

Pulpitis and Odontogenic Facial Inflammation with *Streptococcus gordonii* in a Slow Loris (*Nycticebus coucang*)

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(Accepted: June 12, 2015)

Abstract : A 1-year-old female Slow loris was presented with swelling of left nasal bridge. On physical examination, fracture of left upper canine tooth was found. Cytologic and radiographic examination on the lesion revealed bacterial infection and pulpitis, respectively. The bacteria were identified as *Streptococcus gordonii* by culture and molecular diagnosis. After removal of damaged tooth and administration of antibiotics, the abscess was resolved.

Key words : Slow loris, *Nycticebus coucang*, *Streptococcus gordonii*, odontogenic infection.

Introduction

Slow loris (*Nycticebus coucang*) is a group of prosimians which lives in lowland forest, gardens, and plantations of Indonesia, Malaysia, southern Thailand and Singapore (12). They are classified as vulnerable species on the IUCN Red List (12) and belong to CITES appendix I (2). They have a venom which is anti-parasitic (6) and anti-predator (10). Venom is transpired by toxic bite and some animal traders cut or pull out their teeth to prevent biting without appropriate medical procedure (4). It makes dental problems with bacterial infection.

Several oral flora, including *Streptococcus (S.) gordonii* have been known as an initiator and promoter of dental plaque formation in human medicine (5,9,11). *S. gordonii* is generally nonpathogenic but highly immunogenic and associated with bacterial endocarditis by platelet adhesion (14,15). This case report shows *S. gordonii* infection in the subcutaneous of face by canine tooth fistula in a Slow loris monkey.

Case

A 1-year-old female Slow loris was presented with swelling of the left nasal bridge (Fig 1(A)). Fracture and pulp cavity exposure of the left upper canine tooth were observed on physical examination. The left cervical lymph node enlarged compare to the right side with increased firmness. On radiography, lysis of the pulp was identified (Fig 2). Cytologic preparation was obtained by fine-needle aspiration from swollen facial lesion. Inflammatory response with degenerative neutrophil and phagocytized cocci were found on cytologic examination (Fig 3). The aspirate was cultured on

Muller-Hinton agar at 37°C for 5 days and cultured colony was submitted to antibiotic susceptibility and molecular analysis. The bacteria was susceptible to cephalosporins (cefaclor, cefazolin, cefotaxime, ceftriaxone and cephalothin), aminoglycosides (amikacin and gentamycin), β -lactams (amoxicillin-clavulanic acid and ampicillin-sulbactam), fluoroquinolones (enrofloxacin and ciprofloxacin), tetracycline, doxycycline, trimethoprim-sulfadimethoxazole and chloramphenicol. Isolate was submitted to DNA extraction and polymerase chain reaction (PCR) using bacterial universal primer pair (27F: 5'-AGAGTTTGATCCTGGCTCAG-3', 1492R: 5'-GGTTACCTTGTTACGACTT-3'). PCR products were bi-directionally sequenced using an ABI PRISM™ BigDye™ Terminator Cycle Sequencing Ready Reaction Kit V.3.1 for species identification. The 16S rRNA gene sequence was compared with the gene sequences deposited in GenBank and the sequence of the isolated bacteria corresponded to *S. gordonii* with 100% identity (accession No. AB355602.1).

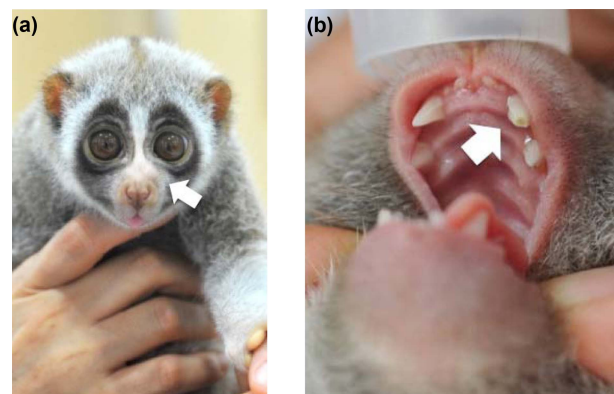


Fig 1. Swelling of left nasal bridge (arrow) (A) and fracture of left upper canine tooth (arrow) (B) were observed on physical examination.

