

Subspectacular Abscess Involved with MRSA (methicillin resistant *Staphylococcus aureus*) in a Snake

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Abstract : A 1-year-old, male, captive born Burmese Python (*Python molurus bivittatus*) presented with cloudiness of the left eye after ecdysis. Based on physical examination and history, subspectacular abscess was diagnosed. The causative microorganism was identified as a methicillin-resistant *Staphylococcus aureus* (MRSA). MRSA is a zoonotic problem of high concern and is a risk in public health and veterinary medicine. To our limited knowledge, this is the first reported case of MRSA infection in snakes.

Key words : Burmese Python (*Python molurus bivittatus*), methicillin-resistant *Staphylococcus aureus* (MRSA), subspectacular abscess.

Introduction

Subspectacular abscesses are one of the most commonly observed ophthalmic diseases in snakes. The nasolacrimal duct in snakes normally exits the subspectacular space and enters the mouth, resulting in direct communication between the subspectacular space and the oral cavity (10). This condition leads to accumulation of purulent debris within the subspectacular space, which lies between the spectacle covering the cornea and cornea due to blockage of the lacrimal duct (4). Infection within the subspectacular space also can arise from penetrating spectacle trauma or hematogenous spread in the case of systemic infection and septicemia (3,4). *Pseudomonas* and *Proteus* spp. are the most commonly isolated bacteria in subspectacular abscess cases (3,10).

Methicillin resistant *Staphylococcus aureus* (MRSA) is a well recognized multi-drug resistant nosocomial pathogen in humans. MRSA has increased over the past 20 years in human and veterinary medicine and is now considered an emerging pathogen as a significant community-associated pathogen (2,7). Transmission of MRSA from dogs to humans has been described (1). To date, the emergence of MRSA in pets has potentially significant implications in public health. This case presented a subspectacular abscess involving MRSA in a Burmese python (*Python molurus bivittatus*). This is the first case report associated with MRSA in veterinary medicine in South Korea.

Case

A 1-year-old, male, captive-born Burmese Python (*Python*

molurus bivittatus) was presented for evaluation with a history of increased opacity of the left eye for a week (Fig. 1A and 1B). The owner reported that this feature might appear after ecdysis. Other signs of illness were not observed except decrease in response to prey. The snake was housed alone in a glass aquarium with artificial carpet bedding. A bath towel, a hide, and artificial plants were also in the aquarium.

On physical examination, the snake was in good condition and had no evidence of nasal discharge or oral cavity lesions. However, it responded poorly to stimuli. A thorough oral examination failed to reveal any oral lesions. The ophthalmic examination revealed normal direct and consensual pupillary light reflexes in snakes. Any defect on spectacle or penetrating wound was not detected on slit lamp examination. Differential diagnosis included subspectacular abscess and retained spectacle based on history. To identify the presence of retained spectacle, the clouded left spectacle was rubbed using cotton swab wetted with warm saline but the spectacle was not removed, retained spectacle was ruled out. Thus subspectacular abscess was tentatively diagnosed and drainage was performed. Butorphanol (0.5 mg/kg, intramuscularly; butorphan, Myung Moon Pharm, Seoul, Korea) was administered as premedication and

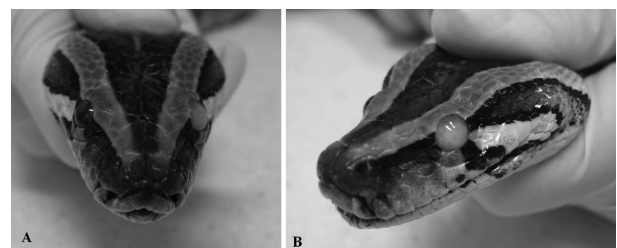


Fig. 1. A Burmese python with increased opacity of the left spectacle.

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left eye was anesthetized with topical 0.5% proparacaine hydrochloride (1 drop on the left eye; Alcaïn, Alcon-couvreur NV, Rijksweg, Belgium). The left spectacle was prepared routinely for surgery with lavages of diluted povidone-iodine and a small wedge resection of the spectacle was performed. After opening the subspectacular space, yellowish caseous materials were removed and admitted for cytology and culture. Cytological examination revealed clusters of degenerative heterophils with gram positive cocci, eosinophilic debris, and occasional epithelial cells. The materials were submitted for bacterial/fungal cultures and antibacterial susceptibility tests. The subspectacular space was flushed out with saline and ophthalmic enrofloxacin solution. After drainage procedure, ceftazidime (50 mg/kg, intramuscular, every 3 days; Kunhwa Pharm., Seoul, Korea) was administered as empirical antibiotics.

