Factors associated with outcome following treatment of horses with septic tenosynovitis: 51 cases (1986–2003)

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Objective—To identify factors associated with outcome (ie, survival and return to function) following treatment of horses with septic tenosynovitis.

Design—Retrospective case series.

Animals—51 horses with septic tenosynovitis.

Procedures—Information was obtained from medical records and through follow-up conversations with owners. Factors analyzed for an association with outcome included affected limb, etiology, duration of clinical signs prior to examination, presence of complications, primary treatment, secondary treatments, number of surgical procedures, and hospitalization time.

Results—Concurrent complications were identified in 41 (80%) horses. The primary treatment consisted of through-and-through lavage in 26 (51%) horses, tenoscopy in 20 (39%), and tenosynoviotomy combined with lavage in 5 (10%). Forty (78%) horses were discharged, and 37 (73%) survived at least 1 year after surgery; 21 of the 37 (57%) returned to their previous or a higher level of performance. Percentages of horses that survived 1 year after discharge and percentages that returned to their intended use did not vary significantly among treatments. Horses with tendon rupture or sepsis of an adjacent joint were significantly less likely to survive. Horses with tendon injury or pannus were significantly less likely to return to their intended use.

Conclusions and Clinical Relevance—Results suggested that various factors were associated with outcome in horses with septic tenosynovitis. However, surgical technique was not found to be associated with survival rate or rate of return to intended use. (J Am Vet Med Assoc 2007;230:1195–1200)

Septic tenosynovitis in horses may result in euthanasia or death, and horses that do survive may not be able to return to their previous level of function. Reasons for a poor outcome in horses with septic tenosynovitis include development of intractable infection, extension of infection to adjacent soft or osseous tissues, laminitis of the contralateral limb, and development of restrictive adhesions.1,2 Specific factors associated with outcome in horses treated for septic tenosynovitis have not been identified, but it seems likely that etiology, the presence of concurrent complications, and treatment may play a role. For example, although trauma is the most common cause of septic tenosynovitis, with the digital flexor tendon sheath most commonly involved,3,4 septic tenosynovitis may also develop following intrathecal injections or as a result of extension from adjacent tissues.3-5 Elimination of bacterial contamination may be less likely following trauma to the tendon sheath because of the presence of necrotic material and the loss of synovial fluid.2 Thus, etiology may play a role in outcome.

Similarly, the presence of concurrent complications may make treatment of septic tenosynovitis more difficult, adversely affecting outcome. In a previous study,5 concurrent complications found to be associated with death or euthanasia of horses with contamination or infection of synovial cavities included osteochondral lesions, osteitis or osteomyelitis, and severe pannus. Severe pannus has also been associated with poor postoperative performance.5-7

The recommended treatment for septic tenosynovitis involves debridement of wounds, lavage of affected structures, establishment of drainage, and maintenance of bactericidal concentrations of antimicrobials at the site of infection.2,9 Recent studies3,7,9,11 suggest that tenoscopy is the treatment of choice for horses with septic tenosynovitis and is superior to other forms of surgical treatment. However, this conclusion was derived by comparing results of separate studies, and the authors are not aware of any single study directly comparing the results of tenoscopy, through-and-through lavage, and tenosynoviotomy in horses with septic tenosynovitis.

The purpose of the study reported here, therefore, was to identify factors associated with outcome (ie, survival and return to function) following treatment of horses with septic tenosynovitis. The authors hypothesized that horses with concurrent complications at the time of initial examination or surgery would have a lower survival rate and lower rate of return to func-
tion than horses without concurrent complications. In addition, the authors hypothesized that horses treated by means of through-and-through lavage or tenosynoviotomy would have a lower rate of return to function than would horses treated by means of tenoscopy.

