

A case of scalp abscess caused by *Achromobacter xylosoxidans* after vacuum delivery

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Achromobacter xylosoxidans is an aerobic gram-negative bacillus that may cause opportunistic infections in immunocompromized patients and newborns. Neonatal scalp abscess is generally a complication of fetal scalp monitoring and is typically polymicrobial. We present a case of a newborn, delivered by vacuum extraction, who developed a scalp abscess that yielded growth of *Achromobacter xylosoxidans*. (Korean J Pediatr 2006;49:451-454)

Key Words : Abscess, *Achromobacter xylosoxidans*, Newborn, Scalp, Vacuum extraction

Introduction

Neonatal scalp abscess is a rare but potentially life threatening emergency that must be differentiated from the much more common cephalhematoma. Scalp abscess in newborn is generally a complication of fetal scalp monitoring¹⁻⁴. Scalp abscess can also occur in newborns who had no scalp electrodes after superinfection of a cephalhematoma and occasionally after forceps or vacuum delivery^{2, 3}.

The organisms involved are usually vaginal in origin. The microbiology is predominantly aerobic with *Streptococcus* species and *Staphylococcus epidermidis*, and *Escherichia coli* being the most common⁴. The predominant anaerobes are *Peptostreptococcus* species, *Bacteroides* species, *Propionibacterium acnes*, and *Prevotella* species. Polymicrobial infection is present in 61% and single organisms are isolated in 39%. *Mycoplasma hominis*, *Neisseria gonorrhoeae*, and *Streptococcus viridans* have been reported to cause scalp abscesses in newborns.

Achromobacter xylosoxidans (*A. xylosoxidans*) is an aerobic, motile, gram-negative bacillus, responsible for spo-

radic nosocomial infections in immunocompromised patients⁵ and newborns⁶⁻⁹. However, no case of scalp abscess caused by *A. xylosoxidans* has been reported.

Here, we describe a case of a neonatal scalp abscess, which was due to *A. xylosoxidans*, after vacuum delivery.

Case Report

A 11 day old male infant was admitted to the neonatal intensive care unit due to swelling over the scalp. He was delivered by vacuum at a maternity clinic at 39 weeks' gestation. Birth weight was 2.94 kg. At discharge on the second day of life, cephalhematoma was not noticed.

On the fifth day of life the baby was noted to have red line on the scalp which developed to swell thereafter. The baby was brought to the maternity clinic by his mother, but observed without treatment. Because the mass was enlarging the baby was transferred to our hospital with the diagnosis of possible abscess at 11 days of age.

On admission, the patient was alert and feeding normally. The vital signs on admission were: temperature, 36.1°C; pulse rate, 152/minutes; respiratory rate, 34/minutes. His anterior fontanelle was flat; about 4.3×3.0×1.7 cm sized, swelling on right parietal area was noted. Overlying scalp appeared to be reddened with a small crust on top (Fig. 1). The remainder of the physical examination was unremarkable.

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The presumptive diagnosis was scalp abscess and possible sepsis. Investigations included: complete blood count; serum C-reactive protein (CRP); culture of the blood, cerebrospinal fluid (CSF) and urine. The white blood cell (WBC) count was 29,980/mm³. Hemoglobin was 10.6 g/dL, and platelets were 1,073,000/mm³. The CRP value was 16 mg/dL. Analysis of the CSF revealed 112 WBCs/mm³, with a differential of 49% neutrophils and 38% lymphocytes; 29,250 red blood cells/mm³; a glucose level of 38 mg/dL; and a protein level of 201 mg/dL. Blood, CSF and urine cultures were negative.

Skull roentgenograms showed a soft tissue swelling over



Fig. 1. Abscess, about 4.3×3.0×1.7 cm sized, erythematous with a small crust on top, over the right parietal scalp is shown.

the right parietal scalp. No skull fractures were present. Magnetic resonance image of the head revealed abscess over the right parietal scalp. There was no abnormal finding in brain parenchyme (Fig. 2A, 2B).

Ampicillin (100 mg/kg per day) and cefotaxime (100 mg/kg per day) were given. However, the size of abscess increased and became tense. On the third hospital day, bloody pus was draining spontaneously from the abscess. The neurosurgery service took the infant to the operating room for incision and drainage; Small amount of pus remained was brought up and there was mild bony erosion. On the ninth hospital day, all three abscess aspirates grew a pure culture of *Achromobacter xylosoxidans*. This bacterium was susceptible *in vitro* to imipenem, piperacillin, trimethoprim/sulfamethoxazole, ceftazime, ticarcillin, intermediate to ampicillin/sulbactam and resistant to ampicillin, amikacin, aztreonam, cephalothin, ciprofloxacin, ceftriaxone, cefepime, gentamicin, tobramycin. On the basis of antimicrobial susceptibility patterns, antibiotics were changed to piperacillin. The infant remained afebrile throughout his hospitalization. After a 2-week course of intravenous piperacillin, he was discharged from the hospital to take an additional 1-week of treatment with oral trimethoprim/sulfamethoxazole at home. A skull roentgenograms prior to discharge showed no evidence of osteomyelitis. At follow-up examination 2 months after surgery the infant was doing well.