Bacterial cultures revealed the presence of *Staphylococcus aureus*, which was confirmed with biochemical tests and an API Staph identification kit (Biomerieux, l'Etoile, France). Antibiotics susceptibility testing was performed by a disc-diffusion test and the test with oxacillin was used to evaluate the methicillin resistance (11,12). Isolated bacteria were resistant against multiple antibiotics including cephazolin, cefotaxim, oxacillin, tetracycline, and chloramphenicol, but susceptible to amikacin, gentamicin, tobramycin, amox-clavulanic acid, and ciprofloxacin (11,12). The results of fungal cultures were negative. Based on the test results, the causative bacteria were identified as MRSA and a diagnosis of subspectacular abscess with MRSA was made. Reexamination after 2 weeks revealed no recurrence.

Discussion

The most common spectacular diseases of snakes are retained spectacles, subspectacular abscess, and pseudobuphthalmos (4). Subspectacular abscesses can be confused with retained spectacles due to its clinical appearances, such as cloudiness. Causes of retained spectacles include dry environment, local injury to the spectacle, mite or tick infestation, and systemic illness. This condition is generally observed after ecdysis due to abnormal shedding of the superficial layer over the eye, especially when environmental humidity is low (3,4,6). Retained spectacles can be distinguished from subspectacular abscesses by applying moisture to the affected eye to loosen the spectacles. In this case, two differential diagnoses were made following physical examination and based on ecdysis history, and the condition was finally diagnosed as subspectacular abscess because there was no response of the affected eye when wetted cotton swab was applied and bacterial infection was confirmed as surgical drainage was performed.

In cases of subspectacular abscess, culture of the debris should be obtained because subspectacular abscess are caused by numerous infectious pathogens, including aerobic and anaerobic bacteria and fungi (4). Heomoprotozoa are sometimes identified in the debris, but their presence is considered to be incidental (10). Generally, *Pseudomonas* spp. are the most

common causative agent (although other organisms may be present), and a broad-spectrum antibiotic such as fluoroquinolone and aminoglycosides, is often used as prophylactic agents (3,4). Ceftazidime is usually the initial drug of choice in reptiles. Ceftazidime is classified as the third generation cephalosporine, which has an excellent gram-negative spectrum and some gram-positive and anaerobic spectrum (8). The action of these agents was especially optimized against *Pseudomonas* spp. (5). Thus, ceftazidime was selected as the initial antimicrobial drug in this case.

Since the mid-1970s, there has been an increase in the number of reports of MRSA infections in pets and in veterinary clinics (9,14,16). MRSA infections are important causes of morbidity and mortality in pets (16). In dogs and cats, MRSA emerged from the direct contact with humans, and humans are regarded as the major source of MRSA infection in these species (16). However, a variety of pets might create significant zoonotic transmission in veterinary clinics as occupational health risks (16). Further, there has been limited investigation into MRSA colonization in exotic animals. Some cases of MRSA infection in parrots and turtles have been reported (13,15). MRSA infections in snakes were unknown up to now, and only one MRSA obtained from skin and mucosa in a snake has been reported (15). To the best of our knowledge, this is the first reported case of a snake infected with MRSA. Although final identification of the isolates was not performed using molecular analysis, veterinarians should be aware of the potential infection of MRSA not only in dogs and cats, but also in exotic animals. Further research about MRSA in exotic animals including molecular and gene analysis for the definite identification and evaluation of resistance to multiple drugs is required.

In conclusion, we described the first case of a subspectacular abscess in a Burmese python due to MRSA in Korea. MRSA is one of the most important emerging agents causing zoonotic problems. Thus, further investigation of MRSA distribution in pets and veterinary hospitals is needed to decrease problems associated with MRSA in public health and veterinary medicine.

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메티실린 내성 황색 포도상구균에 의한 서브스펙타클 농양 (subspectacular abscess)으로 진단된 버미즈 비단뱀

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요 약 : 1살령 수컷 버미즈 비단뱀(Burmese python, *Python molurus bivittatus*)이 탈피 후 좌측 눈이 흐려지는 것을 주증으로 내원하였다. 뱀은 신체검사와 병력을 토대로, 서브스펙타클의 농양(subspectacular abscess)으로 진단되었다. 원인이 된 병원체는 메티실린 내성 황색 포도상구균(methicillin-resistant *Staphylococcus aureus*, MRSA)으로 확인되었다. MRSA는 인수공통적으로 중요한 병원체이며 공중보건과 수의학에서도 중요하게 여겨진다. 이 증례 보고는 MRSA에 감염된 뱀에 대한 최초의 보고이다.

주요어 : 버미즈 비단뱀, 메티실린 내성 황색 포도상구균(MRSA), 서브스펙타클의 농양(subspectacular abscess)