**Criteria for Selection of Cases**

Medical records of horses treated at the Marion duPont Scott Equine Medical Center between January 1986 and July 2003 were searched to identify horses in which a diagnosis of septic tenosynovitis had been made. Cases were included in the study if the medical record was complete and specific criteria for confirmation of a diagnosis of septic tenosynovitis were fulfilled. A diagnosis of septic tenosynovitis was confirmed if results of bacterial culture of synovial fluid were negative or in which synovial fluid was not submitted for bacterial culture, the diagnosis was confirmed if the results of synovial fluid analysis were compatible with sepsis (ie, WBC count > 30,000 cells/µL with > 90% polymorphonuclear leukocytes and total protein concentration > 4 g/dL) or if there were clinical signs or arthroscopic findings compatible with sepsis (ie, severe lameness; heat and effusion of the tendon sheath; intrathecal foreign material, adhesions, and pannus; and inflammation of the synovium or tendon). Pannus was graded as mild in horses with aggregations of fibrin localized around a wound that could be easily removed with arthroscopic rongeurs and did not obscure the tendon. Pannus was graded as severe in horses with diffuse accumulations of fibrin in the tendon sheath that obscured the tendon and required extensive time for removal.

**Procedures**

Medical records of cases included in the study were reviewed. Information obtained included signalment, history, treatment prior to referral, results of diagnostic tests performed at the time of admission, and any concurrent musculoskeletal complications identified during the initial examination or at the time of the first surgery. The duration of clinical signs prior to referral was recorded as < 1 day, 1 to 10 days, or > 10 days. Outcome was determined by contacting owners a minimum of 1 year after discharge from the hospital.

Other data obtained from the medical records included treatment, duration of hospitalization, and duration of antimicrobial treatment. Data obtained from follow-up telephone conversations with owners or trainers included duration of rehabilitation, use of the horse within the first year after discharge, cosmetic appearance, complications related to the initial injury that developed after discharge, and whether treatment was considered a success by the owner.

Outcome was defined in terms of survival and return to function. Horses alive at the time of follow-up were classified as to whether they had returned to their previous or a higher level of performance or had been relegated to a lower level of performance.

**Statistical analysis**—Logistic regression was used to determine whether various factors were associated with survival (yes vs no) or with return to function (previous or higher level of performance vs lower level of performance). Specific factors analyzed for an association with survival included affected limb (forelimb vs hind limb), etiology of septic tenosynovitis (trauma vs other), duration of clinical signs (< 1 day, 1 to 10 days, or > 10 days), primary treatment (tenoscopy, through-and-through lavage, or tenosynoviotomy), use of secondary treatments (local antimicrobial treatment, intrathecal drains, and annular ligament desmotomy), need for more than one surgical procedure, and presence of one or more of the following complications: fibrous adhesions, tenotendinitis, tendon rupture, sepsis of an adjacent joint, pannus (absent or mild vs severe), and bone lesions. For horses that survived, all of the same factors except duration of clinical signs were also analyzed for an association with return to function.

The $\chi^2$ test was used to screen variables for inclusion in the multivariable model, with variables included in the initial model when the $P$ value was < 0.10. Modeling was subsequently performed by means of forward- and reverse-stepping procedures, and the 2 best models were identified by use of the Pearson goodness-of-fit statistic. The more parsimonious of the 2 models was selected, and odds ratios and their 95% confidence intervals were calculated.

All analyses were performed with standard statistical software. Values of $P < 0.05$ were considered significant.

**Results**

Sixty-five cases of septic tenosynovitis were retrieved from the medical records database system. Of these, 14 were excluded because chronic nonseptic tenosynovitis was diagnosed (n = 6), the complete medical record could not be located (4), or the horse was lost to follow-up (4). The remaining 51 cases were included in the study.

Mean follow-up time for cases included in the study was 5.5 years (range, 1 to 16 years). Fifteen of the 51 (29%) cases were treated before 1990, and 36 (71%) were treated after.

