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Editorials

Science-in-brief: Clinical highlights from the American Association of Equine Practitioners 59th Annual Convention and Equine Veterinary Journal Supplement 45

The 59th Annual American Association of Equine Practitioners (AAEP) Convention and Trade Show was held in Nashville, Tennessee from 7 to 11 December 2013. The 5-day convention attracted over 6600 veterinarians, students, technicians, guests and exhibitors. The programme presented a blend of learning opportunities ranging from large didactic lectures to small group discussions. Renowned orthopaedic specialist Dr Sue Dyson delivered the Frank J. Milne State of the Art presentation. Her 3 h presentation included a wide range of videos and still images as well as succinct summaries of her clinical work and research that focused on the art and science of lameness evaluation. Didactic lectures were grouped into morning or afternoon sections including 4 sessions devoted to business and practice management, a session on ethics in equine practice and a novel session delivered by several AAEP past presidents titled 'Lessons Learned'. The programme chair, Dr Jeff Blea, invited noted clinicians to assemble for indepth review sessions on the topics of sport horse lameness, racing-related lameness, reproductive endocrinology and geriatric medicine. He also organised 3 'How To' sessions that presented tips and clinical pearls on ophthalmology, radiology of performance horses and field anaesthesia. Seven other sessions of the convention were devoted to new information, showcasing over 70 papers that the AAEP Educational Programmes Committee had selected for the programme out of several hundred submissions.

For the third year, *EVJ* has published an online supplement to the AAEP proceedings, composed of several full-length peer-reviewed articles reflecting original papers submitted to be considered for presentation at the convention. Highlighted here are 6 articles from the supplement that were on the AAEP programme as well as selected other information from the convention of particular clinical relevance. The complete special *EVJ* supplement is available free online at http://onlinelibrary.wiley.com/doi/10.1111/evj.2013.45.issue-s45/issuetoc

Medicine

Two convention papers included in the *EVJ* supplement provided new information that will help manage critically ill horses and foals.

The majority of hospitalised patients have i.v. catheters placed in one jugular vein for fluid therapy and medication administration and the jugular vein is also often used for collection of serial blood samples. However, thrombophlebitis of the jugular vein is a frequent complication. To investigate whether the transverse facial venous sinus (TFVS) represents a suitable alternative site for collection of blood samples, clinicians at Oregon State University performed a prospective study, comparing the values for blood lactate, packed cell volume and total solids in blood samples collected simultaneously from the TFVS and the jugular vein in a group of healthy horses and also another group of critically ill horses [1]. Values for these parameters were similar for the 2 sites and the authors concluded that the TFVS is a useful blood sampling site for both healthy and ill patients.

Critically ill foals present with a spectrum of challenges requiring skilled management that is expensive and labour intensive. Despite major advances in neonatal care, mortality rates are still significant and clinicians continue to seek better prognostic tools. Lactate is a biomarker reflecting global tissue hypoxia, inadequate oxygen utilisation, sepsis and disease severity. An *EVJ* supplement paper authored by Borchers *et al*. detailed a large multicentre prospective study that evaluated the correlation between serial blood lactate concentration and primary diagnosis with survival/nonsurvival in 643 foals [2]. Lactate concentration was found to be a strong independent biomarker to predict mortality in critically ill foals. Foals admitted with a lactate value above 4.4 mmol/l had a grave prognosis as did foals whose lactate values did not decrease over time. Septic foals and nonsurviving foals have impaired lactate metabolism and sequential lactate monitoring can be used to identify patients at high risk for mortality.

Other papers presented in the 2 'what's new in medicine' sections of the AAEP convention detailed new information on serious diseases that plague the equine industry and offered reports of new conditions and diagnostic tools. Several papers concerned the detection and characteristics of *Rhodococcus equi* infections in foals, with data indicating that traditional screening methods (serial blood measurements or thoracic ultrasound imaging) are ineffective at predicting which foals will develop clinically significant disease. Other papers reported on emerging conditions that are caused by toxic agents (fatal illness that followed avocado ingestion), inheritance (junctional epidermal bullosa [JEB] in Belgian draught horses) or infections (Leishmaniasis, coronavirus). Papers of immediate clinical and practical interest to practitioners included work from Cornell University that showed that a new device that attaches to a standard 'smartphone' produces basic heart rate and heart rhythm analysis that is comparable with a traditional 'wired' base apex electrocardiogram [3]. Clinicians from University of California (UC) at Davis presented data that showed that ACTH (adrenocorticotropic hormone) is stable in plasma and whole blood without centrifugation for at least 24 h and is also stable if frozen for at least 30 days [4]. This new information will allow clinicians more leeway in collecting and storing samples from horses at their home stables for pituitary pars intermedia dysfunction testing. A second paper from UC Davis reported on the use of pooled faecal and environmental samples for the detection of *Salmonella* species by real-time polymerase chain reaction [5]. The method reported, which includes an enrichment culture step, provides a simple method for cost-effective biosurveillance for salmonellosis in equine hospitals.

