflict of interest: None declared
Ethical approval: Not required

References

1. vikaspedia Domains [Internet]. [cited 2024 Oct 24];Available from: https://health.vikaspedia.in/viewcontent/health/diseases/vector-borne-diseases/acute-encephalitis-syndrome
2. Encephalitis to be made “notifiable disease”: Govt | Delhi News - Times of India [Internet]. [cited 2024 Oct 24];Available from: https://timesofindia.indiatimes.com/city/delhi/Encephalitis-to-be-made-notifiable-disease-Govt/articleshow/53651028.cms
3. Acute encephalitis syndrome due to Chandipura virus – India [Internet]. [cited 2024 Oct 24];Available from: https://www.who.int/emergencies/disease-outbreak-news/item/2024-DON529
4. AES_guidelines.pdf [Internet]. [cited 2024 Oct 24];Available from: https://ncvbdc.mohfw.gov.in/WriteReadData/l892s/AES_guidelines.pdf
5. Steiner I, Budka H, Chaudhuri A, Koskiniemi M, Sainio K, Salonen O, et al. Viral encephalitis: a review of diagnostic methods and guidelines for management. European Journal of Neurology 2005;12(5):331–43.
6. Lascano AM, Vargas MI, Lalive PH. Diagnostic tools for immune causes of encephalitis. Clinical Microbiology and Infection 2019;25(4):431–6.
7. Kumar R. Understanding and managing acute encephalitis. F1000Res 2020;9:60.
8. Srivastava N, Deval H, Mittal M, Kant R, Bondre VP. The Outbreaks of Acute Encephalitis Syndrome in Uttar Pradesh, India (1978–2020) and Its Effective Management: A Remarkable Public Health Success Story. Front Public Health [Internet] 2022 [cited 2024 Oct 29];9. Available from: https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2021.793268/full
9. Brown JR, Bharucha T, Breuer J. Encephalitis diagnosis using metagenomics: application of next generation sequencing for undiagnosed cases. Journal of Infection 2018;76(3):225–40.