**Signalment and previous use**—For horses included in the study, mean age at the time of initial examination was 7.9 years (median, 6.5 years; range, 3 months to 21 years). There were 34 (67%) geldings, 15 (29%) females, and 2 (4%) sexually intact males. Twenty-six (51%) horses were Thoroughbreds, 8 (16%) were of mixed breeding, 7 (14%) were Quarter Horses, 6 (12%) were warmbloods, and 4 (8%) represented other breeds. Thirty-one (61%) of the horses reportedly had been used for performance purposes (eg, eventing, show jumping, dressage, and polo) prior to the diagnosis of septic tenosynovitis, 9 (17%) had been used for light showing, 4 (8%) had been used as school horses, 4 (8%) had been used for multiple purposes, and 3 (6%) had been foals between 3 and 9 months old.

**History**—In 48 of the 51 (94%) horses, the underlying cause of the septic tenosynovitis was a laceration or puncture wound, and in 2 (4%), the underlying cause was unknown. In the remaining horse, septic tenosynovitis developed following annular ligament desmotomy. Antimicrobials and nonsteroidal anti-inflammatory drugs had been administered to 43 (85%) horses prior
to referral. Other treatments administered prior to referral included intrathecal through-and-through lavage (n = 4), intrathecal administration of antimicrobials (3), and annular ligament desmotomy (1).

Mean duration of clinical signs prior to initial examination at the Equine Medical Center was 8.8 days (median, 2 days; range, 1.5 hours to 4 months). Horses for which duration of clinical signs was < 1 day were significantly more likely to survive than were horses for which duration of clinical signs was > 10 days. Nineteen of the 22 (86%) horses for which duration of clinical signs was < 1 day survived versus 9 of 17 (53%) for which duration of clinical signs was between 1 and 10 days, and 9 of 12 (75%) horses for which duration of clinical signs was > 10 days.

**Clinical findings**—The digital flexor tendon sheath was involved in 46 of the 51 (90%) horses, the tarsal sheath was involved in 3 (6%), and the carpal extensor sheath was involved in 2 (4%). Two horses had bilateral tenosynovitis. The percentage of horses with hind limb involvement (28/51 [55%]) was not significantly different from the percentage of horses with forelimb involvement (23/51 [45%]). Affected limb (forelimb vs hind limb) was not significantly associated with survival (yes vs no) or with return to function (previous or higher level of performance vs lower level of performance).

The diagnosis of septic tenosynovitis was confirmed in 22 horses on the basis of positive results for bacterial culture of synovial fluid. In the remaining 29 horses, results of bacterial culture of synovial fluid were negative (n = 12) or synovial fluid was not submitted for bacterial culture (17). In these horses, the diagnosis of septic tenosynovitis was made because results of synovial fluid analysis were compatible with sepsis (n = 5), there were clinical signs or arthroscopic findings compatible with sepsis (23), or both (1).

Seventeen of the 51 (33%) horses had synovial fluid draining from the wound or other evidence of a direct communication between the affected synovial structure and an overlying wound.

**Synovial fluid analysis**—Results of synovial fluid analyses performed at the time of admission were available for 34 horses. Mean WBC count was 67,117 cells/µL (range, 5,720 to 331,650 cells/µL), and mean total protein concentration was 4.1 g/dL (range, 2.8 to 7.5 g/dL). Mean proportion of polymorphonuclear leukocytes was 90%.

In 34 cases, synovial fluid or tissue samples from the intrathecal space were submitted for bacterial culture. Microscopic examination of Gram-stained samples revealed bacteria in 29 of the 34 (85%) cases. Results of bacterial culture were positive in 22 of the 34 (65%) cases. In 14, a single organism was obtained, and in 8, multiple organisms were obtained. Coagulase-positive *Staphylococcus* spp were identified most often (6/22 [28%]), followed by *Entero bacter* spp (3/22 [14%]), *Esherichia coli* (3/22 [14%]), and *Pseudomonas* spp (2/22 [9%]). Other less commonly identified species included *Corynebacterium pyogenes* (1/22 [5%]), *Enterococcus* spp (1/22 [5%]), *Actinobacter* spp (1/22 [5%]), *Pasteurella* spp (1/22 [5%]), *Actinobacillus* spp (1/22 [5%]), *Serratia marcescens* (1/22 [5%]), *Bacillus* spp (1/22 [5%]), and *Aeromonas hydrophila* (1/22 [5%]).

