

ANAEROBIC FLORA WITH PREMATURE RUPTURE OF MEMBRANES

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Two manifestations of anaerobic infections have been known in obstetrics for a long time: as puerperal fever from anaerobic cocci and as gas gangrene, usually after artificial abortions but also following normal deliveries. The importance of anaerobics in other gynecologic disease has been disputed. On the other hand, it has been stated that strictly anaerobic bacteria constitute normal vaginal flora in healthy women (2), on the other hand, it has been noted (3) that they occur only rarely. In almost 24% of women bacteroides has been demonstrated in amniotic fluid (4), and ascending infections from anaerobics are said to occur especially with prematurely ruptured membranes (2).

Information on the species identification of anaerobics is sparse. This would be useful, especially for bacteroides species, in order to assess their pathogeneticity. Isolates from pathological material are mostly (75%) *Bacteroides fragilis* whereas *B. vulgatus* is the dominate species in the gastro-intestinal tract and it never causes septicemia (5).

Against this background we present our own findings. In 35 deliveries after premature rupture of membranes during 1978 we obtained cultures from the newborn infants' nasopharynx, ear, axilla, and anus; vaginal or cervical smears were cultured on the mothers. There were two spontaneous stillbirths. There were 25 vaginal deliveries and 13 Cesarean sections.

Until processing in the laboratory within 24 hours the specimens were preserved in transport media. Primary anaerobic surface cultures were inoculated and differentiated according to Werner (5).

Bacteroides species were isolated in 19 of 25 vaginally delivered newborns; peptococcaceae and clostridia (not *C. perfringens*) were found in four and two cases respectively (Table 1). In several newborns up to three bacteroides species were found simultaneously. The bacteroides organisms belonged to a total of 8 species. The organism with known pathogeneticity; i.e., *B. fragilis*, was found only three times; in one infant it was present in all sites together with *Streptococcus agalactiae*. Among the facultatively anaerobic organisms (not *S. agalactiae*, usually enterococi) predominated as well as *Streptococci Escherichia coli* and *Straphylococcus epidermidis*.

Considerably different findings occurred with combination of prematurely ruptured membranes and Cesarean section (Table 3). In only three of 13 newborns were *Bacteroides* species seen, and in one infant additionally anaerobic cocci. Of these, two were *B. oralis*, and one for strain the culture failed before differentiation. Among the facultatively anaerobic strains *S. epidermidis* and streptococci (not *S. agalactiae*) predominated. From clinically confirmed intrauterine infections *S. agalactiae* and *Listeria monocytogenes* were isolated; i.e., species of bacteria known to be perinatal pathogens.

In order to interpret these findings we will compare them to results from our earlier work (6): a. in healthy pregnant women vaginal secretions yield only rarely (5%) strict anaerobics. b. strict anaerobics can be found in 42% of postpartum patients with *B. oralis* dominating with 25 of 88 isolates, followed by *B. fragilis* (19 of 88). c. *B. oralis* is the

predominating species in women with colpitis not caused by *C. albicans*, however, it is not yet clear whether this is colonization or infection. d. In severe gynecologic infections; e.g. peritonitis, IUD, or perforation of the uterus we found *B. fragilis*.

These findings can be interpreted that anaerobic isolates from newborns following vaginal infection are almost exclusively contamination from the flora of the vaginal and GI tract. A possible exception was seen in the infant in whom all cultures yielded *S. agalactiae* together with *B. fragilis*.

The findings in infants who are born by Cesarean section allow the assumption that anaerobics do not occur more often with ascending infections. However, it is interesting that *B. oralis* appears to ascend more easily; i.e., that species which occurs also in lochia and colpitis. The pathogenic importance of these findings is not clear.

From our own observations (Table 4) the greatest peril for the newborn appears to originate from *B. fragilis*. *B. fragilis* was isolated from gastric aspirate and blood in one infant and it occurred together with *E. coli* in one stillborn. The prognosis for infants with *B. fragilis* infection appears to be favorable (1). The infant infected exclusively with *B. fragilis* as well as the one infected with *B. fragilis* and *S. agalactiae* recovered under antibiotic therapy with equivocal sensitivities against *B. fragilis*.

Table 1

Colonization of 25 newborns/fetuses after vaginal delivery with prolonged rupture of membranes

a. <u>Strictly Anaerobic Organism</u>		b. <u>Facultatively Anaerobic Organism</u>	
<i>Bacteroides</i> species	19/25	<i>Streptococcus agalactiae</i>	2/25
Peptococcaceae	4/25	Other streptococci	15/25
<i>Clostridium</i> species	2/25	<i>Staphylococcus</i> species	12/25
		<i>Escherichia coli</i>	18/25
		<i>Candida albicans</i>	3/25

Table 2

Differentiation of *Bacteroides* species from Table 1; N = 26

B. oralis (2), *B. fragilis* (3), *B. thetaiotaomicron* (5), *B. distasonis* (3), *B. vulgatus* (3), *B. variabilis* (1), *B. uniformis* (1), undifferentiable *bacteroides* species (7)

Table 3Bacteroides and peptostreptococcus species in three of 13 newborns following Cesarean section with prolonged rupture of membranes

<u>Strictly Anaerobic</u>	<u>Facultatively Anaerobic</u>
a. Bacteroides oralis	Listeria monocytogenes
b. Bacteroides oralis	Streptococcus epidermidis, Enterococci
c. Bacteroides species	E. coli, P. mirabilis
Peptostreptococcus species	
<u>Exclusively Facultatively Anaerobic Organisms</u>	
Streptococcus agalactiae	2/13
Staphylococcus epidermidis	5/13
Streptococcus species (not S. agalactiae)	5/13
Escherichia coli	1/13
Lactobacillus	1/13

Table 4B. fragilis in two infants with clinical signs of infection

<u>Bacteriology Results</u>	<u>Diagnosis</u>	<u>Chemotherapy</u>
a. B. fragilis	amnionitis	cefazolin + tobramycin
b. B. fragilis, S. agalactiae	sepsis	ampicillin + gentamicin

Literature

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