Reproduction

Several papers in the reproduction section concerned advanced assisted reproduction techniques, particularly intracytoplasmic sperm injection (ICSI). This technique is used to produce foals from infertile mares and from stallions with limited sperm stores. Foss and Ortiz coupled a nicely illustrated paper on the technique of oocyte collection by transvaginal ultrasound guided follicular aspiration [6] with a second paper that detailed experimental work that simulated various protocols that could be used to transport immature and maturing oocytes for ICSI. The *EVJ* supplement contains the full paper detailing their data on oocyte storage protocols [7]. In this paper, a large number of oocytes from both dominant (maturing) follicles and subordinate (immature) follicles were collected by transvaginal aspiration from 28 mares, incubated overnight at room or body temperature and stored in various media and containers prior to ICSI and then the rate of successful blastocyst production was detailed. This work helps define the conditions that optimise successful transport of oocytes from the field to the centres that offer ICSI, making ICSI a viable option for practitioners in the future. The highest blastocyst rates (70%) were reported for maturing oocytes aspirated from dominant follicles that were maintained at 37°C in equilibrated media prior to ICSI but the authors were also able to achieve reasonable blastocyst rates (35–37%) with immature oocytes that were maintained in commercial media at room temperature prior to ICSI.

Livini *et al*. from Italy gave a presentation detailing fertility rates in 97 subfertile mares treated with a uterine lavage of 2 l lactated Ringer's solution immediately before insemination with fresh, cooled or frozen semen [8]. An impressive foaling rate of 68% following the post lavage inseminations was recorded in this group of subfertile mares. This work is of immediate interest to clinicians who perform artificial insemination in broodmares because uterine lavage has most commonly been performed several hours after insemination. This study provides new information on a technique that may help improve fertility rates in barren mares as well as increase efficiency in management of mares with uterine inflammation.

The *EVJ* supplement provides a full report of a paper submitted by clinicians from the University of Georgia on the effect of ergot alkaloids in the breeding stallion [9]. Exposure of horses to ergot alkaloids is common in areas like the southeastern United States, where tall fescue that has a high rate of colonisation with commensal fungal endophytes, is a common pasture grass. The risks of ergot alkaloids in broodmares are well known as ingestion of these fungal endophyte byproducts in late gestation is associated with increased rates of prolonged gestation, premature placental separation, dystocia, retained placenta and agalactica. However, the risks of ergot alkaloid exposure in breeding stallions have not been assessed. Six stallions were fed either toxic endophyte infected tall fescue seed or nontoxic seed. Although ergot alkaloid exposure was associated with slightly reduced gel-free volume in subsequent ejaculate samples, no significant changes were noted in sperm motility, morphology, total numbers or other factors that would be postulated to reduce fertility. This study gives good data that will help veterinarians who practice in environments where tall fescue is common to advise horse owners on feeding and management of breeding stallions.

Diagnostic imaging

Presentations detailing new ways to use ultrasound to image various regions of equine anatomy dominated the diagnostic imaging session at the AAEP convention. The presentations ranged from simple, practical imaging techniques that could easily be implemented in the field using basic equipment to a sophisticated review article that described how the angle beam of the imaging plane and other slight alterations in technique can sometimes create artefacts that confound accurate diagnosis for the novice practitioner, but also provide supplemental tissue information to the expert ultrasonographer.

One well-illustrated presentation with immediate practical relevance for the field clinician was a talk given by Bain on ultrasonography of the jugular vein [10]. As noted above, thrombophlebitis of this region is a common complication in horses following catheterisation or injection. This paper presented clear examples of the appearance of acute, chronic and septic luminal thrombi, with simple imaging instructions that could be followed by a novice practitioner.

Several leading imaging experts wrote another paper detailing the techniques involved in transrectal ultrasound examination of the lumbosacral and sacroiliac joints [11]. This paper described imaging techniques that require advanced interpretation skills, but the drawings and anatomical photographs of the relevant skeletal areas paired with actual ultrasound images provide a clear explanation of a complex anatomical region emerging as an area where dysfunction and pathology have a major impact on performance.

The stifle joint was the subject of several other imaging papers presented in Nashville. A paper by Kleider detailed imaging of the medial femorotibial joint and is of practical relevance for sports medicine practitioners [12]. This paper described a specific technique for injecting the medial femorotibial recess under ultrasound guidance using a standard 7.5 MHz linear transducer. Data on 147 injections performed in 77 horses over a 3-year period was presented and no infections or adverse events occurred. This technique should simplify and improve the accuracy of a process that has been noted to be inconsistent and sometimes difficult if performed without ultrasound visualisation.

Another interesting paper on stifle imaging was found within the surgery section of the proceedings. Clinicians from Colorado State University reported on the use of a needle arthroscope to perform diagnostic stifle arthroscopy in standing patients [13]. The authors have performed the procedure in over 90 standing sedated patients, using a special stand that holds the leg in light flexion. An 18 gauge disposable arthroscope is inserted in various locations to visualise the compartments of this complex joint. This technique represents a major advance that will allow clinicians to assess the stifle in a clinic setting without the need for general anaesthesia and facilitate the diagnosis of a variety of conditions. The procedure will distinguish patients that require surgery from patients requiring medical treatment of their joint condition. The authors also speculate that with expanded use, needle arthroscopy will be an accurate and economical way to assess progress in this joint after surgery or during rehabilitative programmes.

