SURGICAL TREATMENT OF DENTAL-RELATED ABSCESSES IN PET RABBITS

Vittorio Capello, DVM
Clinica Veterinaria S.Siro
Clinica Veterinaria Gran Sasso
Milano, Italy

Formation of dental-related abscesses is common in pet rabbits. Nearly all facial abscesses are a sequela to acquired dental disease, particularly dental disease as a result of metabolic bone disease or tooth fracture. Periapical infections are common, and typically involve both hard and soft tissues, with resultant abscessation and osteomyelitis.

From the clinical standpoint, signs and symptoms of facial abscesses are very different in rabbits when compared to other small mammal species. Development of the abscess is gradual, and the abscess can become very large relative to the size of the patient. Abscesses are usually non-painful, do not affect prehension of food and chewing, and patients are not hyperthermic. Abscesses of rabbits and rodents are surrounded by a very thick capsule wall, and usually contain a white, dense and creamy purulent exudate.

OPTIONS FOR SURGICAL TREATMENT OF PERIAPICAL ABSCESSES

Facial abscesses respond poorly to antibiotic therapy alone, and this is extremely unlikely to resolve them. Treatment must include surgical intervention, and aggressive debridement is generally recommended.

Techniques which have been proposed include:

A. Incision of the capsule, curettage of the purulent exudate, flushing and/or packing of the abscess.
B. Debridement and excision of the entire abscess (including the capsule), and one or more of the following:
   1. Primary closure of the wound
   2. Marsupialization of the abscess site to facilitate postoperative flushing and debridement
   3. Extraction of diseased teeth or bone
   4. Introduction of antibiotic ointments or products designed to enhance healing
   5. Introduction of antibiotic-impregnated polymethylmethacrylate (PMMA) beads
   6. Introduction of calcium hydroxide
   7. Introduction of honey or sugar solutions
   8. Introduction of bioactive ceramics

In author’s experience, the highest rate of success is achieved with:

- surgical excision and debridement of the entire abscess, including the capsule;
- extraction of diseased teeth;
- debridement of the infected/necrotic bone;
- marsupialization of the soft tissues
- frequent postoperative flushing and debridement of the site;
- application of antiseptics, antibiotics and/or products to promote healing into the surgical site until complete healing occurs by secondary intention.

PATIENT SELECTION AND DECISION MAKING

Patients should be carefully evaluated and selected prior to beginning an invasive surgical procedure. A complete and accurate diagnosis based on clinical and radiographic findings is critical to help formulate a treatment plan and determine prognosis. Of equal importance is the level of expected owner compliance, as many patients require multiple surgical procedures, frequent recheck examinations (in some cases for the rest of the patient’s life) and in some cases moderately intensive at-home care. Owners should also understand some procedures may be temporarily cosmetically unappealing.

Poor owner compliance frequently results in disappointing overall results. It should be taken into consideration that in these cases, or in cases of very severe dental disease or complications, euthanasia may be the appropriate and humane choice for the welfare of the patient.

MARSUPIALIZATION

The most common abscesses of pet rabbits develop from periapical infection of mandibular cheek teeth. The typical radiographic abnormalities are represented by a fragment of a mandibular cheek tooth, associated with mandibular osteomyelitis. The cheek tooth fragment is usually visible in the circular radiolucent lesion that likely represents purulent material (Fig. 1).

Figure 1.
The rabbit is anesthetized and placed in lateral or dorsal recumbency, depending on the site of infection. The area is shaved and aseptically prepared. An adhesive transparent drape is placed on the surgical field, facilitating view of the orientation of the head.

A 1-2 cm skin incision is made over the firm mass, taking care not to enter the underlying abscess. Subcutaneous tissue and muscle layers are gently dissected to free as much of the abscess capsule as possible, taking care not to disrupt connection to the cortical bone. A good retractor like the “Lone Star retractor” is used to facilitate access to the surgical site.

The junction between the capsule and mandibular bone is incised using the tip of a #11 scalpel blade. Portions of the wall of the abscess are typically composed of thick connective tissue and/or thin cortical bone, which prevents removal of the entire capsule in one piece. After the incision, the lateral wall of the abscess is carefully dissected free and removed.

The purulent material is removed and the bone cavity flushed. Samples for culture and sensitivity should be collected from the capsule wall, as the purulent material itself is usually sterile (Fig. 2).

Remaining debris or purulent material is removed with a bone curette. Infected or necrotic cortical bone is debrided to the point of bleeding with a small pair of rongeurs or needle holders. This step alone, however will not be enough to resolve osteomyelitis.

After thorough debridement, the fragment of the cheek tooth involved can be visualized. A Crossley’s luxator or hypodermic needle may be used to gently free the attachment of the fragment to the bone. The tooth, which is sometimes attached to a fragment of necrotic alveolar bone, is extracted (Fig. 3).

The bone cavity is debrided once again, and thoroughly flushed with saline and dilute povidone iodine, or 0.05-0.1 % chlorhexidine solution. After surgical debridement of the abscess site, the bone appearing at the bottom of the cavity is actually the lateral side of the medial cortex of the mandible.

