

# Case Report

## Subscapular lymph node abscessation as a result of metastatic *Streptococcus equi* subspecies *equi* infection: An atypical presentation of bastard strangles in a mare

D. D. Whelchel\*, C. E. Arnold and M. K. Chaffin

Large Animal Clinical Sciences, Texas A&M College of Veterinary Medicine and Biochemical Sciences, 4475 CVM LACS, Texas A&M University, College Station, Texas 77943-4475, USA.

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### Summary

The case reported here represents an atypical presentation of bastard strangles in an 18-year-old Arab mare. The horse initially presented for progressive neck pain characterised by reluctance to lateral and ventroflexion of the neck. Subsequent diagnostics revealed a subscapular abscess and aspirates of the mass cultured positive for *Streptococcus equi* ssp. *equi*. Surgical drainage and debridement of the abscess was performed under general anaesthesia. Six months post surgery, the mare had made a complete recovery.

### Introduction

Strangles, the disease caused by *Streptococcus equi* ssp. *equi* infection in the horse, is most frequently characterised by acute fever, upper respiratory catarrh, and mucopurulent nasal discharge combined with acute submandibular and pharyngeal lymphadenopathy (Sweeney *et al.* 2005). Lymph node involvement can result in upper airway obstruction and suffocation hence the name 'strangles'. Although the submaxillary, submandibular and retropharyngeal lymph nodes are the most common site of abscessation, *S. equi* infection can potentially occur at any site in the body (Sweeney *et al.* 2005). This metastatic spread of *S. equi* is more commonly known as 'bastard strangles' (Sweeney *et al.* 1987). Common sites for metastatic strangles include lung, mesentery, liver, spleen, kidneys and brain (Sweeney *et al.* 2005).

Detection and diagnosis of metastatic strangles may be challenging. A history of recent exposure to *S. equi* along

with signs of chronic infection such as low grade fever, chronic inflammatory leucogram, anaemia of chronic disease, hyperfibrinogenaemia and hyperglobulinaemia can be suggestive of metastatic strangles (Dalgleish *et al.* 1993; Kaplan and Rush 1996; Spoomakers *et al.* 2003; Pusterla *et al.* 2007). More specifically, elevated IgM titres (>1:12,800) and a clinical response to appropriate antimicrobial therapy (such as penicillin) can further support a diagnosis of *S. equi* (Sweeney *et al.* 2005).

The case presented in this article represents an atypical presentation of *S. equi* infection.

### Case details

#### History

An 18-year-old Arab mare presented to the Texas A&M University Veterinary Medical Teaching Hospital for reported neck pain and stiffness. Approximately 6 weeks prior to presentation, the owner first noted that the horse was reluctant to collect her head and flex her neck while riding. Subsequently, the horse was lunged in side reins to force collection of the head. Progression of neck stiffness or pain eventually resulted in the mare grazing in an awkward posture with her right forelimb extended forward and her left forelimb positioned caudally. One week prior to presentation, chiropractic adjustment of the neck was performed with the horse becoming recumbent during the procedure. Although the mare was able to stand, she exhibited marked reluctance to flex her neck following the chiropractic adjustment and was subsequently referred to the hospital for evaluation.

#### Physical examination

At presentation, the mare was bright, alert and responsive with vital parameters within normal ranges (heart rate:

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\*Author to whom correspondence should be addressed. Present address: Department of Large Animal Medicine, College of Veterinary Medicine, University of Georgia, Athens, Georgia 30606, USA.

48 beats/min; respiration rate: 24 breaths/min; rectal temperature: 37.8°C). The mare exhibited stiffness in the cervical region and was reluctant to perform lateral and ventroflexion of the neck. No focal area of pain, heat or swelling was appreciated on initial palpation of the neck and no evidence of lymphadenopathy was detected on physical examination.

