

# **JUNE BUG'S STICK-Y SITUATION**

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## INTRODUCTION

Abscesses are a chronic inflammatory response characterized by a fibrous capsule containing purulent debris which forms when the acute inflammatory response fails to clear the body of the initial cause of inflammation. They serve as a mechanism the body uses to separate ongoing suppurative inflammation from the surrounding healthy tissues. These pockets can be sterile, or they can be associated with invading organisms, most commonly bacteria. In dogs, the most common bacteria associated with abscesses are those found on the skin such as *Streptococcus* and *Staphylococcus* species that enter the tissue by penetrating wounds or less commonly by hematogenous spread.<sup>1</sup>

In the initial stages of inflammation, antibiotics are able to penetrate to the site and reach therapeutic concentrations capable of killing invading organisms. However, if the inflammation is not resolved, an abscess will form with a thick fibrous capsule, which will prevent adequate penetration by antibiotics. Additionally, the purulent debris within the abscess can dilute antibiotics and prevent them from reaching therapeutic concentrations, making the organisms more resistant to antibiotic therapy.<sup>1</sup>

Management of some abscesses may become more complicated due to location or to the presence of foreign material within them serving as a persistent nidus of infection or inflammation. For example, retrobulbar abscesses are located behind the globe and can be difficult to manage due to the inaccessible location and complications associated with inflammation in this area.<sup>6</sup> Other difficult to resolve abscesses may be complicated by the presence of a foreign body, such as a grass awn or stick. In these cases, bacteria may thrive within the abscess due to persistent infection of the tissues. Migration of the foreign material through the soft tissues can also contribute to chronic abscessation by irritating the tissues.

Typically, surgical intervention is necessary for these animals.<sup>3</sup> The following case is one in which both location and presence of a foreign body played a role in the history and management of the patient.

## **HISTORY AND PRESENTATION**

June Bug is an approximately 4 year old female spayed chocolate Labrador retriever who presented to Mississippi State University College of Veterinary Medicine Small Animal Emergency service on February 19, 2019 for facial swelling and drainage from her left ear. In October 2017, she was playing fetch with a stick, which impaled her oropharynx. The owners noted some tissue on the stick when they removed it and took her to her primary care veterinarian. The wound in her mouth was cleaned and flushed, and June Bug was prescribed antibiotics. Soon after, she presented to her primary care veterinarian for inability to open her mouth. A masticatory muscle myositis antibody test was negative at that time. She was given prednisone and initially showed improvement. However, she had intermittent facial swelling, inability to open her mouth, drainage from her mouth, and retrobulbar abscess since the initial presentation and was treated with intermittent clindamycin and prednisone. The morning of February 19, 2019 she presented to her primary care for severe facial swelling and drainage from the left ear. At the time of presentation, she was not on prednisone or clindamycin but was taking Deramaxx, tramadol, and Proin. Previously, she had no history of drainage from her ears.

On presentation, June Bug was extremely anxious, alert, and responsive. She had a body condition score of 8/9. Her temperature was 102.8°F. She had a heart rate of 92 beats per minute and a respiration rate of 100 breaths per minute. No ocular or nasal discharge was present. Dried

exudate was seen ventral to the left ear, and the ear canal had a moist substance within it that was inconsistent with seruminous debris. The left eye had no menace response and no direct or consensual left to right pupillary light response. Her mucous membranes were pink and moist and she had a capillary refill time of less than 2 seconds. An oral exam could not be performed due to pain when opening her mouth. No murmurs, arrhythmia, crackles, or wheezes were heard on cardiothoracic auscultation. The rest of her physical examination was normal.

## **PATHOPHYSIOLOGY**

The acute inflammatory response is characterized by five clinical signs that reflect vascular changes and inflammatory mediators in place to allow penetration to the site of inflammation. These signs are redness, swelling, heat, pain, and loss of function. These vascular changes are mediated by inflammatory cytokines and allow neutrophils, complement proteins, acute phase proteins, antibodies, and other inflammatory mediators to leave the vasculature and travel to the site of inflammation and resolve the inciting cause.<sup>8</sup>

When this mechanism fails, a chronic inflammatory response may be initiated leading to fibrosis, granuloma formation, or abscess formation. Abscesses are characterized by a fibrous capsule containing purulent debris in the center and act as a mechanism to wall off diseased tissue from the healthy tissue around it. Abscesses can be categorized broadly as septic or sterile, with septic abscesses being caused most commonly by bacteria.<sup>6</sup>

When an abscess is resistant to treatment, it is important to consider the possibility of a foreign body within it. June Bug had a known history of penetrating oropharyngeal trauma by a stick, a condition that medium to large breed dogs are predisposed to and that increases suspicion

of foreign material. Dogs with oropharyngeal trauma may present in either the acute phase or the chronic phase of the disease process. In the acute phase, dogs may be hypersalivating or show signs of dysphagia and oral pain. These signs are related to the acute phase of inflammation. In the chronic phase, they typically present with abscessation and discharge from the sinuses, which is consistent with the chronic phase of inflammation when the body attempts to wall off the inflamed area. With penetrating wounds, the abscess forms deeper in the surrounding area because bacteria and the foreign material are driven deeper into the tissues. Antibiotic therapy may or may not successfully sterilize the foreign body. Regardless of sterilization, it will serve as a source of persistent inflammation and potentially chronic abscess formation.<sup>3</sup>

## **DIAGNOSTIC APPROACH**

Prior to sedation for computed tomography, basic bloodwork was performed to aid in assessment of June Bug's overall health. Complete blood count revealed a mild lymphocytopenia and mild monocytopenia. Serum chemistry revealed no abnormalities. With these considerations, methadone and dexmedetomidine were used to sedate June Bug for the following diagnostic procedures.

