FOCUS  Distortion Control

Circular external fixators are composed of rings or arches interconnected by threaded rods to create a rigid frame. Small, tensioned transfixing wires secure the frame to the bone. Correct anatomic location of the transfixing wires is important to ensure proper fixation and a good surgical outcome. Understanding the effects of radiographic distortion is critical. In this study, 10 radiographic images were taken of 3 circular external fixators with differing intersecting angles (30°, 60°, and 90°) for transfixing wires. The 10 images were obtained by rotating the device through varying degrees from parallel with the central x-ray beam (10°-80°). For all 3 devices, distortion was greatest when transfixing wires were at smaller angles of rotation or farthest from the x-ray table. Likewise, at all angles of rotation, the 30° device created the greatest distortion. The authors demonstrated that angle and distance from the table affected distortion. This could mislead the interpreter and lead to unnecessary surgical adjustments, anesthesia time, and repeated radiography. Placement of the fixator in the center of the x-ray beam with the wire intersection as close to the table as possible can best reduce distortion artifact.

Commentary
External skeletal fixators (ESFs) are versatile devices used in orthopedic practice to treat conditions such as fractures and limb deformities. The components are metallic, which makes radiographic assessment of bones and the fixation extremely challenging. It is important to consider the position of the device and angle of the radiographic beam because distortion can be substantial, as this study shows. The radiographic beam should be centered on the area of interest and positioned 0° or 90° orthogonal to the fixation in order to minimize artifacts. This may require several different views along various aspects of a long bone or fixator, at various obliquities, to fully appreciate each fixation element in an ESF construct.—Jason Bleedorn DVM, DACVS

Source

Feline USG: When to Worry

Urine specific gravity (USG) is a useful, practical tool for evaluating kidney function in cats. Previous studies have suggested that healthy cats should have a USG >1.035, but no large-scale studies have been conducted. This prospective cross-sectional study evaluated the USG of 1040 healthy cats that were presented to primary practice for routine evaluation. Importantly, investigation of adults with a USG ≥1.035 should be expected in apparently healthy cats. The results confirmed that 88% of adult cats and 92% of young (<6 months old) cats had USG ≥1.035, which led authors to conclude that a USG >1.035 should be expected in apparently healthy cats. Most environmental factors minimally affected USG, which decreased slightly with increasing age, was lower in females, higher in unfasted cats, lower in cats with increasing drinking avidity, and higher when measured at reference laboratories than in-house with refractometers. Sampling time did not affect USG. Dietary changes implemented to reduce the USG by increasing the moisture content of the diet were only slightly effective, and only in females. The authors recommend monitoring the USG of cats when dietary changes are made to determine efficacy. The authors recommend that cats ≥9 years of age that have a USG <1.035 be further evaluated to determine the cause of the low USG; these cats were more likely to have subclinical disease identified than were younger cats with USG >1.035.

Global Commentary
Assessment of USG is a simple diagnostic test, invaluable in interpreting the presence of azotemia and assessing the cat’s urine concentrating ability. This study confirms that most (88%) healthy cats (irrespective of age) produce a USG >1.035. Importantly, investigation of adults with a USG <1.035 revealed an underlying disease in 38%, and in even an even higher proportion of cats ≥9 years of age. These results emphasize the importance of not ignoring a USG <1.035 in spot urine samples. Importantly, different refractometers yielded significantly different results, and other studies have also shown that feline-specific refractometers are unnecessary and less reliable.1 This study showed the importance of spot-checking feline USG, and it is likely that serial measurements of USG in individual cats over time (especially those ≥9 years old) would yield even more valuable results in the future.—Andy Sparkes, BVetMed, PhD, DECvim-MRCVS

Reference

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