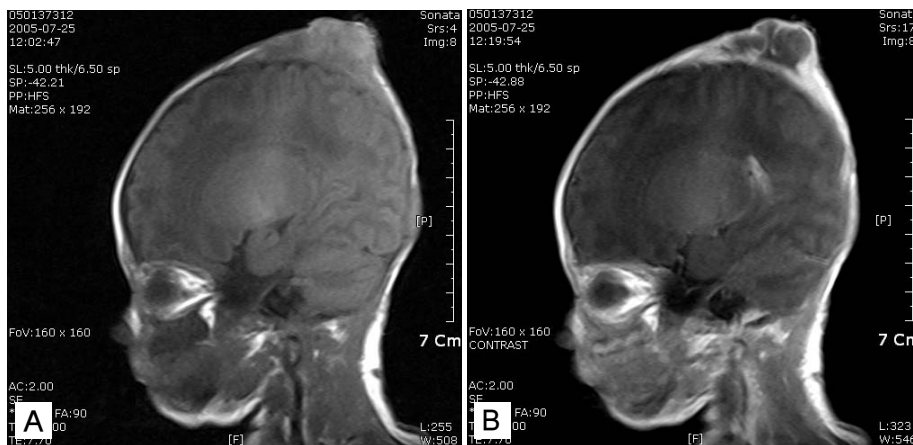


Fig. 2. (A) Sagittal T1-weighted magnetic resonance (MR) image of the head shows swelling in the right parietal scalp. Internal signal of the swelling is heterogenous and iso to slightly high compared with gray matter. **(B)** Sagittal T2-weighted magnetic resonance (MR) image shows this lesion is abscess with high internal signal intensity. After contrast media injection, peripheral enhancement is noted.

Discussion

Microbiologically, *A. xylosoxidans* is a Gram-negative bacillus with peritrichous. *A. xylosoxidans* is not fermentative, but decomposes glucose and xylose oxidatively¹⁰. It has been isolated from the normal flora of the ear and gastrointestinal tract in humans and from aquatic surroundings in hospitals. Previous reported cases of infection caused by *A. xylosoxidans* included bacteremia, meningitis, biliary tract infection, pneumonia, osteomyelitis, and endophthalmitis^{5, 11-15}. It has rarely been reported as cause of abscess. There has been no report of scalp abscess caused by *A. xylosoxidans*. The case described here may be the first case of a scalp abscess caused by *A. xylosoxidans*. In this case, the scalp abscess may have been caused by a skin infection after the vacuum delivery.

Scalp abscesses tend to develop on day 4 of life and start as small indurated masses 1 to 3 cm in diameter that soon become fluctuant and suppurative. In our patient, scalp abscess was first noticed at 5 days of age. Characteristically, scalp abscesses demonstrate erythema, tenderness, and warmth, and tend to be more circumscribed than cephalhematomas. Cephalhematomas usually develop on the first day of life, resolve over a 3-week period, and demonstrate minimal erythema, tenderness, and warmth. It may be difficult to clinically differentiate an infected scalp abscess from a sterile cephalhematoma, but infection should be suspected in infants with persistently enlarging hematomas, those who have signs of infection (tenderness, warmth, erythema) and in ill-appearing or febrile infants who have what appears to be a cephalhematoma.

Delayed diagnosis results in a lethal outcome. Therefore the early diagnosis and appropriate treatment is important and may be life saving. In our patient, the delayed diagnosis and administration of antibiotics seems to have led to the progress of the disease.

Twenty seven percent of cases of scalp abscess have had positive blood cultures; all have cultured the same organism as recovered from the scalp abscess⁴. In this patient, blood culture yielded no growth.

Appropriate diagnostic workup of a suspected neonatal scalp abscess should include: a history of scalp electrode use; a physical examination to look for a fluctuant or indurated mass; skull X-rays, which might reveal a bony defect; and CT, which might reveal an abscess and would

rule out any associated intraparenchymal complications. Optimal diagnosis and treatment also includes needle aspiration followed by incision and drainage of the abscess cavity and subsequent intravenous antibiotics, guided by the sensitivities of the cultured organisms.

Ceftazidime is the only extended-spectrum cephalosporin that typically has good in vitro activity against *A. xylosoxidans*; meropenem and trimethoprim-sulfamethoxazole are also typically active. This organism is generally resistant to aminoglycoside and aztreonam. Monotherapy is probably sufficient in most cases of infection. Our patient responded to piperacillin and the scalp abscess caused by *A. xylosoxidans* resolved without complications. The severity of neonatal infection by *A. xylosoxidans* has been reported previously⁶⁻⁹. The high mortality of these infections seems mainly related to the host status of newborns, especially prematurity or low birth weight. Indeed *A. xylosoxidans* appears weakly virulent.

한글 요약

진공분만으로 출생한 신생아에서 발생한 *Achromobacter xylosoxidans*에 의한 두피 농양 1례

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*Achromobacter xylosoxidans*는 호기성 그람음성균으로 면역저하자과 신생아에서 기회감염을 일으킬 수 있다. 신생아에서 두피 농양은 주로 태아 감시의 합병증으로 발생하고 대개 여러 균 감염이 된다. 저자들은 진공분만으로 출생 후 두피 농양이 발생하였고 *Achromobacter xylosoxidans*가 배양된 1례를 경험하여 보고하는 바이다.

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