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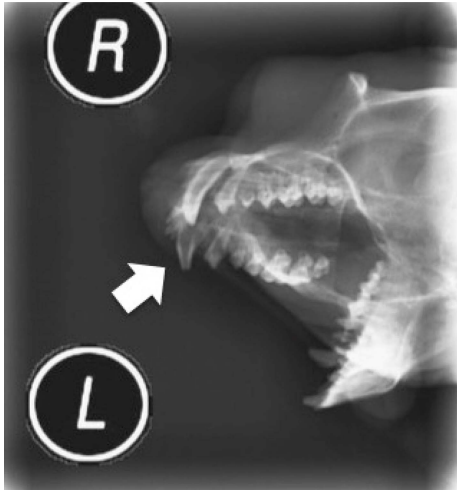


Fig 2. Radiographic examination showed increased radiolucency of pulp cavity of the left upper canine tooth (arrow) compared to the right side.

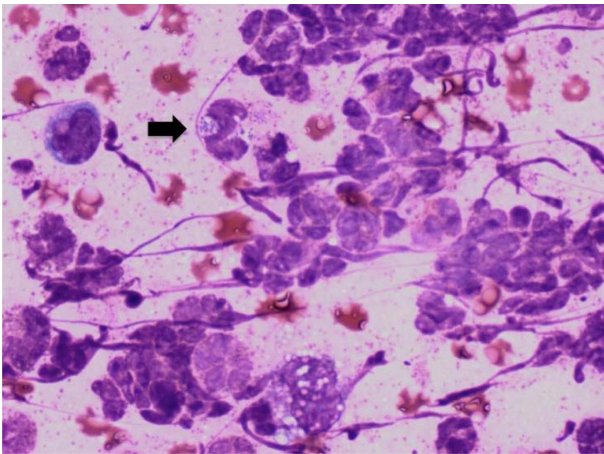


Fig 3. Pyogranulomatous inflammation and bacterial infection on cytology. Note the degenerative neutrophils and phagocytized cocci (arrow).

Removal of the damaged canine tooth was performed and 30 mg/kg of cephalexin and 10 mg/kg of metronidazole were administered per oral q12hs for 7 days. The patient was reexamined 1 week after surgery and resolution of the lesion was confirmed.

Discussion

Dental diseases are common in non-human primates (1,3,7, 8) and clinical manifestation of dental problem ranges from simple discoloration of teeth, inappetence or facial swelling to mandibular fractures (13). Bacteria associated with dental disease of Slow lorises include *E. coli*, *Streptococcus* spp., *Klebsiella* spp. and *Staphylococcus* spp. (4). Infection of the root canal may produce serious osteomyelitis and can be fatal (13). There are several factors associated with dental diseases of lorises: diet, behavioral problem, genetic factors and specific pathogens (13). The patient's tooth was fractured with an unexpected accident. The patient described in this report had bacterial infection and primary cause was assumed

as tooth fracture. Although Slow lorises are endangered species, illegal trades are prevalent and inappropriate handling and teeth cut may cause dental disease and infection (4). To the best of our knowledge, this is the first report of pulpitis with *S. gordonii* in a Slow loris.

Conclusion

This patient was diagnosed as pulpitis and facial abscess with bacterial infection based on physical examination, radiograph, cytology, culture and molecular diagnosis. It is supposed that the organism, *S. gordonii*, colonized in the subcutaneous of the patient face through the damaged tooth canal.

Acknowledgements

This work was supported by the research grant of Chungbuk National University in 2012.

