

# Case Report

## Juvenile mandibular ossifying fibroma in a 12-week-old foal

S. S. TROSTLE\*, N. RANTANEN, M. ANDERSON†, S. TAYLOR AND D. S. VRONO‡

*San Luis Rey Equine Hospital, 4211 Holly Lane, Bonsall, California 92003; †California Animal Health & Food Safety Laboratory System, PO Box 1770, Davis, California 95617; ‡938 North Diamond Bar Blvd, Diamond Bar, California 91765, USA.*

**Keywords:** horse; juvenile; mandibular; ossifying; fibroma

### Introduction

Proliferative, fibro-osseous lesions of the oral cavity have been reported to occur in young horses (Pool 1978; Pascoe and Summers 1981; Barber *et al.* 1983; Livesey and Wilkie 1986; Morse *et al.* 1988; Pirie and Dixon 1993). Many previously described lesions of the mandible and maxillae in young horses, such as fibroma, osteoma and osteosarcoma, may well have been ossifying fibroma (Barber *et al.* 1983; Livesey and Wilkie 1986). Equine juvenile mandibular ossifying fibroma has been described as a separate entity based upon characteristic histological findings and its predilection for the rostral portion of the mandible in young horses (Morse *et al.* 1988). **In this article, we report a case of juvenile mandibular ossifying fibroma in a 12-week-old foal.**

### Case details

#### History

A 12-week-old, 150 kg Morgan colt was admitted to the San Luis Rey Equine Hospital for evaluation of a mass on the left hemimandible. The mass had not been detected at birth, but was first noted when the foal was aged approximately 6 weeks. Tissue obtained from the mass by fine needle aspiration at 10 weeks of age was thought to be an organising haematoma.

#### Clinical findings

On physical examination, the foal's temperature, pulse and respiratory rates were within normal limits and it appeared bright and alert. Respiratory and cardiac sounds heard during auscultation of the thoracic cavity were normal. On the left hemimandible, a 10 x 5 x 5 cm ovoid mass was located ventral to the mandible in the area of the premolars (**Fig 1**). The mass

was firm and had a sessile base. The foal showed no signs of pain during palpation or manipulation of the mass. The oral cavity appeared normal and the gingival mucosa was not disrupted. The foal was sedated with xylazine (0.3 mg/kg bwt i.v.) and digital radiographs of the mandible (**Fig 2**) demonstrated bony enlargement of the left hemimandible at the level of the premolars. The mass had a smooth bony cortex with a rosette pattern of trabecular bone and a poorly defined, centrally located, radiolucent area. Radiographically, the mass did not appear to be locally invasive. Differential diagnoses at the time included osteogenic tumours such as osteoma and osteosarcoma, tumours of dental origin such as ameloblastoma and odontoma, and soft tissue tumours such as juvenile ossifying fibroma.

#### Treatment and outcome

##### Surgery

On the following day, the foal was prepared for surgical resection of the mass. Haematology was found to be normal. A 16 gauge indwelling jugular catheter was placed and anaesthesia induced



**Fig 1:** View of the left mandible, with a firm mass centred over the area of the premolars.

\*Author to whom correspondence should be addressed. Present address: Blue Ridge Equine Clinic, PO Box 278, Free Union, Virginia 22940, USA.



**Fig 2:** Lateral radiograph of the left hemimandible. Note the smooth bony cortex with a rosette pattern of trabecular bone and a poorly defined centrally located radiolucent area. The mass appears to be centred over the premolars.

