EPIDEMIC OF NECROTIZING ENTEROCOLITIS:

ITS POSSIBLE VIRAL ORIGIN

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INTRODUCTION

During the period 1978 to 1980, an epidemic of necrotizing enterocolitis was observed at the Maternity Unit of the Baudelocque University Clinic. A total number of 46 cases occurred during three different periods, among 3988 deliveries.

A study from a clinical, therapeutic and prophylactic point of view of these cases is presented. The circumstances which imply that these cases are probably the result of infection by the corona virus is also described.

CLINICAL FEATURES

Between August 1978 and May 1979, thirty cases occurred in two successive waves among 1800 deliveries: August to November, 5 cases; February to May, 25 cases. A clear relationship exists between the occurrences of the cases and the activities in the ward.

The time of occurrence was between day 4 and day 14 in twenty-six cases, but mostly during the 2nd week of life. However, three children became sick before the 3rd day and one premature baby after a month. Nine babies were premature, four were small for dates at term and seventeen had been born after 37 weeks and weighed more than 2500 g.

Among these thirty cases, the diagnosis was certain in 17, on the basis of radiographical and/or histological evidence. In thirteen cases however, because of the lack of characteristic findings, the diagnosis was presumptive. In every case, specimens were taken for bacteriological examination.

The treatment was chiefly medical, consisting of aspiration, parenteral nutrition, and antibiotics. Among the seventeen certain cases, 8 children were cured by medical treatment; 4 children were operated upon (resection and/or colostomy) in the acute stage of the disease, with one death after operation for bowel perforation; 3 children had secondary closure of the colostomy carried out without further problem; and 5 children were operated upon later for scar stenosis. One died because of staphylococcal septicemia which occurred in the intensive care unit.

Among the thirteen probable cases, 12 were cured and 1 died on day 5. The postmortem examination failed to demonstrate the cause of death or the presence of an enterocolitis.

Among these 30 children, only one received complete direct breast feeding. Human milk from a bottle was given to 14 and formula or mixed feeding to 15.

Bacteriological studies were positive in nineteen children with the following various organisms in the fecal, gastric, blood and peritoneal specimens: *E. Coli* 2, *Enterobacter* 2, *Klebsiella* 1, *Ristella* 1. In seven cases, one or several *Clostridia* were found in the stools (*butyricum*, *perfringens*, *tertium*, *difficile*). Virological studies were negative at that time. A retrospective epidemiological study was conducted and compared with two control groups. All the information concerning the three groups had been stored previously using the process of data acquisition for computerization.

RESULTS

Twenty-nine were premature babies with 40 percent being less than 2500 g as against 6 and 11 percent respectively in the controls. All the other parameters such as age of the mother, socio-economic status, parity, third trimester hemorrhage, number of antenatal consultations, length and location of antepartum hospitalization, and composition of the medical personnel are not significantly

different. As expected, the only significant differences were the complications occurring at the delivery and the neonatal state (only one umbilical catheterization in the enterocolitis group). Treatment against infection during pregnancy has been more frequently observed in the study group compared to controls. Summarizing these observations, it may be said that an epidemic occurred abruptly in a department where no such case had been observed previously. Term and premature babies were involved simultaneously.

Administrative and medical measures were taken in order to stop the epidemic. These included reinforcement of hygienic measures; closure, cleaning and sterilization of the neonatal unit and delivery rooms; complete separation between mother and newborn; use of disposable bottles; and encouragement of breast feeding (from 45 to 80 percent). These measures seemed to be effective since no further case occurred after May 12th until the month of September. The origin of the epidemic remained a mystery.

In September 1979, 5 new cases occurred. One of them was relatively severe and needed surgery due to perforation. After the reopening of the unit in November that same year, eleven new cases occurred; all cases were mild and recovered.

For psychological reasons, it was necessary to close the department completely for two months, during which, both complete disinfection and architectural changes were made. One measure in particular may have been effective. All the postnatal rooms were converted to single rooms, with the baby staying day and night in the same room with the mother, in order to avoid contact with other infants. Despite these measures, the epidemic persisted.

As stated above, the virological studies made in May had been unsuccessful. In September, studies completed in two other laboratories (Dr. Chany, Hôpital St. Vincent de Paul, Paris, and Dr. Laporte, National Institute for Agronomic Research, Grignon) were able to document the presence of the corona virus in the 4 cases studied. Such a virus was also observed in 5 of the 11 cases occurring after the reopening of the unit, and in 6 of the 7 mothers studied.

DISCUSSION

The seven reasons in favor of implicating the corona virus are as follows:

- (a) Observation of the corona virus by electron microscope in the feces and digestive tract specimens from sick newborn infants. Such an observation is quite unusual and is different from the frequent observation of the rotavirus in the feces of newborns with mild diarrhea.
- (b) Culture of the corona virus from the feces of sick newborn.
- (d) Similarities with enteritis due to the corona virus in animals.
- (e) Simultaneous occurrence of digestive tract epidemics among adults or infants in the Paris area.
- (f) Observation of the corona virus in the feces of mothers of sick newborns.
- (g) Observation of a large number of carriers among the nursing and medical staff. There was an overall occurrence of 10 percent of which 3 percent were doctors and 7 percent were nurses. Interestingly enough, the person in charge of the laundry had also been contaminated.

Although it is clear that no definite proof that the corona virus is responsible for this specific epidemic, it does seem a reasonable assumption. This does not mean that no other organism can be associated with the viral infection. On the contrary, such an association appears to be quite probable particularly in the production of intestinal gas giving rise to the characteristic radiological signs.

CONCLUSION

Necrotizing enterocolitis is no longer restricted to babies' intensive care units. It may occur in maternity departments. It affects normal term infants as well as those premature and small for dates.

Preventive measures are effective to some extent, particularly isolation of the newborn to the room of their mothers and also breast feeding. Immunologic protection of the bowel may encourage normal bacterial colonization.

It is recommended that when such epidemics do occur, a rapid exchange of information be organized. Also, a central register could be established at the IAMANEH office.

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