Computed tomography is a valuable tool for assessing soft tissues, and in this case was used to assess the full extent of abscessation. CT revealed a pocket of fluid at the left temporomandibular joint extending to the atlas. The pocket showed an area suspicious of foreign material within the temporalis muscle. The appearance of wood foreign bodies on CT have been described multiple ways in the literature including as hypo- or hyperattenuating foci with gas within or around them. Usually they are angular or linear in shape and do not conform to the

normal anatomy around them.<sup>4</sup> The foreign material in this case was described as a smoothly margined ovoid mineral attenuating structure surrounded by a large peripherally contrast enhancing fluid attenuating region. This was consistent with an abscess with foreign material inside it.

Following CT, fluid was sampled from the fluid pocket by ultrasound guided fine needle aspirate. A slide was made for cytologic evaluation, which revealed severe septic suppurative inflammation with predominantly neutrophils mixed with fewer macrophages, plasma cells, and small lymphocytes. Leukophagia was also observed. Intracellular cocci were seen rarely on the slide. Abscesses are highly cellular on cytology, containing greater than 90% neutrophils with fewer populations of other inflammatory cells. The neutrophils are commonly degenerate and show toxic changes. In the case of sterile abscesses, the macrophage population may increase to more than 50% of the nucleated cell count.<sup>7</sup> Because of the high cellularity and predominance of degenerate neutrophils in addition to the presence of intracellular bacteria, the sample was consistent with a septic abscess.

Ophthalmic examination was performed to assess the left eye for potential causes for blindness. Pupillary light response was absent in the left eye. She also had no dazzle or menace responses in this eye. The pupil was mydriatic. The optic nerve head was found to be mildly darkened. The globe retracted normally and without pain. With her history of a retrobulbar abscess and exophthalmos, retrobulbar nerve damage was suspected. Given the findings on CT and the nonpainful nature of her left eye, it was not recommended to be removed, though it would likely not regain vision.

## TREATMENT AND MANAGEMENT

After locating the abscess and foreign material by CT, surgical removal of the foreign material and debridement of the abscess was elected. A dorsal approach was taken to avoid major nerve and vascular structures located on the lateral aspect of the head in the area of the abscess, such as the facial artery and vein and the auriculopalpebral nerve.<sup>2</sup> The wood fragment was found medial to the temporomandibular joint lodged in the temporalis muscle. It was removed, and the abscess pocket was thoroughly flushed with sterile saline. A sample of the capsule was saved for culture and antimicrobial sensitivity testing. A Jackson-Pratt drain was placed during surgery to monitor fluid production and provide drainage to the area.

After surgery, June Bug began receiving cefoxitin as a broad-spectrum antibiotic until antimicrobial sensitivity test results returned. Her pain was managed using methadone immediately after surgery but was discontinued in the following days. Tylenol 4 was used to manage pain after methadone was discontinued. Trazodone was used to manage anxiety while in the hospital. The culture revealed growth of hemolytic *Escherichia coli*, *Moraxella osloensis*, *Pasteurella multocida*, and an unidentified organism suspicious of *Actinomyces* species. *Actinomyces* is typically sensitive to amoxicillin.<sup>5</sup> The other bacteria showed shared sensitivity to amikacin, cefpodoxime, chloramphenicol, gentamicin, imipenem, ticarcillin, and trimethoprim sulfa. A 6 week course of amoxicillin was prescribed to treat the suspected *Actinomyces*. While all bacteria cultured had sensitivity to trimethoprim sulfa, due to the severity of potential side effects at the necessary doses including keratoconjunctivitis sicca, a cephalosporin, cefpodoxime was considered the most advantageous option with the fewest detrimental effects on the patient to treat the remaining bacteria, so she was also prescribed a 2 week course of cefpodoxime. Since

June Bug was already blind in the left eye, it was decided to avoid the risk of further pathology to the eye.

## **CASE OUTCOME**

June Bug was discharged from the hospital on February 25, 2019. Shortly afterward, she developed a soft swelling around the incision site. The owner reported that the area did not seem painful to June Bug and no discharge was associated with it. For these reasons, we decided it was most likely a seroma and recommended warm packing the area and closely monitoring for any signs of pain or discharge. After 2 days, the swelling had reduced significantly. No drainage or pain was noted by the owners at any point during this episode. June Bug began playing with her ball again after her seroma began to resolve. June Bug did not return for her recheck appointment, but the owners report she is doing well at home and is recovered back to her old self with no signs of pain or discomfort.



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