with a combination of xylazine (0.3 mg/kg bwt i.v.), ketamine (2.2 mg/kg bwt i.v.) and diazepam (0.02 mg/kg bwt i.v.). The foal was intubated orotracheally and maintained on isoflurane inhalant anaesthesia. Preoperative antimicrobial drugs were not administered in anticipation of intraoperative cultures. The foal was positioned in dorsal recumbency and the mandible aseptically prepared and draped for surgery. A 12 cm long, fusiform-shaped skin incision was centered over the mass. Underlying subcutaneous tissue was elevated away from the bony mass by sharp dissection using scissors and a scalpel. The bony mass was isolated and split longitudinally to determine the depth and location of the normal mandibular periosteum and cortical bone. Osteotomes and curettes were then used to debride the remainder of the mass to a level of the mandible that grossly appeared normal (**Fig 3**). Based on gross anatomical evaluation, the mass was removed in its entirety and intraoperative radiography used to confirm complete resection. An 18 gauge needle was placed into an area from which necrotic tissue had been debrided and was determined radiographically to extend to the caudal root of the first cheek tooth (706) (**Fig 4**). The subcutaneous tissue was closed with 2-0 polyglactin 910 in a simple continuous pattern and the skin with 2-0 polypropylene in a cruciate pattern. The foal recovered uneventfully from anaesthesia.

### Histology

Histologically, the tissue consisted of orderly spicules of trabecular bone with crude woven bone cores, covered by lamellar bone and bordered by a single layer of orderly osteoblasts set in an oedematous fibrous stroma. The bony trabeculae arose perpendicular to an indistinct osteogenic layer of the periosteum. The connective tissue stroma between the generally parallel trabecular systems was oedematous with centrally orientated, small calibre blood vessels set in a delicate fibrillar stroma formed by stellate to spindle-shaped fibroblasts. Focal areas of pseudocysts occurred randomly in the bony



**Fig 3:** Intraoperative view with the horse in dorsal recumbency; rostral is to the left. The mass was sectioned longitudinally in an attempt to determine the presence of normal mandibular periosteum and bone.



**Fig 4:** Intraoperative lateral radiograph of the left mandible. The bony mass has been surgically resected and an 18 gauge, 3.8 cm long needle placed at the level of gelatinous tract in the mandible. It appears to extend to the caudal root of the second premolar (706).

mass. These areas were formed by mucinous degeneration of the oedematous intertrabecular fibrillar matrix accompanied by osteoclastic destruction of the adjacent trabecular bone. The histological findings were typical of those of juvenile mandibular ossifying fibroma (Morse *et al.* 1988).

### Post operative outcome

Post operatively, the foal received procaine penicillin G (22,000 iu/kg bwt i.m. q. 12 h) and gentamicin (6 mg/kg bwt i.v. q. 24 h) for 24 h, plus phenylbutazone (2.2 mg/kg bwt *per os* q. 12 h) for 5 days post operatively. No bacteria were cultured from tissue obtained intraoperatively from the lesion. The foal was discharged 3 days after surgery with instructions for the incision to be monitored and the skin sutures removed 10 days after surgery. The referring veterinarian reported that the incision had healed primarily at the time of suture removal. The owners reported 12 months after surgery that there was no recurrence of the swelling and no problem associated with dentition.

### Discussion

Juvenile ossifying fibroma is a well recognised but uncommon condition affecting young horses (Morse *et al.* 1988; Richardson *et al.* 1991). The predilection of the tumour for the rostral portion of the mandible of young horses, coupled with its clinical, radiographic and histological characteristics,

supports the classification of this lesion as a distinct entity (Morse *et al.* 1988). There has previously been confusion and difficulty in diagnosing fibro-osseous lesions of the equine mandible (Pool 1978). Richardson *et al.* (1991) suggested that many previously diagnosed tumours of the premaxilla, maxilla and mandible were likely to have been ossifying fibromas.

Histologically, equine juvenile ossifying fibromas have a characteristic abrupt transition from subgingival fibroblastic stroma to a zone of proliferating osteoblasts that form irregular spicules of osteoid (Morse *et al.* 1988). The layer of proliferating osteoblasts blends with a deeper zone of bony trabeculae rimmed by osteoblasts and separated by intertrabecular spaces of moderate cellular density (Morse *et al.* 1988).

