HYDROPS AND ERYTHROBLASTOSIS FOETALIS AN AUTOPSY STUDY

by

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Since the first unifying concept of the clinical syndromes previously known as icterus gravis neonatorum, congenital anemia of the newborn, and hydrops fetalis Diamond *et al* (1932), our knowledge and understanding of this condition have expanded considerably. The etiologic role of blood group incompatibility, first discovered in the Rh system by Levine in 1940; the development of the antiglobulin test for detection of antibody coated red cells by Coombs in 1946; and the use of exchange transfusions by Diamond *et al* (1946) in the treatment of the affected infant all represent major mile stones in the unfolding history of erythroblastosis fetalis. The classic monograph by Allen and Diamond in 1957 reviews erythroblastosis fetalis in great depth and clarity, and is a basic prerequisite to an understanding of the problem of this disorder and the important advances that have occurred in recent years. A firm diagnosis should usually only be made on the basis of substantiating evidence from the serological and haematological study of the blood during life and often an autopsy diagnosis requires confirmation from these sources. In severe cases, as in hydrops foetalis, the diagnosis may appear easy, but it is essential that the diagnosis should not depend on external examination only. Hydrops of the foetus, very comparable to that resulting from incompatibility, can occur in the absence of any incompatibility and subsequent pregnancies are then normal. In these cases the spleen is usually not enlarged and haemopoiesis in the different organs is usually normal in amount and distribution. Usually this form of hydrops foetalis, only some times associated with some erythroblastemia, remains unexplained as in the series reported by Potter (1940) and no relevant abnormality can be found in mother or child. In the most severe cases the foetuses are macerated, dead born, or die at birth Morison (1970).

The purpose of this paper is to cite the incidence of erythroblastosis foetalis and to discuss its clinico-pathological relationship.

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Material and Methods

Autopsies were performed on 165 newborn infants dying in perinatal period at the Medical College Hospital, Aurangabad, during the period of two years from March 1970 to April 1972. Out of 165 newborn, 99 were still born (85 fresh and 14 macerated) and 66 were neonatal deaths occurring within one week of birth. Detailed obstetric histories were recorded in all these cases and complete autopsy was performed. Tissues were preserved in 10 per cent formaline and routine paraffin processing was followed, special stains were employed wherever needed. Indirect test for Rh antibodies and V.D.R.L. test were done routinely.

Results

There were 14 macerated still births, all were premature. In 8 cases maternal history of antepartum haemorrhage, toxaemia and hypertension was obtained. In 2 cases maceration was associated with anencephaly and in 4 cases no maternal or foetal abnormality was observed. Indirect Coomb's test was negative in all these cases. V.D.R.L. of mother was weakly positive in 2 cases, but no evidence of syphilitic infection was found in the foetuses. All the placentae were enlarged and oedematus. Large areas of infarction were present in 4 and focal areas of hyalinization and calcification were present in 2. All the placentae were negative for spirochetes by Lividitii stain. There was no enlargement of spleen and liver in all these cases. Associated clinical conditions of the mother were toxaemia of pregnancy and antepartum haemorrhage in 57 per cent of the cases. The antepartum haemorrhage consisted of a small loss spread over several days or even weeks, 28.5 per cent were free of obstetrically recognised complications.

There were 5 cases of hydrops foetalis; all were still births. Out of these 4 were not associated with Rh-incompatibility. The most constant gross finding at autopsy was enlargement of spleen. Enlargement of liver was seen in only one case. Maternal history in these four cases were uneventful. One case of hydrops foetalis was full term still born of an Rh-negative mother. The first delivery was normal without any complication in the perinatal period. In the second delivery baby was still born and hydropic. At autopsy generalised odema, ascitis and hydrothorax were found. Liver, spleen and adrenals were enlarged. Microscopic examination showed haemopoetic focci in liver (Fig. 1), spleen, kidneys (Fig. 2), adrenals, myocardium and lungs. Indirect Coomb's test was positive in this case.

