ROUTINE USE OF ANAEROBIC IN PEDIATRIC PATIENTS

Introduction

Anaerobic bacteria can cause a variety of endogenous infections in children, and may be serious and life-threatening. Because of their fastidious nature, they are difficult to isolate from infectious sites, and are often overlooked. Anaerobic bacteria can occur in all body sites, including the central nervous system, oral cavity, head and neck, chest, abdomen, pelvis, skin and soft tissues. They colonize the newborn during vaginal delivery and have been recovered from several types of neonatal infections. These include bacteremia, cellulitis of the site of fetal monitoring, neonatal aspiration pneumonia, conjunctivitis, ophalitis and infant botulism. [1]

A Glance of Anaerobic Bacteremia in newborns

The awareness of the role of anaerobic bacteria in neonatal bacteremia and sepsis has increased in recent years. The incidence of recovery of anaerobes in neonatal bacteremia varies between 1.8% and 12.5% [2]. Many studies revealed that the most common anaerobes isolated are Bacteroides spp. (particularly B. Fragilis), and Clostridium spp. (mostly C. perfringens) [1, 2, 3, 4]. Other commonly found anaerobes are Peptostreptococcus spp., P. Acnes, Veillonella spp., Fusobacterium spp. and Eubacterium spp.

Polymicrobial infections of anaerobes or aerobe-anaerobe are frequently reported. Chow and co-workers [5] reported the simultaneous isolation of Bacteroides spp. from gastric aspirate in four instances, from the amniotic fluid or uterus at caesarean section in two cases and from the maternal and fetal placental surfaces and the external auditory canal in one instance each. Brook et al. [6] reported the concomitant recovery of B. fragilis group from lung aspirates of two patients with pneumonitis; Harrod and Sevens [7] recovered B. fragilis from the inflamed placenta; Dysant and associates [19] and Brook et al. [6], Kasik et al. [18] and Webber and Tuohy [8] recovered B. fragilis from the cerebrospinal fluid of a total of four patients with meningitis. Brook [9] isolated B. fragilis from an occipital abscess that developed following neonatal monitoring with scalp electrodes. Ahonkhai et al. [10] described the concomitant isolation of C. perfringens in the placenta of a newborn. Kosloske et al. [11] recovered

Clostridium spp., B. fragilis, and Eubacterium spp. from the peritoneal cavity of four patients with necrotizing enterocolitis. Brook et al. [12] isolated Clostridium difficile from the peritoneal cavity of a newborn with necrotizing enterocolitis [13].

In one patient, reported by Noel et. al. [14], Bacteroides vulgatus was isolated from single blood culture along with 4 aerobic bacteria (Streptococcus faecalis, E. Coli, Streptococcus faecium, and Klebsiella pneumoniae) [13]

A Glance of Anaerobic Bacteremia in Children

Anaerobic bacteremia is rarely described in pediatric patients. Several studies showed recovery of anaerobe from children who were undergoing dental manipulation [14, 15], Propionibacterium spp. dominating, followed by Veillonella alcalescens.

Brook and colleagues [16] summarized their experience in detecting of anaerobic bacteremia noted in 28 children at UCLA Medical Center and Children Hospital in Washing DC. Twenty-nine anaerobic isolates were recovered from 28 patients (age 1 week-15 years). Bacteriodes spp (particularly B. fragillis) was the predominant species encountered. Study revealed that all patients with P. acnes bacteremia had clinical infection.

Similar to newborns, an important aspect in anaerobic bacteremia in children is that anaerobes frequently present in cases of polymicrobial bacteremia reflecting the fact that localized anaerobic infections are usually polymicrobial. Frommell and Todd [17] reported 56 children with bacteremia with multiple bacteria isolates. Rosenfeld and Jameson [18] reported a 15-year-old child with polymicrobial bacteremia involving seven isolates (including four Bacteriodes spp. and anaerobic cocci) associated with pharyngotonsillitis.

The importance of Routine Anaerobic Blood Culture in Pediatric Patients

Recovery of Obligate Anaerobic Bacteria

Anaerobic bacteria are important clinical pathogens and these organisms can only be recovered by anaerobic blood cultures. The isolation and identification of certain Clostridium species, B. Fragilis, Peptostreptococcus, Fusabacterium and P. ances, in the blood stream calls for need to perform routine anaerobic blood culture

Optimize the recovery of wider spectrum of organism

A review of the experience of John Hopkins indicates that 16% of streptococci and 17% of Enterobacteriaceae were recovered only in anaerobic bottle. Study by Shoji and colleagues [19] revealed that 25% of enterobacteriaceae, 15% of staphylococci and 10% of streptococci only detectable by anaerobic culture bottles. The study also shown that combination of aerobic-anaerobic blood culture bottles could increase the yield of facultative anaerobic bacteria.

A recent study in University of Malaya Medical Centre revealed that omitting the anaerobic bottle in pediatric blood cultures would have decreased the isolation rate from 11.7% to 10.3% [4]. The result was in total agreement with a previous study by Riley and Parasakthi [20].

High Mortality Rate Caused by Anaerobic Bacteria

The overall mortality noted in newborns is 26% and is highest with B. Fragillis groups (34%) whereas in older children, mortality rate range from 15-35%. Delayed in detection of anaerobic bacteria which lead to the inappropriate choice of antimicrobial therapy was often a contributory factor to mortality [13].

Similar Symptoms With Aerobic Infection

The clinical presentation of anaerobic bacteremia is similar to that of aerobic infection except for the signs of infection observed at the infection's port of entry. These commonly include fever, chills, hypotension, leukocytosis and shock [13]. Thus, routine use of anaerobic blood culture bottle could help to minimize the risk of missed isolation and improve the patient care.

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