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Isolation of aerobic bacteria from the placenta

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Cultures for aerobic bacteria were prepared from 353 placentas. Specimens were taken from the chorion after removing the amnion. The specimens were immersed into Stuart transport medium.

Microscopic examination of the placenta and cultures from the throat and ear of newborns were also done. The rate of positive bacterial cultures was 16%. Chorioamnionitis was found in 15%. The proportion of chorioamnionitis caused by aerobic bacteria was 44%. The rate of positive bacterial cultures from the placenta in the group of newborns with clinical signs of intrauterine infection was 63%. Bacteria can be present on the chorionic plate without any histological evidence of chorioamnionitis. Bacteriological examination of the placenta is therefore mandatory when amniotic fluid infection is suspected.

Acute inflammation of the placenta often has no adverse effects on the mother or fetus but in some cases it is associated with early onset of labour, congenital pneumonia and clinical evidence of maternal infection [4, 8, 9, 10]. A few of the infections may be haematogenous but most appear to be initiated by bacteria which have ascended through the cervix [2]. Amniotic fluid infection increases the number of apnoeic episodes of the newborn. In a prospective study of 50,826 neonates, amniotic fluid infection was the underlying disorder in 35% of preterm and 25% of term neonates who had multiple episodes of apnoea [12]. Neonatal bacterial infections may potentiate the neurotoxicity of hyperbilirubinaemia [3, 7, 14]. Amniotic fluid infections increased the frequency of mental motor, visual and hearing impairment [11].

Since demonstration of the organisms is important in infections, we have worked out a method for culturing aerobic bacteria from the placenta.

In this paper we present our experience with isolation of aerobic bacteria from the placenta. We examined the specificity of the method, and the relation between the positive bacterial finding and the clinical evidence of neonatal infection.

Materials and Methods

Before taking material from the placenta we removed the amnion from the chorion. Specimens were taken from the surface of the chorion. For this purpose we used a cotton swab previously boiled in phosphate buffer pH 7.4 and treated with 2% active charcoal in water. After obtaining the test material, the swabs were immersed into Stuart transport medium modified by Abdou [1]. In this medium the specimens could be preserved without overgrowth of

non-pathogenic organisms. The specimens were then inoculated into broth and blood agar. In the case of bacterial growth further identifications were made.

Specimens were taken within one hour after birth. The placentas were kept at room temperature, under sterile conditions. For the examination of specificity [6] we have chosen cases where on the basis of history, the clinical appearance of the newborn and histological examination of the placenta no bacterial growth could be expected. In this group we included newborns with the criteria as follows. (1) The membranes had not ruptured prematurely; (2) the cervix was not dilated before the beginning of labour; (3) delivery occurred without any instrumental aid; (4) the mother was not toxaemic and the amniotic fluid was not meconium-stained; (5) the mother had no urogenital infection; (6) there was no inflammation in the subchorionic plate of the placenta; (7) the mother and her baby had no fever before and after the delivery. We believe that under such conditions the chorion must be free of bacteria.

An infiltration by neutrophils of the subchorionic plate of the placenta was considered an evidence of chorioamnionitis [11].

Immediately after birth, throat and ear swabs were also taken.

The rate of bacterial growth from the placenta was examined whenever some clinical evidence of neonatal infection could be discovered. In this group we included newborns with the symptoms of intrauterine acquired infection: apnoea, respiratory distress, tachypnoea, fever, distension, hyperbilirubinaemia [5]. The placentas were examined unselected. The birth weight of the newborns ranged from 980 g to 4200 g.

Results

Specimens for bacterial culturing were taken from 353 placentas. Bacterial growth could be observed in 57 cases (16%). The organisms isolated were Escherichia coli in 16, cases, Pseudomonas aeruginosa in 14 Streptococcus beta haemolyticus in 14, Staphylococcus aureus in 9, and Klebsiella pneumoniae in 4 cases.

Chorioamnionitis was found in 52 cases (15%).

In the group of healthy newborns, specimens were taken from 54 placentas. Bacteria could be isolated from 2 placentas (4%). In 96% of the cases the chorionic plate was free of aerobic bacteria and on the basis of the history, the appearance of the newborn and the histological findings the presence of organisms was not expectable.

In 52 cases with chorioamnionitis, bacterial growth was seen in 23 cases (44%).

In the group of placentas with a positive culture, chorioamnionitis has been found in 23 cases (40%) and 22 newborns showed clinical evidence of intrauterine infection (38%).

In 35 newborns with clinical evidence of intrauterine infection, bacteria were isolated from the placenta in 22 cases (63%).

The same organism could be isolated from the ear and throat of 10 newborns.

Discussion

Pathogenic bacteria may be cultured from many placentas [9, 10]. In our study the rate of positive cultures of aerobic bacteria amounted

to 16%. Naeye et al could identify congenital pneumonia in 76% of their cases with placentitis; pathogenic aerobic bacteria were present in the lungs of 63% of those with, and 14% of those without, congenital pneumonia [8].

Specificity is the ability of a test to identify correctly all of the non-diseased patients as non-diseased [6]. Therefore we examined the rate of positive bacterial cultures in healthy placentas. The placenta passes the birth canal and during this process the surface can be contaminated with bacteria, so it senseless to take specimens from the maternal or fetal surfaces. Therefore we removed the amnion and the specimens were taken from the chorion. We did not find bacterial growth from the placentas of healthy newborns in 96% of the cases.

The sensitivity of the method could not be determined. Sensitivity is the accuracy of a test in correctly identifying all of the diseased patients [6]. The non-specificity and wide range of signs and symptoms that may be observed in neonates with intrauterine infection make the correct diagnosis difficult [5]. Cultures of gastric aspirate, of throat and ear swabs or of cord blood may be misleading [5].

In our material the proportion of chorioamnionitis caused by aerobic bacteria was 44%. This can be explained by the fact that chorioamnionitis can be caused by organisms other than aerobic bacteria, i.e by anaerobic bacteria, viruses, mycoplasma, etc. [9, 13].

Positive bacterial cultures were found in 57 cases. In this group chorioamnionitis was found in 40%. According to this finding, bacteria can be present on the chorionic plate without causing leucocytic infiltration. Hence the absence of chorioamnionitis does not rule out the presence of bacteria on the chorionic plate. The organisms can spread to the fetus, causing infection.

Conclusions

Bacteriological examination of the placenta is mandatory if amniotic fluid infection is suspected. Bacteria can be present on the chorionic plate without any evidence of chorioamnionitis. Owing to the small percentage of false positive cases, the method seems to be suitable for isolation of aerobic bacterial from the placenta.

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