## Diagnostics

Initial diagnostic evaluation included a complete blood count (CBC) and blood chemistry, a neurological examination, and survey cervical radiographs. The CBC revealed leucocytosis ( $17.1 \times 10^9$  cells/l; reference range [rr]  $5\text{--}14.3 \times 10^9$  cells/l), mature neutrophilia ( $15.0 \times 10^9$  cells/l; rr  $2.26\text{--}8.58 \times 10^9$  cells/l), lymphopenia ( $9 \times 10^6$  cells/l; rr  $25\text{--}70 \times 10^9$  cells/l), mild anaemia (packed cell volume: 27.1%; rr 32–53%), and normal fibrinogen levels (4.0 g/l; rr 1–4 g/l). Blood chemistry analysis revealed hyperproteinaemia (98 g/l; rr 53–73 g/l) and hyperglobulinaemia (68 g/l; rr 22–38 g/l) with normal albumin concentration (30 g/l; rr 23–31 g/l). These findings suggested a chronic inflammatory response with a mild anaemia, presumably associated with chronic disease. A comprehensive neurological examination was performed and no neurological deficits were noted with the exception of resistance to lateral and ventroflexion of the neck. Cervical radiographs revealed no abnormalities.

Nuclear scintigraphy was performed to further evaluate the cervical region. An i.v. catheter was placed in the jugular vein and 200 mCi of  $^{99m}\text{Te}$ -HDP was administered i.v. Images were collected using a gamma scintillation camera for the bone phase (2 h post injection). Increased uptake of the radionuclide was visualised in the caudal half of the vertebral body of C6 and articular facets of C6 and C7. Although this has been reported to be a normal finding (Dyson 2003), additional radiographic views focusing on the C6–C7 articulation were taken. Oblique, dorsoventral and lateral views revealed a slight bony irregularity of the C6–C7 articular facets consistent with low grade osteoarthritic change. These findings were regarded as normal ageing changes and unlikely to be the cause the mare's severe clinical signs. Subsequently, ultrasonic evaluation of the cervical region and vertebral column was performed and no significant abnormalities were noted.

After initial diagnostic work-up, the differential diagnoses for the mare's cervical pain and stiffness included diskospondylitis, vertebral osteomyelitis, myositis or soft tissue abscess. Due to suspicion of diskospondylitis, a blood culture was submitted; no bacterial organisms were isolated after 10 days. Further communications with the owner revealed the confirmation of 4 horses positive for *Streptococcus equi* ssp. *equi* at the mare's boarding facility. Therefore, an upper airway endoscopic examination was performed using a 1 m endoscope; the pharyngeal region, larynx, and guttural pouches appeared within normal limits and no retropharyngeal



**Fig 1:** View of abscess on right side of neck. Cranial and dorsal borders were identified sonographically as outlined by yellow dots. The abscess was located cranial to the withers and the cranial border of the scapula. Ultrasonographically, the abscess was also visible on the contralateral side of the neck.

lymphadenopathy was noted. Subsequent bloodwork revealed a mild hyperfibrinogaemia (5.0 g/l) with a persistent chronic inflammatory leucogram, hyperglobulinaemia and mild anaemia (white blood cell count:  $18.7 \times 10^9$  cells/l; mature neutrophils:  $16.1 \times 10^9$  cells/l; globulins: 72 g/l; and packed cell volume: 29.2%, rr 32–53%).

Within 4 days of presentation, the mare's clinical symptoms of neck pain progressed to the point where she would graze grass in lateral recumbency in efforts to avoid lowering her head to eat from the ground. Simultaneously, a swelling developed just craniodorsal to the right scapula (Fig 1). Ultrasonography of the area revealed an encapsulated mass containing fluid with a mixed echo pattern, consistent with pus. The mass emerged dorsally from underneath the proximo-cranial edge of the scapula to the mid withers. On the left side of the caudal cervical region, a deep mass with similar echogenic appearance was visualised; however, no swellings were appreciated on palpation of the left cervical or withers region. Sonographically, these findings were consistent with an abscess involving structures deep and axial to both scapulas extending towards the withers and caudal cervical region. Involvement of the supraspinatous bursa was not detected. Aspiration of the mass in the region of the right caudal cervical region yielded a thick, yellow, purulent, nonodorous fluid. Samples were submitted for cytological evaluation as well as aerobic and anaerobic cultures and sensitivities. Markedly degenerate neutrophils, too numerous to count in number, along with both extracellular and intracellular bacterial cocci in pairs or short chains were observed cytologically. The majority of bacteria stained Gram-positive. The sample was characterised as marked septic suppurative exudate. Cultures isolated a *Streptococcus equi* ssp. *equi* that was sensitive to penicillins, cephalosporins and doxycycline. IgM titres were submitted and returned as 1:6400. Brucellosis titres were less than 1:50 on plate agglutination test.



