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Arup Das

Veterinary Clinical Complex, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam, India

Dwijen Kalita

Department of Surgery and Radiology, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam, India

Anjali CJ

Department of Surgery and Radiology, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam, India

Bitupona Deuri

Department of Surgery and Radiology, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam, India

Shantishree Das

Department of Surgery and Radiology, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam, India

Bali Yomgam

Department of Surgery and Radiology, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam, India

M Sai Shashank Reddy

Department of Surgery and Radiology, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam, India

Chandramita Barman

Department of Surgery and Radiology, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam, India

Corresponding Author

Anjali CJ

Department of Surgery and Radiology, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam, India

Surgical management of dental abscess in a rabbit using marsupialization technique

Arup Das, Dwijen Kalita, Anjali CJ, Bitupona Deuri, Shantishree Das, Bali Yomgam, M Sai Shashank Reddy and Chandramita Barman

Abstract

A two year old male rabbit was presented to Department of Surgery and Radiology, College of Veterinary Science, Khanapara with a swelling on the lower jaw since one month. Pain was elicited on palpation of the lump close to the mandible. Skull radiography revealed osteomyelitis of the mandible and a fluid filled cavity originating from the mandibular cheek teeth on right ventro-lateral aspect of jaw. The condition was diagnosed as a dental abscess. The surgical procedure consisted of lancing the abscess, aggressive surgical debridement of infected soft tissues and bone, marsupialization of the site under general anaesthesia and repeated wound flushing for two weeks. Bacterial culture of purulent material collected from abscess identified *Staphylococcus* spp. Rabbit also received systemic treatment with Enrofloxacin for four weeks.

Keywords: Radiography, osteomyelitis, mandible, abscess, marsupialization

Introduction

Dental abscesses are common in rabbits and can be detected as a hard lump or swelling usually located at the ventro-lateral aspect of the mandible or the lateral aspect of the maxilla. Root elongation, crown deformities, malocclusion, dental spurs and food impaction between the teeth may predispose to dental abscesses. However, the pathophysiologic process is not completely understood (Taylor *et al.*, 2010) [12]. Occasionally, part of the overlying skin becomes necrotic and a fistula or rupture may occur. Thorough diagnosis using standard or advanced diagnostic imaging should be pursued to make a proper diagnosis, identify surgical candidates and plan the most effective treatment (Capello, 2011) [7].

The treatment of dental abscesses in rabbits is challenging because they produce a thick, caseous pus that is not only difficult to drain but usually contains anaerobic bacteria that are challenging to culture and identify (Tyrrell *et al.*, 2002; Hoyles *et al.*, 2000) [14, 10]. Various surgical options are available to treat dental abscesses. The goal of most of the surgical procedures is to remove the entire abscesses including the capsule, extract the tooth fragments involved and debride the osteomyelitic bone (Capello *et al.*, 2005) [5].

Marsupialization of the soft tissues around the area of affected bone has high percentage of successful outcome particularly in cases of deep or severe osteomyelitis which are common. This technique allows postoperative flushing and debridement of the surgical site, application of antiseptics or other products to promote healing, and constant direct monitoring of healing (Capello, 2008) [6]. Enrofloxacin is a broad spectrum antibiotic licensed for use in rabbits and is safe when administered over long periods without causing digestive problems (Broome *et al.*, 1991) [3]. Clinical outcome of the surgical management of dental abscess in a rabbit using marsupialization technique followed by systemic administration of enrofloxacin is recorded in this article.

Materials and Methods

A 2 year old cross bred male rabbit was presented to the Department of Surgery and Radiology, College of Veterinary Science, Khanapara with the history of a swelling on the lower jaw which has been noticed for one month by the owner. On palpation, a firm immobile lump could be felt on the right ventrolateral aspect of the lower jaw. A dental examination was performed and no loose tooth could be detected. Radiographic examination revealed osteomyelitis of the right hemi-mandible and a large abscess involving the roots of the mandibular cheek tooth (Fig.1).

The dental abscess was decided to be approached surgically using marsupialization of the abscess site. The rabbit was anesthetised using ketamine-xylazine in combination at 35 and 5 mg/kg body weight, respectively. The animal was placed on left lateral recumbency (Fig.2.) and the surgical site was shaved, aseptically prepared and draped. A skin incision was made over the lump. The subcutaneous tissue and muscle layers were bluntly separated to expose the capsule of the abscess. The junction between the capsule and the underlying bone was dissected using sharp scissors. The purulent exudate along with a small portion of the capsule was submitted for culture and sensitivity. The purulent exudate was removed and the bony cavity was thoroughly flushed using saline. The infected bone was debrided using a bone curette and the necrotic soft tissues surrounding the bone were resected. The bony cavity was again flushed using saline followed by 6 percent hydrogen peroxide solution. Marsupialization of the soft tissues around the surgical site was performed using 3-0 Polyamide sutures (Fig.3.). The wound was repeatedly flushed for two weeks using 6 percent hydrogen peroxide solution and packed using 5 percent povidone iodine ointment. Postoperatively, enrofloxacin at 5 mg/kg twice daily and meloxicam at 1 mg/kg/day were administered orally for 4 weeks and 3 days respectively.