**Complications**—Concurrent complications were identified in 41 of the 51 (80%) horses (Table 1). Nine horses had partial rupture (ie, ≤ 70%) of the superficial digital flexor tendon (n = 4), deep digital flexor tendon (4), or both (1), and 8 of these horses survived at least 1 year after discharge. Three horses had complete rupture of the superficial digital flexor tendon, and 1 survived at least 1 year after discharge. One horse had complete rupture of the deep digital flexor tendon and did not survive.

**Treatment**—The primary treatment consisted of through-and-through lavage in 26 (51%) horses, tenoscopy in 20 (39%) horses, and tenosynoviotomy combined with lavage in 5 (10%) horses. For all horses, the initial surgical procedure was performed with general anesthesia. Through-and-through lavage was accomplished by placing large-bore needles in the proximal and distal extremities of the affected tendon sheath. In 7 horses that underwent through-and-through lavage, 1-cm-long incisions were created that served as instrument portals for removal of fibrin and adhesions; these incisions were sutured at the completion of surgery. Tenoscopy and tenosynoviotomy were performed as described. Annular ligament desmotomy was performed in 7 horses; this included transection of the palmar or plantar annular ligament of the metacarpophalangeal or metatarsophalangeal joint and transection of the proximal digital annular ligament.

In all horses, amikacin (300 mg) or gentamicin (500 mg) was instilled in the tendon sheath following surgery. All horses were treated with broad-spectrum antimicrobials following surgery consisting of ampicillin sodium (11 mg/kg [5 mg/lb], IV, q 8 h), potassium G penicillin (22,000 U/kg [10,000 U/lb], IV, q 6 h), or sodium cefotiofur (2.2 mg/kg [1.0 mg/lb], IV, q 12 h) in conjunction with gentamicin (6.6 mg/kg [3 mg/lb], IV, q 24 h). Eleven horses also received metronidazole (15 mg/kg [6.8 mg/lb], PO, q 8 h).

Twenty of the 26 (77%) horses that underwent through-and-through lavage, 14 of the 20 (70%) horses that underwent tenoscopy, and 3 of the 5 (60%) horses that underwent tenosynoviotomy recovered enough to return to function (previous or higher level of performance vs no) or with return to function (previous or higher level of performance vs lower level of performance).

Table 1—Concurrent complications in 51 horses with septic tenosynovitis.

<table>
<thead>
<tr>
<th>Complication</th>
<th>No. of survivors (%)</th>
<th>No. that returned to function (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tendon injury*</td>
<td>12 (24)</td>
<td>10 (83)</td>
</tr>
<tr>
<td>Tendon rupture†</td>
<td>13 (25)</td>
<td>9 (69)</td>
</tr>
<tr>
<td>Sepsis of an adjacent joint</td>
<td>7 (14)</td>
<td>4 (57)</td>
</tr>
<tr>
<td>Osteochondral lesions‡</td>
<td>14 (27)</td>
<td>11 (79)</td>
</tr>
<tr>
<td>Pannus</td>
<td>17 (33)</td>
<td>9 (53)</td>
</tr>
<tr>
<td>Fibrous adhesions</td>
<td>11 (22)</td>
<td>8 (55)</td>
</tr>
</tbody>
</table>

*Fraying or tearing of the tendon seen during surgery or tendinitis diagnosed ultrasonographically. †Partial (< 70%) or complete rupture of the affected tendon. ‡Metacarpophalangeal joint in 5 horses, tibiotarsal joint in 1 horse, and distal interphalangeal joint in 1 horses. §Involving the proximal sesamoid bones.
that underwent tenosynoviotomy survived at least 1 year after discharge. Percentages of horses that survived 1 year after discharge did not vary significantly among treatments. Eleven of the 20 horses that survived after through-and-through lavage, 9 of the 14 horses that survived after tenoscopy, and 1 of the 3 horses that survived after tenosynoviotomy returned to their previous or a higher level of performance. Percentages of horses that returned to their previous or a higher level of performance did not vary significantly among treatment groups.