References

1. Baskerville M. Canine tooth root infection as a cause of facial abscess in the common marmoset (*Callithrix jacchus*). *Lab Anim* 1984; 18: 115-118.
2. Convention on international trade in endangered species of wild fauna and flora appendices I, II and III. Available at: www.cites.org/ Version 2015.2. Accessed April 6, 2015.
3. Curtis JW, Brodsh DL, Weaver DS, Brady AG. Periapical abscesses of cut canine teeth in cynomolgus macaques. *Lab Anim* 1986; 20: 277-280.
4. Duangurai T, Bomrunpan C, Udomkunsri P, Areevijitrakul L, Sutasha K. Bacteria associated root teeth abscesses in slow lorises (*Nycticebus coucang*) and their antimicrobial susceptibility during 2010 to 2012 at veterinary teaching hospital Kasetsart university, Bangkok, Thailand. *Proceeding of Asian Zoo and Wildlife Medicine* 2013; 5-7.
5. Fabricius L, Dahlen G, Sundqvist G, Happonen RP, Moller AJR. Influence of residual bacteria on periapical tissue healing after chemomechanical treatment and root filling of experimentally infected monkey teeth. *Eur J Oral Sci* 2006; 114: 278-285.
6. Grow NB, Wirdateti, Nekaris KAI. Does toxic defence in *Nycticebus* spp. relate to ectoparasites? The lethal effects of slow loris venom on arthropods. *Toxicon* 2015; 95: 1-5.
7. Johnson-Delaney CA. Nonhuman primate dental care. *J Exotic Pet Med* 2008; 17: 138-143.
8. Kimura T. An oro-facial disease 'noma (cancrum oris)' in a Japanese monkey (*Macaca fuscata*): clinical signs, clinicopathological features, and response to treatment. *J Med Primatol* 2008; 27: 217-222.
9. Lee SF. Oral colonization and immune responses to *Streptococcus gordonii*: potential use as a vector to induce antibodies against respiratory pathogens. *Curr Opin Infect Dis* 2003; 16: 231-235.
10. Ligabue-Braun R, Verli H, Carlini CR. Venomous mammals: A review. *Toxicon* 2012; 59: 680-695.
11. Loo CY, Corliss DA, Ganeshkumar N. *Streptococcus gordonii* biofilm formation: Identification of genes that code for biofilm phenotypes. *J Bacteriol* 2000; 182: 1374-1382.
12. Nekaris A, Streicher U. 2008. *Nycticebus coucang*. The IUCN Red List of threatened species. Available at: www.iucn.org/

- iucnredlist.org. Version 2014.3. Accessed April 6, 2015.
13. Plesker R, Schulze H. Dental disease in Slender lorises (*Loris tardigradus*). *Zoo Biol* 2013; 32: 571-574.
 14. Plummer C, Douglas CWI. Relationship between the ability of oral streptococci to interact with platelet glycoprotein Iba and with the salivary low-molecular-weight mucin, MG2. *FEMS Immunol Med Microbiol* 2006; 48: 390-399.
 15. Wang PL. Roles of oral bacteria in cardiovascular diseases- From molecular mechanisms to clinical cases: Treatment of periodontal disease regarded as Biofilm Infection: Systemic administration of azithromycin. *J Pharmacol Sci* 2010; 113: 126-133.

슬로우로리스에서 *Streptococcus gordonii*에 의한 치수염 및 안면부 염증 증례

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요 약 : 안면부 부종으로 내원한 1년령의 암컷 슬로우로리스의 신체검사에서 좌측 상악 견치의 골절이 확인되었다. 세 포검사 및 방사선상에서 세균감염과 치수염이 각각 확인되었다. 세균은 배양 및 분자진단을 통해 *Streptococcus gordonii*로 동정되었다. 손상된 치아의 발치 및 항생제 투여 후 병변은 소실되었다.

주요어 : 슬로우로리스, *Nycticebus coucang*, *Streptococcus gordonii*, 치아유래 감염