Results and discussion

In pet rabbits, the most common complications of acquired dental disease are periapical infections, osteomyelitis of the jaw and facial abscesses (Capello, 2005) [5]. Radiology can be used to determine the underlying cause of abscesses in rabbits and to ascertain the extent of osteomyelitis. Affected roots are often long and distorted or an area of radiolucency around the root may be seen. The bacterial culture of purulent exudate collected from the abscess along with a portion of the capsule isolated *Staphylococcus* spp (Fig.4.). Although *Pasteurella multocida* is believed to be the pathogen in rabbit abscess, *S. aureus* is often found and other bacteria such as *Bacterioides*, *Pseudomonas* or *Proteus* can also be isolated (Hillyer, 1997) [9]. Because periapical infection, osteomyelitis and abscesses are of bacterial origin, antimicrobial therapy is indicated. However, with the exception of some anecdotal reports, no clinical trials have shown that medical therapy alone is effective. Combined dental and surgical treatment removes the entire capsule and the affected tooth/teeth and thoroughly debride the osteomyelitic bone which prevent frequent reoccurrence (Aiken, 2004; Capello, 2004) [1, 4]. This outcome ultimately facilitates the efficacy of antibiotic therapy. The most widely reported and recommended treatment includes aggressive surgical debridement of infected soft tissues and bone with excision of the abscess capsule, removal of the affected teeth, marsupialization of the site, and repeated wound flushing until secondary intention wound closure is obtained (Capello, 2005) [5]. Systemic treatment with antimicrobials for a minimum of 2 to 4 weeks after surgery is also recommended (Bennet, 1999) [2]. Oral administration of Enrofloxacin at 5 mg/kg twice daily can be given for long periods to rabbits and is more likely to achieve therapeutic tissue levels (Broome *et al.*, 1991) [3]. Oral administration of meloxicam has been shown to be well tolerated by rabbits (Turner *et al.*, 2006) [13]. High dose (1 mg/kg/day) of meloxicam does induce a degree of analgesia (Leach *et al.*, 2009) [11]. In this case, the marsupialization sutures were removed 7 days postoperatively, once granulation tissue started to cover the exposed bone. At 3 weeks after surgery,

the bony cavity was filled with new connective tissue. The overlying skin was completely healed at 4 weeks after the surgery (Fig.5.). Similar findings were observed by Capello (2016) [8].



Fig 1: Lateral view of the skull of rabbit with osteomyelitis of the mandible involving roots of the mandibular cheek teeth and a large abscess (arrow)



Fig 2: Anaesthetised patient is placed in lateral recumbency



Fig 3: Marsupialization of the surgical site using Polyamide 3-0

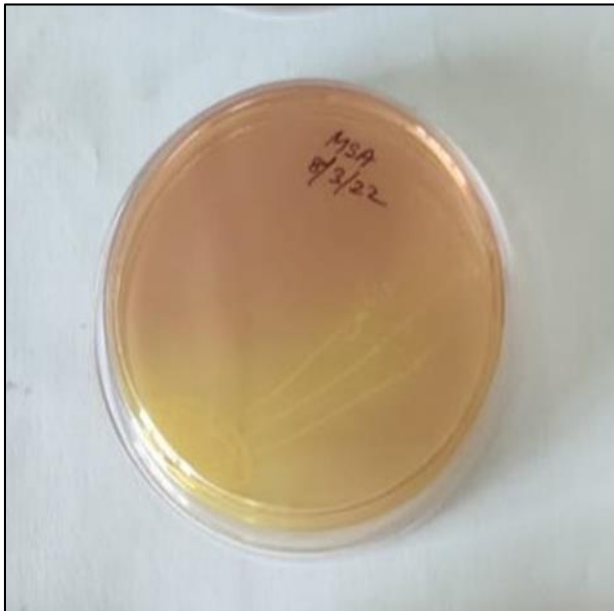


Fig 4: Golden-yellow colonies of *Staphylococcus* sp. in Mannitol Salt Agar



Fig 5: Healed skin after 4 weeks of surgery

Conclusion

A case of dental abscess in rabbit and its successful treatment using a surgical approach of marsupialization is discussed in this article. The rabbit had an uneventful recovery by 4 weeks after surgery following repeated flushing and antimicrobial therapy.

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