Tendon rupture was identified in 13 horses (Table 1). In all 4 horses with complete rupture of a digital flexor tendon, the tendon was sutured with a locking-loop pattern. In 3 of the 9 horses with partial rupture of a digital flexor tendon, the tendon was sutured. In 10 horses with tendon rupture, a half-limb cast was applied. In the remaining 3, a Robert Jones bandage was applied to the affected limb.

In 9 of 16 horses with severely contaminated wounds, the wound was surgically closed following debridement of devitalized tissue. In 5 horses, an ingress-egress drain system was implanted. Other secondary treatments performed in selected horses included IV regional limb perfusion (9/51 [18%]), implantation of polymethyl methacrylate beads (6 [12%]), and implantation of continuous antimicrobial infusion devices (5 [10%]). There was no significant association between outcome (survival or return to function) and use of secondary treatments.

Mean duration of antimicrobial treatment was 18.8 days (range, 3 to 48 days). Phenylbutazone was administered to all horses before and after surgery (2.2 to 4.4 mg/kg [1 to 2 mg/lb], IV or PO, q 12 h). Mean duration of phenylbutazone treatment was 10 days (range, 4 to 34 days). Controlled walking was initiated after surgery in horses in which a cast had not been applied. Other postoperative treatments were performed on a case-by-case basis and included intra-articular administration of hyaluronic acid or antimicrobials and application of a heel wedge to the affected and contralateral limb to decrease tension on the flexor tendons. Mean duration of hospitalization was 15.3 days (range, 0 to 49 days).

More than 1 surgical lavage procedure was performed in 14 of the 51 (27%) horses. Twenty-seven of the 37 (72%) horses in which a single surgical lavage was performed survived at least 1 year after surgery; compared with 9 of the 14 (64%) horses in which multiple surgical lavage procedures were performed. These percentages were not significantly different.

Outcome—Forty of the 51 (78%) horses were discharged from the hospital, and 37 of the 51 (73%) horses were alive at least 1 year after surgery. Logistic regression analysis indicated that horses in which duration of clinical signs was < 1 day were significantly more likely to survive at least 1 year after surgery, compared with horses in which duration of clinical signs was > 10 days. Horses with sepsis of an adjacent joint were less likely to survive at least 1 year after surgery, compared with horses without evidence of sepsis of an adjacent joint, and horses with partial or complete tendon rupture were significantly less likely to survive at least 1 year after surgery, compared with horses without evidence of tendon rupture (Table 2). The percentage of horses examined before 1990 that survived at least 1 year after surgery (11/15 [73%]) was not significantly different from the percentage of horses examined after 1990 that survived at least 1 year after surgery (26/36 [72%]).

Eleven horses were euthanized while hospitalized. Three horses developed gastrointestinal tract complications, including acute colitis, cecal impaction, and septic peritonitis secondary to perforation of a gastric ulcer. In all 3 horses, the septic tenosynovitis appeared to be responding to treatment at the time of euthanasia. Two horses developed laminitis of the contralateral limb within 24 hours of admission. Both horses were subsequently euthanized because the laminitis became progressively worse. Six horses did not respond to surgical treatment of septic tenosynovitis, including 4 that underwent > 1 surgical procedure. All 6 of these horses had 1 or more concurrent complications, including sepsis of an adjacent joint (n = 2), partial or complete rupture of the affected tendon (4), and osteomyelitis of the axial border of the proximal sesamoid bones (1).

Four horses were euthanized following discharge from the hospital. Two of these horses developed signs of acute lameness between 2 and 7 days after discharge from the hospital. Both were reexamined, and sepsis of the previously affected tendon sheath was confirmed on the basis of clinical signs and results of synoviocentesis. Further surgical treatment was declined, and both horses were euthanized. One horse was reexamined after development of lameness of 7 days’ duration. Radiography revealed osteomyelitis of the proximal sesamoid bones. A total of 3 surgical procedures (through-and-through lavage twice and tenoscopy once) were performed, and the horse was hospitalized for 40 days. Following the third procedure, improvement was seen for 2 days, but severe lameness recurred, and purulent drainage from the tendon sheath was seen. The horse was subsequently euthanized. The fourth horse was readmitted 20 days after discharge from the hospital with sepsis resulting from incomplete removal of a suture. Through-and-through lavage was performed on 3 occasions, and during the third surgery, a decision was made for euthanasia because of intractable sepsis and necrosis of the superficial flexor tendon.