**Fig 2:** Intraoperative view of the incision through the skin extending to the capsule surrounding the abscesses. Approximately 5 l of thick yellow exudate were evacuated from the abscess.

### Diagnosis

An abscess in this location represented an aberrant presentation of metastatic *S. equi* infection or bastard strangles. We suspected that the subscapular mass resulted from abscessation of a right subscapular lymph node. Enlargement of the abscess resulted in cervical pain and the presenting clinical signs. *S. equi* IgM titres were 1:6400. Titres ranging from 1:3200 to 1:6400 are usually found 4–12 weeks post infection or vaccination (Sweeney *et al.* 2005). The mare had no history of recent vaccination for *S. equi*; therefore, this titre further supported the diagnosis of metastatic *S. equi*.

### Therapy

Initially, the mare was started on a course of oral phenylbutazone (4.4 mg/kg bwt *per os* q. 12 h) to relieve discomfort and omeprazole (2 mg/kg bwt once a day *per os*) as a gastric ulcer preventative. Surgical drainage and debridement of the abscess under general anaesthesia was recommended to the owner.

Following informed consent, perioperative broad spectrum antibiotic therapy consisting of i.v. ceftiofur (Naxcel 2.2 mg/kg bwt q. 12 h) and flunixin meglumine (Banamine 1.1 mg/kg bwt q. 12 h) was instituted. Prior to surgery, the boundaries of the abscess were identified by ultrasonography and marked with skin staples. Initially, the mare was sedated with romifidine hydrochloride (0.08–0.1 mg/kg bwt i.v.) and butorphanol tartrate (0.02 mg/kg bwt i.v.). Anaesthesia was induced with thiopental (5.7 mg/kg bwt) and guaifenesin (given to effect, 34.5 mg/kg bwt i.v.). An endotracheal tube was placed and the mare was maintained on sevoflurane (SevoFlo)<sup>1</sup> inhalant with mechanical ventilation. Intraoperatively, butorphanol (10 mg/h) and lidocaine (2.7 mg/kg bwt/h) were administered i.v. at a constant rate of infusion for additional analgesia. The mare was placed in left lateral recumbency and the surgical area was clipped, prepared and draped in aseptic fashion. Two



**Fig 3:** A penrose drain was placed through both incisions to promote post operative drainage of the abscess.

5 cm linear skin incisions were created, one over the proximal aspect of the scapula and the second at the rostral edge at the level of the proximal third of the scapula. The cervical portion of the *trapezius*, *rhomboideus cervicis* and *subclavis* muscles were sharply transected. The capsule surrounding the abscess was incised, releasing approximately 5 l of thick yellow exudate (Fig 2). After manual debridement and lavage of the abscess, exploration of the remaining fibrous capsule revealed that the abscess extended from the cranio-axial surface of the right scapula to the axial surface of the left scapula. This finding explained sonographic visualisation of the abscess from both sides of the neck. Subsequently, 20 million units of potassium penicillin G was reconstituted in one litre of sterile saline and instilled into the fibrous capsule. A penrose drain was placed through both incisions (Fig 3). Recovery from surgery was achieved with assistance from a head and tail rope.

Post operative care consisted of daily lavage of the abscess with a dilute betadine solution and instillation of 10 million units of potassium penicillin G into the incisions. The penrose drain was removed 3 days after surgery. As drainage from the wounds decreased and an appropriate bed of granulation tissue developed, lavages and topical antimicrobial therapy were discontinued. Antimicrobial therapy with ceftiofur was discontinued on Day 14 after surgery. The mare was placed on doxycycline (10 mg/kg bwt *per os* q. 12 h) for an additional 10 days. Flunixin meglumine was discontinued 3 days after surgery due to the improvement in the mare's level of comfort. Prior to discharge from the hospital, 3 consecutive cultures from swabs of the incisions and a pharyngeal wash were negative for *S. equi* ssp. *equi*. The mare was discharged with instructions for daily wound care and stall rest with hand walking for the next 30 days. Additional recommendations included checking SeM titres every 6 months prior to vaccination for *S. equi* in the future. Specifically, it was recommended not to vaccinate the horse if titres were greater than 1:1600 (Sweeney *et al.* 2005).