Ossifying fibromas tend to be diagnosed clinically in horses aged less than 2 years (Richardson *et al.* 1991). Most masses appear to be present at the level of the incisors; in this case, the mass was centred more over the premolars (Richardson *et al.* 1991). Historical evaluation of medical records of horses affected with juvenile ossifying fibroma suggests that it may be associated with trauma (Morse *et al.* 1988), but the young age observed in affected human individuals and horses suggests that ossifying fibroma is probably developmental in origin (Morse *et al.* 1988). The solitary masses can be disfiguring, and the rate of growth varies over a period of days to months (Morse *et al.* 1988; Richardson *et al.* 1991). They are firmly attached to the bony mandibular cortex and are usually nonpainful, but occasionally are ulcerated on the gingival surface and may bleed.

Treatment of horses affected with juvenile ossifying fibroma has consisted of local debridement (Morse *et al.* 1988), local debridement combined with cryotherapy or radiation therapy (Morse *et al.* 1988), rostral mandibulectomy (Richardson *et al.* 1991) or hemimaxillectomy (Kawcak *et al.* 1996) and megavoltage radiation (Robbins *et al.* 1996). Results of local debulking yielded a high recurrence of the condition, typically within 3 months after surgery, necessitating a second surgery to resolve the condition (Morse *et al.* 1988). The most likely reason for local recurrence is incomplete excision. Additional therapies, such as radiotherapy or cryotherapy, have been used in addition to local debulking to reduce the incidence of recurrence (Morse *et al.* 1988). Recurrence following local debulking together with the large size of some of the lesions is a reason for performing rostral mandibulectomy for treatment of lesions on the rostral aspect of the mandible (Richardson *et al.* 1991).

At surgery, we were uncertain as to the origin of the mass. Preoperatively, mandibulectomy was not considered to be a viable treatment option since the mass was centred over the premolars. Intraoperatively, the mass was suspected to be a tumour of dental origin, because the necrotic tract extended to the caudal root of tooth 706. We elected to perform only local debridement until the origin of the mass could be identified.

This report demonstrated that ossifying fibroma can occur in very young horses. Although the rostral portion of the mandible is a site of predilection for juvenile ossifying fibroma, tumours can occur at other locations on the mandible, as well as the maxillae and premaxilla. Treatment with surgical debridement alone can be successful in some cases with ossifying fibroma. More studies need to be conducted to determine which horses could be candidates for simple surgical excision and which require aggressive surgical treatment, such as rostral mandibulectomy.

## References

- Barber, S.M., Clark, E.G. and Fretz, P.B. (1983) Fibroblastic tumor of the premaxilla in two horses. *J. Am. vet. med. Ass.* **182**, 700-702.
- Kawack, C.E., Stashak, T.S. and Norrdin, R.W. (1996) Treatment of ossifying fibroma in a horse with hemimaxillectomy. *Equine Pract.* **18**, 22-25.
- Livesey, M.A. and Wilkie, I.W. (1986) Focal and multifocal osteosarcoma in two foals. *Equine vet. J.* **18**, 407-410.
- Morse, C.C., Saik, J.E., Richardson, D.W. and Fetter, A.W. (1988) Equine juvenile mandibular ossifying fibroma. *Vet. Pathol.* **25**, 15-21.
- Pascoe, R.R. and Summers, P.M. (1981) Clinical survey of tumors and tumor like lesions in horses in southeast Queensland. *Equine vet. J.* **13**, 235-239.
- Pirie, R.S. and Dixon, P.M. (1993) Mandibular tumours in the horse: a review of the literature and 7 case reports. *Equine vet. Educ.* **5**, 287-294.
- Pool, R.R. (1978) Tumors of bone and cartilage. In: *Tumors in Domesticated Animals*, 2nd edn., Ed: J.E. Moulton, University of California Press, Berkley, California. pp 90-149.
- Richardson, D.W., Evans, L.H. and Tulleners, E.P. (1991) Rostral mandibulectomy in five horses. *J. Am. vet. med. Ass.* **199**, 1179-1182.
- Robbins, S.C. Arighi, M. and Ottewell, G. (1996) The use of megavoltage radiation to treat juvenile mandibular ossifying fibroma in a horse. *Can. vet. J.* **37**, 683-684.