REVIEW ARTICLE

Fetal outcome in pregnant women with rabies infection – review of literature

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Abstract

Objective - to review the fetal outcome of women suffered from rabies infection in pregnancy.

Methods - This is a literature review which deals with perinatal outcome among pregnant women who suffered from rabies infection, PubMed and Google Scholar were searched using no limit for language and time span,

Results - We found publications of 16 cases of mothers dying of suspected or confirmed rabies shortly after delivery and all had live births. 15 babies survived and was free of rabies infection .Four babies did not receive post exposure prophylaxis against rabies of which one baby died after birth.

Conclusion - Mother-to-child transmission of rabies is possible, but rare. Rabies post exposure prophylaxis including RIG should be administered as soon as possible to babies born from probably rabid mothers. Whether cesarean-section clearly provides prevention remains unclear.

Introduction

Rabies has a mortality rate of nearly 100 %, and India remains a high-risk region for its transmission. Rabies incidence in India has been constant for a decade with 18 000 to 20 000 cases of rabies a year (about 36% of the world's deaths from rabies) and there is no obvious declining trend1 . Exposure of women to rabies virus during pregnancy is not uncommon in endemic countries . The pregnant women constitute a special and sizeable group and continue to remain vulnerable to this fatal disease following exposure to rabid animals. In most cases, women receive post-exposure treatment and the risk of rabies is thereby eliminated for both the mother and child. However, some are not treated and develop rabies infection. These rare clinical situations remain extremely difficult to manage for physicians, as risk of rabies vertical transmission is not well defined. The objective of this article is to review the fetal outcome of women suffered from rabies infection in pregnancy.

Methods

This is a nonsystematic review which deals with perinatal outcome among pregnant women who suffered from rabies infection .For this review we carried out an electronic search. PubMed and Google Scholar were searched using "Rabies in pregnancy" and " Rabies and Pregnancy" as key words with no limit for language and time span. Only relevant articles which provide reasonable informnation regarding fetomaternal outcome in women with

rabies in pregnancy were included. .Main outcome were tabulated and findings were further discussed in the text under subheadings .

Results

We found publications since the beginning of 20 th century describing 16 cases of mothers dying of suspected or confirmed rabies shortly after delivery (Table 1) . Of these 16 deliveries all had live births . Ten women had cesarean section and six had vaginal delivery. Although gestational age at delivery was not available in some reports, it can be presumed that all women had delivery at or after 34 weeks as all but one baby survived till the time of reporting of cases . Out of the 16 babies , 15 babies survived and was free of rabies infection .Four babies did not receive post exposure prophylaxis against rabies of which one baby died after birth.

Table 1 – Published cases of rabies in pregnant women and fetal outcome

No	Study	Year of occurrence	Reporting area	Mother	Baby
1	Quoted by Machado et al, 1966[2]	1935	Vietnam	Arrived rabid at term, had C section	Alive, No PEP
2	Viazhevich 1957[3]	1953	Russia	Rabies 7 days after vaginal delivery	Alive, No PEP
3.	Relova 1963[4]	1959	Philippines	Arrived rabid at term, had C section	Alive, No PEP
4	Machado et al 1966[2]	1964	Brazil	Arrived rabid at 8 months, had C section	Alive, received PEP (H Rig + Vac)
5	Spence et al 1975[5]	1972	Thailand	Rabid 2 days after vaginal delivery	Alive, No PEP
6	Muller Holve[6]	1975	Togo	Arrived rabid at 34 weeks, had vaginal delivery	Alive, No PEP
7	Sipahioglu, 1985[7]	1981	Turky	Rabid before vaginal delivery, Had induced labour	Died after 40 hrs of confirmed rabies, No PEP
8	Thongcharoen 1988 cited by Lumbiganon, 1990[8]	Before 1988	Thailand	Had C section, inadequate information	No rabies infection, No PEP
9	Thongcharoen 1988 cited by Lumbiganon, 1990 [8]	Before 1988	Thailand	Had C Section , inadequate information	No rabies infection, no PEP
10	Lumbiganon, 1990[8]	1987	Thailand	Arrived rabid at 40 weeks for vaginal delivery	Alive, PEP at birth
11	Iehle et al 2008[9]	2004	Madagascar	Arrived rabid at 34 weeks, had C section	Alive, PEP at day 3, No RIG
12	Swende et al, 2009[10]	2009	Niger	Rabid before delivery at 35 weeks, had C section	Alive, no PEP
13	Auguemon C et al 2016[11]	2013	Cambodia	Rabid 12 hrs before delivery, had vaginal delivery at 38weeks	Alive, PEP (RIG + Vaccine)
14	Qu et al 2016[12]	2013	China	Rabid in labour, had C section	Alive, Received PEP, no RIG
15	Mondal et al 2014[13]	2014	India, Bankura	Rabid at delivery at 34 weeks, had C section	Alive, PEP (RIG + Vac)
16	Auguemon C et al 2016[11]	2015	Benin, Africa	Rabid at delivery at 39 weeks, had C Section	Alive PEP (RIG + Vaccine)

Discussion

Though it is known that rabies post exposure prophylaxis (PEP) is highly effective when administered quickly, in parts of the developing world this may not be feasible as cases are mostly reported from developing countries (**Table 1**). Death of all pregnant women after appearance of rabies symptoms is in agreement with the fact that for previously unvaccinated patients rabies has 100% mortality.

There is only one newborn baby died out of 16 cases. This is the only mother to child transmission case of rabies and reported from Turky where baby died suddenly after 40 hours and 30 minutes of birth , However the autopsy, macroscopic and microscopic examinations confirmed the diagnosis of rabies in both the mother and the baby7. It is highly probable that vertical transmission occurred before birth as 40 hours would constitute an unusually short incubation period 11 . The other 15 children born from mothers with confirmed or probable rabies were all healthy at birth. This may suggest that inutero transmission of rabies virus is unlikely. Most authors suggest that baby is protected due to absence of viremia or because of protective role of placenta[11,12].

Route of delivery – Out of 16 women 10 had cesarean delivery an six had vaginal delivery. As 15 babies had favourable outcome, the route of delivery seems does not affect outcome This may be due to the fact that rabies virus is not readily transmitted by blood [11].

Role of PEP in infants born of Rabid mothers – Although out of 16 babies 4 babies did not receive PEP , it seems reasonable to administer PEP (RIG + Vaccine) as there is no contraindication to administer in neonate and rabies is 100% fatal. The ability of newborns to respond adequately to vaccines is well documented14 . Follow-up of the immune response in an infant vaccinated three days after birth showed high serum titres of both rabies neutralizing antibodies and specific anti-rabies glycoprotein IgG after immunization[11].

Protection of health care workers who handle mother and baby – Although exposure of health care providers through direct contact of blood or body secretions to damaged skin or broken mucosa may occur while caring rabid women , no such case has been published . Exposure of blood and body fluids can be avoided by observing standard protocols. Nevertheless, World Health Organization recommends PEP in health care workers after careful assessment of risks[15],

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