Current Developments in Virology

In a recent meeting at WHO Headquarters in Geneva current knowledge on viral diseases was reviewed in order to set priorities in terms of the public health measures called for. The diseases were classified into three broad major groups according to the type of action recommended. The Bulletin *has undertaken to present selected working papers from each of these groups. The last issue focused on those diseases which affect large segments of the population and for which immunization is practical. This issue, in turn, presents a selection from the second group—namely diseases that have implications for international health but for which vaccines are not yet available.*

MARBURG VIRUS[1]

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Marburg virus is known to have produced two episodes of human disease—one in Germany and Yugoslavia in 1967 (31 cases, seven of which were fatal) and one in South Africa in 1975 (three cases, one of them fatal). Further studies of this hazardous agent are essential, especially with reference to the risks for medical personnel attending patients with hemorrhagic fevers.

Marburg virus disease was first recognized in 1967, when an outbreak occurred in Germany and Yugoslavia (*1*). A total of 31 persons were hospitalized with severe febrile hemorrhagic disease and seven died. Of the 31 patients, 25 were laboratory workers whose history indicated contact with blood or tissue from the African green monkey, *Cercopithecus aethiops*. The remaining six had had contact with other persons suffering from the disease.

There was no further evidence of Marburg virus anywhere until February 1975, when a young male tourist in Johannesburg, South Africa, was hospitalized with hemorrhagic fever and died (*2*). His female companion entered the hospital seven days later with the same clinical symptoms, and after another seven days an attending nurse also came down with the disease. Both the latter patients recovered.

The Marburg agent is an RNA virus with morphologic characteristics unlike those of

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any other known virus family. It has a uniform diameter of 75 to 80 nm and is highly pleomorphic, sometimes appearing as bizarre cylindrical and fishhook-shaped particles. It may be grown in cell cultures, but with little or no cytopathic effect. Infection of vervet monkeys is uniformly fatal; guinea pigs are also susceptible.

In the 1967 outbreak the initial source of the human disease was traced to laboratory monkeys shipped from Uganda. The source of the monkeys, infection is not known. However, their unusually high mortality rate suggests that monkeys, along with man, are accidental hosts.

The source of the more recent cases in South Africa is also unknown. The fatally afflicted man and his companion had traveled extensively in Rhodesia just before his death. But they had had no known contact with nonhuman primates, and all the other animals with which they were reportedly in contact were found negative for Marburg virus antibodies.

This recent episode proves that man is susceptible to Marburg virus disease under natural conditions, and that virus transmission to man is not restricted to such unique circumstances as those which existed in 1967. It also suggests that there may have been other fatalities from Marburg virus which could have been misdiagnosed as yellow fever or rickettsial hemorrhagic fever.

The rarity of the disease suggests that the virus is restricted to some animal species which have infrequent contact with humans. Nevertheless in view of the ecologic alterations continually taking place in the developing countries, it is possible that the virus could become a greater threat to man. Greater knowledge of the distribution of Marburg virus in nature is therefore essential. It is also important that differential diagnoses be made in suspected cases of hemorrhagic fevers in order to learn more about the epidemiology of these diseases and in order to better assess the risks that their etiologic agents pose for attending medical personnel.

Recommendations

- Work in the following areas should be encouraged: laboratory studies on the pathogenesis of Marburg virus disease in animal models;
- Serologic surveys for evidence of infection among human populations in southeast Africa;
- Field studies in the same region to learn about the natural hosts of the virus;
- Differential laboratory diagnoses of hemorrhagic fevers, particularly in southeast Africa; and
- Education of medical personnel to the risks associated with care of hemorrhagic fever patients.

SUMMARY

Marburg virus disease, which produced 20 per cent mortality when it first occurred during 1967 in Germany and Yugoslavia, recently appeared again in South Africa. The source of the first outbreak was monkeys shipped from Africa; the origin of the second episode is unclear. Because distribution of the virus in nature is unknown, its threat to man cannot be readily determined. Differential laboratory diagnoses of hemorrhagic fevers should be encouraged in order to learn more about the epidemiology of these diseases and to better assess the risks which their etiologic agents may pose for attending medical personnel.

REFERENCES

(*1*) Martini, G. A., and R. Seigert. *Marburg Virus Disease.* New York, Springer-Verlag, 1971.

(*2*) United States Public Health Service, Center for Disease Control. *Morbidity Mortality Weekly Rep* 24:89-90, 1975.