Marsupialization of the surgical site is performed with 3-0 or smaller non-absorbable suture material. This procedure allows postoperative flushing and treatment and will facilitate healing by second intention, reducing the risk of recurrence. This treatment method requires a longer and more difficult post-treatment period. However the ability to access and observe the surgical site may make this method preferable to implantation of antibiotic-impregnated beads or other similar techniques. The author prefers povidone iodine/antibiotic ointment to fill the bone cavity. Postoperative appearance often temporarily unattractive, and owners much be prepared for this (Fig. 4).

The diseased overgrown premolar and molar teeth extracted form sites of abscessations have the typical “L-shaped” deformity of the apex. Sometimes the normal structure of the tooth or the fragments is deformed and altered, and can be firmly attached to a fragment of necrotic osteomyelitic bone. Failure to remove these materials results in a high rate of treatment failure.
The postoperative radiograph shows a wide radiolucent area corresponding to the debrided bone site, and the tooth fragment is no longer visible.

POSTOPERATIVE CARE AND DEBRIDEMENT

Postoperative care following marsupialization includes daily flushing, frequent debridement of hard and soft tissues, local application of an antimicrobial ointment and administration of systemic antibiotics and analgesics. Anorexic rabbits must be encouraged to eat as quickly as possible after surgery. Commercial hand feeding products, such as Oxbow Critical Care® are excellent for this purpose. Adjunct fluid therapy may be necessary in some patients.

Frequent recheck examinations and follow-up are mandatory to increase the chance of a successful outcome and should be discussed with the owner prior to surgery. Some owners may be able to perform part of the postoperative care at home. Rabbits can usually be adequately restrained and local therapy performed without sedation. The use of an Elizabethan collar to prevent mutilation of the surgical site is seldom necessary.

The rabbit is placed in lateral recumbency. The head is firmly held in one hand, while taking care to avoid occlusion of nares. The area around the wound is moistened with sterile saline. Crusts, debris and hair in and around the open fistula are gently removed with forceps and sterile gauze. The bone cavity is flushed with sterile saline solution. The catheter tipped syringe, or syringe with a blunt needle helps to direct the flow and achieve adequate pressure for flushing. Syringes with needles should be used with extreme caution in a non-anesthetized patient.

Both the bone cavity and the soft tissues around it are gently debrided with a bone curette or a small Volkmann’s spoon. The goal is to remove debris and to promote bleeding of healthy tissues. The site is then flushed with 0.1% chlorhexidine. Excess solution is removed with sterile gauze or a cotton swab.

An antimicrobial ointment is introduced into the wound with a small syringe. Once a granulation bed has formed (typically after about one week), a collagen-based product designed to promote healing can be used as well. The ointment may also be spread around the marsupialization site to prevent dessication and promote healing.

POSTOPERATIVE FOLLOW-UP

Sutures are usually removed from the marsupialized site 10-12 days postoperatively. At 3 weeks post surgery, the bone cavity is filling with new connective tissue and other deep soft tissues usually heal, reducing the size of the fistula. In about one week, the overlying skin will be completely healed.

In rare cases, significant soft tissue edema may develop following surgery. Skin sutures may contribute to local ischemia which could prevent healing. In these cases, sutures may be removed as quickly as a few days after surgery. Early suture removal will make continued lavage and curettage of the wound more difficult.

LONG-TERM FOLLOW-UP

Periapical abscesses and osteomyelitis are associated with a high rate of reoccurrence. Improved success rates can be achieved with thorough debridement, extraction of diseased teeth and bone marsupialization, and proper post-surgical management, including appropriate antibiotic therapy. Frequent recheck evaluation is critical to determine that both soft and hard tissues are healing, and infection is responding to therapy.

Longer-term follow up (6-8 weeks post surgery) includes radiographic evaluation to demonstrate remodeling and apposition of new bone in the previous sites of osteomyelitis.

OTHER TECHNIQUES

Introduction of the AIPMMA Beads

Implantation of antibiotic-impregnated polymethylmethacrylate (AIPMMA) beads should be considered when complete debridement cannot be achieved, owner compliance may be poor, or post surgical cosmetic appearance is of concern. In the author’s experience, this technique alone without marsupialization is associated with a higher rate of treatment failure.

AIPMMA beads are already available from the market, but are often too big for this purpose. They can be aseptically prepared mixing cefazolin powder to the polymer powder of the methylmethacrylate. Then the liquid monomer is added to the mixed powder, and to make small beads easily, a syringe is filled with methylmethacrylate paste when it is still soft. The strip of paste squeezed out of the syringe is cut in very short pieces, making small spherical beads.

After the removal of the mandibular abscess and the capsule, the extraction of cheek teeth fragments and debridement of the osteomyelitic bone has been accomplished, a small AIPMMA bead, aseptically prepared, is placed into the bone cavity. Additional beads are then introduced.

PMMA beads do not reabsorb and are generally not removed. Therefore the size and number of beads should be chosen to fit the bone cavity. Alternatively, it may be feasible to use a larger number of beads and remove them once healing of the bone cavity begins.

The placement of simple interrupted sutures in muscle and subcutaneous layers keeps the beads in place. Then the skin is sutured in a simple interrupted pattern using non-absorbable material (3-0 to 5-0 nylon).

DEBRIDEMENT OF MAXILLARY ABSCESSEATION

The treatment of maxillary abscessations is similar to that described above.
References