**Case Communications**

**Escherichia coli Brain Abscess in a Very Low Birthweight Premature Infant**

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Key words: brain abscess, *Escherichia coli*, very low birthweight, ultrasound

Brain abscesses are uncommon in neonates and even rarer in very low birthweight infants. Brain abscess could be single [1] or multiple [2,3], and might be associated with various conditions and interventions, such as bacteremia, fungemia [1], scalp vein catheter infection, ventriculoperitoneal shunt ascending infection, or meningitis [3,4].

Diagnosis of a brain abscess in a sick premature infant is now feasible by bedside ultrasound examination. Detection of such an abscess by ultrasound could be incidental or based on suspicious clinical findings. We report here a case of brain abscess in a very low birthweight premature infant and describe relevant microbiologic, imaging and management aspects.

**Patient Description**

A 28 week female premature infant weighing 1,187 g experienced mild respiratory distress syndrome after birth. On day 5 of age, ampicillin and gentamicin were initiated due to suspected sepsis. On day 8 her condition deteriorated and antibacterial therapy was switched to vancomycin and imipenem-cilastin, pending results of the sepsis workup. Multiresistant *Klebsiella* grew in the bloodstream but not in the urine or cerebrospinal fluid. Amikacin was added and vancomycin was discontinued. The infant’s condition improved and subsequent blood cultures were sterile. Brain ultrasound on day 9 was normal.

On day 22 of age, while on antibacterial therapy, a routine brain ultra-sound revealed a 3 x 2.6 cm hypoechic and well-defined lesion in the left occipital area (Figure A), which was further delineated by computerized tomography (Figure B). The lesion was punctured by a neurosurgeon and an exudative hemorrhagic fluid was aspirated in which multiresistant *Escherichia coli* grew with abundance of granulocytes and cell debris. Concurrent CSF examination showed pleocytosis (red blood cells 8,430, neutrophils 975, lymphocytes 57), elevated protein concentration (423 mg/dl) and low glucose concentration (3 mg/dl), without microbial growth. The patient was treated with meropenem for 3 weeks. Brain CT on day 52 revealed a smaller 1.1 x 1.5 cm lesion, and brain ultrasound displayed similar findings. The baby was discharged home on day 73 of age.

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CSF = cerebrospinal fluid

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[A] Brain ultrasound shows a large, mainly hypoechic, well-defined parasagittal lesion in the left occipital area (arrows) with mild mass effect on adjacent structures.

[B] CT of the brain at the same level showing a low density, well-defined lesion with ring enhancement (arrowheads) after contrast-medium injection.
Comment
The causative pathogens of brain abscess in newborn infants are diverse and include gram-negative bacteria such as *Citrobacter*, *Klebsiella*, *Proteus*, *Serratia*, and enteric species [3,5], coagulase-negative or positive staphylococci [2], anaerobes and *Candida* species [1].

Our tiny premature infant had fulminating gram-negative sepsis and developed partially treated meningitis with brain abscess while on broad-spectrum antibacterial treatment. This case is unique in that the brain abscess was due to multiresistant *E. coli*, a pathogen not previously reported in a very low birthweight premature infant as a cause of brain abscess.

We would like to emphasize the importance of obtaining material from the brain abscess, whenever possible, for definitive microbial identification and optimization of antimicrobial therapy. In addition, the present case highlights the role of routine bedside ultrasound in neonatal intensive care units for the detection, localization, and follow-up of brain abscess in neonates.

References

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Critical Limb Ischemia Successfully Treated by Intermittent Pneumatic Compression

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Key words: intermittent compression, critical ischemia, arterial circulation

Intermittent pneumatic compression is a well-known method for the prevention of deep vein thrombosis and reduction of lymphedema in the lower limbs. Recently however, the concept of using IPC for the treatment of ischemic legs reemerged [1]. This method, which applies impulse compression based on high pressure rapid inflation technology, was found to improve arterial circulation in the lower limbs [2]. We present the case of patient with critical limb ischemia successfully treated by this method.

**Patient Description**
A 75 year old man was referred to our outpatient clinic after one year of progressive rest pain in both legs accompanied by edema in his lower legs and non-healing ulcers on his calves. He also suffered from chronic obstructive pulmonary disease and non-insulin diabetes mellitus. Physical examination revealed: blood pressure 130/90, pulse 90, a systolic heart murmur, absence of pulses in both legs below the groin region, two arterial ulcers on each leg and bilateral edema of the feet. The patient was defined as having critical limb ischemia (Fontaine III) and immediate measures were necessary to restore perfusion.

After team consult the patient was considered to be a non-surgical candidate because of the high operative risk. We decided to try the recently introduced IPC device ArtAssist AA-1000e (ACI Medical Inc, San Marcos, CA, USA) that has foot and calf cuffs (known as the IPPC). A treatment regimen of 3 hours a day in divided sessions was started immediately and the patient continued this mode of therapy for 3 months as an outpatient. We noticed a prominent reduction in his leg edema after 3 days, and the patient felt relief of his rest pain. Three weeks after the treatment was begun the ulcers had healed. Doppler examinations at the end of the 3 months demonstrated a significantly improved ankle-brachial index in both legs compared to the previous Doppler exam (Figure), and there was a favorable change in the pulse volume recording. At the end of 3 months there was a subjective and objective improvement in both legs. We were not able to detect any change in distance walking because the patient's severe COPD prevented prolonged ambulation.

Comment
Recently, external pneumatic compression has been shown to significantly aid in the treatment of peripheral occlusive arterial disease. Claudication range has been at

IPC = intermittent pneumatic compression

COPD = chronic obstructive pulmonary disease