



IS RABIES TRANSMISSABLE THROUGH MILK?

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Abstract

Aim: To study with the chances of transmission of rabies virus through milk of a rabid animal. *Introduction:* Rabies is transmitted through secretions of a rabid animal. *Discussion:* Odds cannot be ruled out that rabies virus is present in milk of rabid animal. *Conclusion:* Message through seminar at World rabies day on 27/09/2017 conveys that the point that people consuming the milk of rabid animal need not be given ARV has created dilemma.

Keywords:

ARV (Anti Rabies Vaccine), RIG (Rabies Immunoglobulin), pasteurization.

Introduction

Rabies is a viral infection (zoonosis) usually transmitted through the saliva (mainly through bite) of infected mammals.¹ The virus enters the central nervous system of the host, causing an encephalomyelitis that is almost always fatal². It is a Rhabdovirus. Rabies virus is a rod- or bullet-shaped, single-stranded, negative-sense, unsegmented, and enveloped RNA virus. The virus genome encodes five proteins.³

The replication of rabies virus is believed to be similar to that of other negative-stranded RNA viruses. The virus attaches to the host cell membranes via the G protein, penetrates the cytoplasm by fusion or pinocytosis, and is uncoated to RNP³. In up to 99% of cases, domestic dogs are responsible for rabies virus transmission to humans. Yet, rabies can affect both domestic and wild animals. It is spread to people through bites or scratches, usually via saliva. Rabies is present on all continents, except Antarctica, with over 95% of human deaths occurring in the Asia and Africa regions. Rabies is one of the neglected tropical diseases that predominantly affect poor and vulnerable populations who live in remote rural locations. Although effective human vaccines and immunoglobulin exist for rabies, they are not readily available or accessible to those in need.⁴

Human cases due to non-bite exposures to rabies are very rare. Scratches, abrasions, open wounds, and mucous membranes contaminated with saliva or other potentially infectious material (such as brain tissue) from a rabid animal constitute non-bite exposures. Inhalation of aerosolized rabies virus is also a potential non-bite route of exposure, but other than laboratory workers, most people are unlikely to encounter aerosolized rabies virus. There are no published studies that have demonstrated the presence of rabies virus in cow's milk. Although transmission of rabies virus from consuming unpasteurized milk from an infected animal is theoretically possible, no human has ever been reported to develop rabies via this route. Milk that has been pasteurized/ boiled presents no risk for rabies virus transmission.

Rabies is spread by saliva or brain tissue of an infected animal coming in contact with a break in the skin. The virus that causes rabies does not ordinarily exist in milk, even when the animal is sick with rabies. Also, rabies takes many days to develop in the bitten animal. The cow died too soon to have died of rabies or even to have developed infection with rabies that could be transmitted. So it seems very likely that people who drank the milk of this cow will not get rabies. But because rabies is such a severe disease, it would be wise to have a doctor check this out, just to be sure no important part of the story has been missed. Nothing will happen if you drink pasteurized or sterilized milk, rare incidents are there, where rabies transmitted through unpasteurized milk.

Case reports of milk consumption of a rabid animal

Case 1:⁵ Bangalore July 29, (2002). The campaign for extermination of street dogs in the City by the Stray Dog Free Bangalore has taken a bizarre turn with its Secretary, warning that even cows' milk is getting contaminated by the deadly rabies virus.

Case 2:⁵ Recently (2001-2002) in Channapatna taluk(India), a rabid dog went around biting people and cattle, and as a result, a cow developed rabies. Just as diseases were transmitted from a lactating mother to a child being breast-fed, milk from cattle with rabies could infect humans.

“Unless milk is well boiled, there is a risk of exposing children to rabies. Un-boiled milk is used to make `prasada'(a form of religious offering after prayers), and this can be contaminated. According to a paper submitted at the last Indian Virology Conference, tests conducted on the brains of slaughtered cattle and sheep showed that an alarming two per cent of them contained rabies virus. This shows that devotees are at risk while consuming `prasada'”.