Table 2—Results of logistic regression modeling of factors associated with survival at least 1 year after surgery in 51 horses with septic tenosynovitis.

<table>
<thead>
<tr>
<th>Variable and category</th>
<th>No. of horses</th>
<th>Odds ratio</th>
<th>95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of clinical signs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 10 days</td>
<td>12</td>
<td>Referent</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>&lt; 1 day</td>
<td>22</td>
<td>15.6</td>
<td>1.24–50.0</td>
<td>&lt; 0.027</td>
</tr>
<tr>
<td>1 to 10 days</td>
<td>17</td>
<td>1.344</td>
<td>0.201–10.48</td>
<td>&lt; 0.078</td>
</tr>
<tr>
<td>Sepsis of an adjacent joint</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absent</td>
<td>44</td>
<td>Referent</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Present</td>
<td>7</td>
<td>0.131</td>
<td>0.015–0.947</td>
<td>&lt; 0.044</td>
</tr>
<tr>
<td>Tendon rupture</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absent</td>
<td>38</td>
<td>Referent</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Present</td>
<td>13</td>
<td>0.064</td>
<td>0.003–0.554</td>
<td>&lt; 0.026</td>
</tr>
</tbody>
</table>

CI = Confidence interval. NA = Not applicable. The odds ratio represents the odds that a horse in that category would survive at least 1 year after surgery, compared with the odds for a horse in the referent category.
Twenty-one of the 37 (57%) horses that survived at least 1 year after surgery returned to their previous or a higher level of performance. The remaining 16 (43%) returned to function at a lower level of performance. This includes 7 horses that returned to competition but at a lower level, 5 horses that were retired from competition and used as broodmares, 2 horses that were still in training, and 2 horses that were used for trail riding. The presence of tendon injuries and the presence of severe pannus were significantly associated with a decreased likelihood of returning to a previous or higher level of performance (Table 3).

Convalescent period—Rehabilitation time for the 37 horses that survived at least 1 year ranged from 6 months to 1 year, with several owners commenting that rehabilitation time extended beyond the original recommendation. Seventeen of the 37 (46%) horses had mild to moderate distension of the affected sheath, and 3 (8%) had severe distension and thickening of the sheath. Other complications reported included lameness (9 [24%]), recurrence of tendonitis (4 [11%]), and cellulitis (2 [5%]). Owners of 33 of the 37 (89%) horses considered treatment to be successful. Two owners did not consider treatment to be successful because the convalescence period was too long, and 2 did not consider treatment to be successful because the horse could not be returned to its previous function.

**Discussion**

The criteria used to confirm a diagnosis of septic tenosynovitis in horses included in the present study were similar to those used in previous studies, and reflect the idea that negative bacterial culture results do not necessarily rule out infection. Collection of synovial fluid can be difficult, if not impossible, in intractable horses and in horses with an open and nondistended tendon sheath or a severely inflamed tendon sheath. Additionally, bacteria can become sequestered in neutrophils, fibrin, or synovium, making isolation difficult.

Previous treatment, such as antimicrobial administration and joint lavage, can also inhibit bacterial growth in culture. As a result, it has been suggested that broader inclusion criteria than positive bacterial culture results be used in clinical studies. In the present study, broad but strictly defined diagnostic criteria were used to identify horses with septic tenosynovitis.