## Outcome

Re-examination 30 days after discharge found the mare to be sound at a walk and trot. Flexion of the head and neck was normal and the surgical incisions were nearly healed. The mare grazed with her head and neck in a normal position. Within 2 months, she made a complete recovery. Six months post surgery, the owner was again riding the horse and reported no abnormalities.

## Discussion

The case reported here is a novel presentation of metastatic *S. equi* in both the location of the abscess and the presenting clinical symptoms. The patient showed none of the common signs characterised by strangles nor the insidious clinical signs associated with metastatic *S. equi*. Instead, the patient presented for cervical pain and an inability to lower the head to graze grass. Initially, there were no signs of peripheral abscessation; however, over the course of hospitalisation, a cervical abscess erupted in the caudo-dorsal cervical region just cranial to the proximal border of the right scapula. Aspirates of the abscess cultured positive for *S. equi* and a diagnosis of metastatic *S. equi* was confirmed. Surgical exploration revealed an abscess that originated deep to the medial surface of the scapula; based on the location and extent of the abscess, we postulate that the mass probably resulted from abscessation of a subscapular lymph node. To our knowledge, metastatic *S. equi* has not been previously reported in a subscapular lymph node; however, metastatic abscesses can originate from any lymph node in the body.

Interestingly, horses with paravertebral abscesses along the ventral surface of C4–C7 showed similar clinical signs to the case reported in this article (Rooney 1979). These horses were described as holding the neck in a rigid position, resistant to both lateral and ventroflexion of the neck, and were ataxic. Particularly, these patients were unable to bend the neck ventrally to eat or drink. In the case reported here, no signs of ataxia or other neurological deficits were evident.

Reaching a diagnosis of metastatic strangles may be challenging. A history of recent exposure to *S. equi* along with signs of chronic infection such as low grade fever, a chronic inflammatory leucogram, anaemia of chronic disease, hyperfibrinogenaemia and hyperglobulinaemia can be indicative of metastatic strangles (Dalgleish *et al.* 1993; Kaplan and Rush 1996; Spoormakers *et al.* 2003; Pusterla *et al.* 2007). Diagnostic findings in this case were consistent with previous reports of metastatic *S. equi*. The patient's CBC and blood chemistry showed indications of chronic inflammation; similar findings were reported in other cases of metastatic *S. equi* (Ford and Lokai 1980; Dalgleish *et al.* 1993; Spoormakers *et al.* 2003; Finno *et al.* 2006; Pusterla *et al.* 2007).

More specifically, a very high SeM titre (antibodies to the *S. equi* M protein) is indicative of a metastatic

infection. A high SeM specific titre for *S. equi* (SeM ELISA titre of 1:6400) was detected in this patient. Although a titre >1:12,800 is most consistent with metastatic *S. equi*, Pusterla *et al.* (2007) reported similar titres in patients with intra-abdominal *S. equi* abscesses (Sweeney *et al.* 2005). Individual variation in immune response as well as the timing of antibody measurement relative to the course of disease should be taken into consideration when interpreting the SeM ELISA (Pusterla *et al.* 2007).

In retrospect, earlier knowledge of a strangles outbreak on the farm may have increased the index of suspicion for metastatic *S. equi* and diagnostics such as the SeM titre might have been performed earlier. Careful re-evaluation of the patient and serial ultrasound examinations were critical in making the diagnosis for this case. The swelling found just craniodorsal to the right scapula was first noted on daily physical examination and serial ultrasonograms aided in characterising the mass as an abscess, identifying the extent of abscess, and delineating the surgical landmarks. Although a soft tissue abscess could have been detected earlier using computed tomography or magnetic resonance imaging, the size of the horse and location of the mass precluded use of these modalities. Finally, cytology from a fine needle aspirate of the mass was consistent with an abscess and culture of the fluid provided a definitive diagnosis of metastatic *S. equi*.

## Manufacturer's address

<sup>1</sup>Abbott Laboratories, North Chicago, Illinois, USA.

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