Case 3:⁶ The Rogers County Health Department held special clinics on Saturday and Monday (24 & 26 Dec 2005) to provide a preventive or prophylaxis rabies regimen. The people treated were over 62, including children, who drank un-pasteurized milk from a rabid cow. Officials suspect the cow was infected when it was bitten by a rabid shunk.

Case 4:⁷ 80 ill after consuming milk of cows bitten by rabies infected dog in Mumbai (India) made headlines on Jan 22, 2017. As many as 80 persons in Aurangabad district took ill after consuming milk of the cows bitten by rabies infected dog, said an officer. "The incident came to light on Saturday evening when many people complained of vomiting and nausea. They are being treated and none of them is serious," said resident district collector of Aurangabad. "We have found two cows whose milk had been consumed by people who fell sick later. Officers from health and animal husbandry department found that these cows are bitten by dogs having rabies. Treatment of cows has started," he said. When asked about the *dogs with infection*, he said, "It is a serious issue and dogs can bite people as well. Preventive measures are going on," he said.

Case 5:⁸ Rabies is a viral zoonosis that is usually transmitted by the bite of an infected mammal. However, in Massachusetts, two incidents have been reported since 1996 of potential mass exposures to rabies through drinking unpasteurized milk.

General view: There exists a dilemma on the transmission of the virus by the milk consumption of a rabid animal.

Discussion

In the light of the above cited cases it can be said that ARV has been advised in cases on exposure to the consumption of milk by rabid animal (mainly cow). In majority of the cases the authorities are not sure whether the transmission has occurred or not but they just want to ward off any aspect of people acquiring the disease as it is 100% fatal.

Transmission by milk is rare. Anecdotal reports exist of rabies transmission by ingestion of milk from rabid animals (e.g. from a rabid sheep to a nursing lamb). In these reports, the more conventional routes (e.g. bite or mucous membrane exposure) could not be completely excluded. Transmission of virus in unpasteurized milk is theoretically possible. The risk could be defined better if samples of milk and mammary tissue were collected from rabid livestock and assayed for the presence, viability and infectivity of rabies virus. Regardless of the amount of viable rabies virus that may be shed in cow's milk, the theoretical risk for transmission of rabies from this route can be eliminated if all dairy products are pasteurized before consumption. However, because rabies virus is inactivated by temperatures below those used for cooking and pasteurization, eating cooked meat or drinking pasteurized milk from a rabid animal is not an indication for 'Post-Exposure Prophylaxis'(PEP).

A conference (cum training programme) was held at Government Medical College, Patiala's physiology lecture theatre on World Rabies Day. In a seminar the guidelines by Human Biologicals Institute which state 'Unboiled milk of a rabid animal may contain rabies virus. There is a theoretical risk of humans contracting rabies after having consumed unboiled milk of a rabid animal. If somebody has consumed raw milk, then the full dose of RIG has to be given to be given systemically. This should be followed by full course of vaccination'⁹. The discussion started on a point when a person referred that rabies cannot be transferred by pasteurized milk and so there was no need of Anti Rabies Vaccination. The other person did

not agree with the point which led to an argument but there was no conclusion to the discussion.

If the people who consume milk from a rabid cow need not have a vaccination then it should be directed as it costs people a lot. According to WHO September 2017 information, treating a rabies exposure, where the average cost of rabies post-exposure prophylaxis (PEP) is US\$ 40 in Africa, and US\$ 49 in Asia, can be a catastrophic financial burden on affected families whose average daily income is around US\$ 1–2 per person⁴. Also the people who are affected are generally the ones that belong to the low socioeconomic status in accordance with the Kuppuswamy guidelines (2017).¹⁰

Conclusion

Although it has been said that rabies is not transmitted through boiled/pasteurized milk it is hard to comment whether it is true or not and if yes then whether it is able to cause the disease by this route; also what would be the appropriate prophylaxis for such cases. The main drawback with this disease is that studies cannot be conducted which leave us with limited knowledge regarding the disease. According to recent guidelines by some organizations people exposed to pasteurized milk from a rabid animal need not be vaccinated. But there has been seen debate on that too. The need of the hour is to have a recommendation as on what to do and convey it to the peripheral health centers as these are the first ones to counter such incidents.

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