There is general consensus in the veterinary literature that the keys to successful treatment of horses with septic tenosynovitis are early recognition and prompt treatment. Most often, however, such statements are made on the basis of clinical experience alone. A recent study found that horses examined < 36 hours after injury had a significantly better prognosis for return to intended use than did horses examined > 36 hours after injury (89% and 40% respectively). Interestingly, there was a significantly worse prognosis for horses treated within 12 hours of injury, and the authors suggested that other factors, such as severity of the wound, accounted for the poor prognosis in this group. In the present study, horses for which duration of clinical signs was < 1 day had a lower risk of death, compared with horses for which duration of clinical signs was > 10 days. Furthermore, there was no significant difference in outcome between horses for which duration of clinical signs was between 1 and 10 days and those for which duration of clinical signs was > 10 days. In contrast, other studies have reported no association between outcome and duration of clinical signs. This apparent discrepancy may be due to factors other than duration of clinical signs that have an effect on outcome, such as presence and severity of complications and treatment performed, or may be a result of the small numbers of cases in some of these previous studies.

Previous studies reported that 73% to 94% of horses with penetrating injuries causing contamination or sepsis of a tendon sheath survived, with 50% to 92% of horses returning to their intended use. Long-term survival rate (37/51 [73%]) and rate of return to function (21/37 [57%]) in the present study were in the low ends of these ranges, possibly because of the high numbers of horses with concurrent complications (41/51 [80%]), tendon rupture (13/51 [25%]), or sepsis of an adjacent joint (7/51 [14%]).

In the authors’ experience, trauma to the flexor tendons in conjunction with septic tenosynovitis presents a treatment challenge. Immobilization of the limb in a cast to decrease tendon movement limits the ability to evaluate the tendon sheath on a daily basis and initiate treatment if required. Furthermore, injured tendons within tendon sheaths have been shown to have a decreased healing capacity as a result of segmental vascular supply. An individual horse’s tolerance for wearing a cast is important because of the lengthy immobilization period, and the authors recommend providing thick sole and frog support as well as support bandages to minimize the risk of laminitis of the contralateral limb. Results of the present study suggest that horses with septic tenosynovitis that have partial or complete rupture of the affected tendon or concurrent sepsis of an adjacent joint have a guarded prognosis for long-term survival.

Development of fibrous adhesions in the tendon sheath has been reported as the most common reason for failure to return to function in horses with septic tenosynovitis. This is particularly a problem in horses with tendon injuries, and in other species it has been shown that formation of adhesions between intact patellar synovium, healing tendon, and surrounding tis-
sues cannot be avoided. Techniques that decrease the formation of adhesions, such as early implementation of daily controlled motion, have been described. Use of sodium hyaluronate, adhesiolyis via tenoscopy, and palmar or plantar annular ligament desmotomy may also be of benefit in limiting the effects of adhesions, but do not always prevent them from forming.

Advantages of arthroscopic surgery, compared with conventional through-and-through lavage, are well documented. Arthroscopic surgery provides better visualization, enhances lavage, and allows guided debridement with minimal invasiveness. A greater percentage of the synovial surface may be evaluated, and fibrin and adhesions can be removed. Surprisingly, therefore, we did not find any association between surgical procedure and long-term survival or return to function in the present study. This suggests that for horses with septic tenosynovitis, the most important treatment may be instillation of a large volume of fluid to remove inflammatory exudates, fibrin, cellular debris, and cytokines. However, the role that other techniques may have had in the success of through-and-through lavage could not be determined. Treatment was individualized for each horse in the study, and numerous secondary treatments were used. Although a significant association between outcome and use of secondary treatments was not found, this may have been due to the relatively small numbers of horses in each group.

In summary, results of the present study suggest that the prognosis for horses with septic tenosynovitis is improved if treatment is initiated within 24 hours of injury. A poor outcome was associated with concurrent sepsis of an adjacent joint or partial or complete rupture of the affected tendon. Horses with tendon injuries or pannus were also less likely to return to their previous level of performance. Outcome was not found to be associated with treatment modality, suggesting that veterinarians should consider the use of through-and-through lavage, in conjunction with appropriate secondary treatments, in horses with septic tenosynovitis, especially when cost is a major factor.

References