Lameness

Horses that present with acute laminitis require potent medication to control severe pain and facilitate positioning for radiographic imaging, evaluation of the digit and application of therapeutic devices. Nonsteroidal anti-inflammatory drugs (NSAIDs) are well established as useful medications for this purpose but these drugs are contraindicated in some patients and there is concern of toxic effects at high doses. Foreman and Ruemmler from the University of Illinois presented data on the effect of i.m. meperidine hydrochloride (a narcotic also known as Demerol) as a skeletal analgesic in horses. Their full paper is available in the *EVJ* online supplement [14]. They used an adjustable heart bar shoe to induce severe short-term lameness in a group of 8 horses and then administered either meperidine or saline to each horse i.m. They compared the resultant reduction in lameness parameters to similar experiments that had been done to assess the analgesic effects of NSAIDs. They found that i.m. meperidine was followed by improvement in heart rate and lameness scores for the treated horses, but the effect was short-term (<3.7 h) as compared with previous data on NSAIDs which showed analgesic effects lasting 8–12 h. The authors commented that intermittent dosage of a narcotic between NSAID administration might allow a decreased dosage of NSAIDs in horses with severe skeletal pain, thus reducing NSAID-related toxicity.

Other papers in the lameness section of clinical interest provided new information on methods of regional anaesthesia or access to anatomic sites commonly treated with injections. Sampson and Rocconi from Mississipi State University detailed a simple basilar sesamoidean approach for accesssing the sheath of the deep digital flexor tendon sheath [15]. Another paper from Colorado State University provided data that showed the technique commonly employed to block the deep branch of the lateral plantar nerve for the diagnosis of pain in the proximal suspensory area may not be specific to that nerve: contrast dye studies demonstrated that injected medication may enter the tarsal sheath, the tarsometatarsal joint or other subtarsal regions of the hind leg [16]. A second paper on regional anaesthesia of this area suggested that a low-volume, perpendicular needle approach may produce the least false-positive responses when attempting to block horses for hind leg proximal suspensory ligament issues [17].

Surgery

General anaesthesia is required for many advanced imaging procedures in horses as well as a large number of surgeries. Post anaesthetic colic is a serious risk of general anaesthesia. Clinicians at Colorado State University did a retrospective study of 416 horses that underwent general anaesthesia for a variety of nongastrointestinal surgeries and imaging studies over a period of 3 years. Their full paper, which assessed a variety risk factors associated with post anaesthetic colic, is reproduced in the *EVJ* supplement [18]. Three risk factors that were significant for the development of colic were increasing blood lactate levels, a delay of 7 or more hours in the passage of faeces after anaesthesia and patients of Arabian bloodlines. The overall rate of post anaesthetic colic was 5.3% with intestinal impaction or nonspecific abdominal pain comprising most of the cases. Delayed faecal output was reported in 8.7% of cases. This information should help clinicians identify horses at increased risk for colic after anaesthesia and promote proactive management.

Several other retrospective studies on surgical outcomes and complications were presented at the convention. A paper out of the University of Pennsylvania compared post operative complications in geriatric horses vs. mature nongeriatric horses that underwent colic surgery [19]. They found that the geriatric population had a larger percentage of horses with small intestine strangulation requiring resection than the mature horses but the geriatrics with these small intestinal lesions did not have a higher rate of long-term complications than their mature counterparts. Short-term outcome was similar in both groups no matter what the inciting cause of the colic. Geriatric patients did have a higher rate of post operative reflux and inappetence, but a similar rate of survival to mature horses.

A study done at the University of Guelph examined the long-term results of laparoscopic vs. conventional cryptorchidectomy [20]. They found that

as a group, horses that underwent laparoscopy experienced longer operative times, longer hospitalisation and an increased rate of post operative complications than the group that were operated on using a conventional inguinal approach. Their findings question whether cryptorchid patients might be better served by conventional surgery as opposed to laparoscopy.

Another paper from Louisiana State University assessed the long-term outcome of laser-assisted modified Forssell's procedure for cribbing [21]. The authors reported an 84.4% success rate in reducing this undesirable stable vice in operated patients but noted that the success rate was reduced in horses that had been cribbers for more than 3 years or horses that experienced post operative complications.

One other practical finding presented in the surgery section that came out of the AAEP convention concerned antibiotic drug options in regional limb perfusion (RLP). Regional limb perfusion is a procedure used to treat a variety of infections in the distal limb including septic synovial structures. A study out of Cornell University using a middle carpal joint model compared the results of RLP using amikacin sulfate alone to RLP with a combination of amikacin sulfate and ticarcillin/clavulanate [22]. They found that the addition of ticarcillin/clavulanate reduced the levels of amikacin detectable in the target joint and also demonstrated that antimicrobial activity on amikacin susceptible and ticarcillen resistant cultures was reduced. The use of this combination of drugs for RLP is discouraged.

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