Discussion

Maceration was observed in 14 cases. This condition is differentiated from other causes of antepartum death, for example asphyxia (prepartum), congenital malformations and syphilis—by the absence of characteristic lesions associated with these diseases and pathological states. In other words, antepartum death with maceration only is diagnosed and classified chiefly by exclusion (Bound *et al*, 1956). Associated clinical conditions of the mother were toxaemia of pregnancy and antepartum haemorrhage in 57 per cent of the cases. In absence of the evidence for Rh-incompatibility, the cause for maceration group is difficult to assess. The most plausible hypothesis to explain the majority of deaths in this group, as suggested by Bound *et al* (1956) is that of placental insufficiency. This implies inadequate supply of oxygen and nutriment to the foetus and an in-

adequate removal of metabolites too gradual in its effects to cause sudden death with asphyxial haemorrhage, but sufficient to lead to impairment of growth and as the foetal needs increase, to cause death. In the cases associated with repeated small antepartum haemorrhage areas of separation occur leading to a condition of placental insufficiency.

Hydrops foetalis was observed in 5 cases in this study, out of which only one was associated with Rh-incompatibility. Hydrops foetalis is not always a result of blood group incompatibility. It has been observed in association with congenital malformations (Clairaux 1958), homozygous alpha thalassaemia, chronic foetomaternal transfusion (Weisert and Marstrander 1960), congenital syphilis and maternal hydramnios (Oski and Naiman 1968). In maternal hydramnios the mechanisms of hydrops foetalis is not clear (Oski and Naiman 1968). In homozygous alpha thalasaemia in addition to generalised hydrops, there is marked ascitis and gross hepatomegaly with only minimal spleenomegaly (Weisert and Marstrander 1960). The latter finding contrasts with that in hydrops due to blood group incompatibility in which the degree of spleenomegaly parallels the degree of hepatomegaly. In the present study no evidence suggestive of any of the above mentioned conditions was found, therefore the cause of hydrops in 4 cases remains unexplained. Only one death was attributable to materno-foetal Rh-incompatibility in the present series of 165 autopsies. This relatively low incidence of 0.6 per cent of perinatal deaths due to Rh-incompatibility is similar to that reported by Medhi *et al* (1961) as 0.5 per cent and is significantly lower than that reported by Bound *et al* (1956) as 4.4 per cent perinatal deaths and Clairaux (1958) as 4.9 per cent and 9.3 per cent in still births and neonatal deaths, respectively. This is probably due to low incidence of Rh(D) negative population. In ABO maternal-foetal incompatibility hydrops foetalis and still births are exceedingly rare (Oski and Naiman 1968).

Summary

Maceration was observed in 14 cases out of 165 autopsy studied (8.4 per cent). No evidence of Rh-incompatibility or syphilis was observed in these cases and the cause of maceration was probably placental insufficiency as a result of the associated maternal and obstetric conditions.

Hydrops foetalis was observed in 5 cases. In 4 cases the cause was not known. Maternal-foetal Rh-incompatibility was seen in one case (0.6 per cent). This relatively low incidence may be due to low incidence of Rh-negative population

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References

1. Allen, F. H., Jr. and Diamond, L. K.: Brown and Co., 1957.
2. Bound, J. P., Butler, N. R. and Spector, W. G.: Brit. Med. Jour. 2: 5003, 1956.
3. Clairaux, A. E.: Neonatal Pathology in Modern Trends in Pediatrics, 2nd Series, Holzel, A. and Tizard, J. P. M. ed., Paul, B. Hoeber, Inc., New York, 1958.
4. Coombs, R. R. A. (1946): Quoted by Morison, J. E., 1970.
5. Diamond, L. K., Blackfan, K. D. and Baty, J. H.: Erythroblastosis Foetalis and its association with universal odema of foetus, icterus gravisneonatorum and anemia of new born. J. Pediat. 1: 269, 1932.
6. Diamond, et al (1949): Quoted by Oski Naiman, 1968.

7. Levine, P. (1940): Quoted by Oski and Naiman, 1968.
8. Mehdi, Z., Naichi, P. M. and Gopal Rao, V.: Ind. J. Med. Res. 49: 879, 1961.
9. Morison, J. E.: Foetal and Neonatal Pathology, 3rd Ed., Butterworths, London, p. 311, 1970.
10. Oski, F. A. and Naiman, J. L.: Haematologic problems in newborn, Volume 4, W. B. Saunders Company, Philadelphia and London, 1968, p. 136.
11. Potter, E. L.: J. Amer. Med. Assoc. 115: 996, 1940
12. Weisert, O. and Marstrander, J.: Acta. Paediat. 49: 426, 1960.

See Figs. on Art Paper III