

## Optimizing Parenteral Nutrition Success

Parenteral nutrition (PN) is used when dogs and cats are unable to consume or tolerate adequate enteral nutrients. A total parenteral nutrition (TPN) solution typically covers 100% of a patient's nutritional and caloric needs, while partial parenteral nutrition (PPN) covers a fraction of that. PN must be delivered into a central or peripheral vein, depending on osmolarity of the mixture. This study investigated whether PN can effectively deliver the energy requirements of critically ill animals without increased risk for death. Cases from 319 dogs and 112 cats were retrospectively reviewed, with the most common diagnosis being pancreatitis ( $n=109$  dogs,  $n=34$  cats). The only metabolic risk factor associated with death was hypercreatininemia in dogs (8/79), which was independent of the association between chronic kidney disease (CKD) and death. Negative associations for survival included longer duration of inadequate caloric

intake before PN, hepatic lipidosis in cats, and CKD in dogs. Despite the frequency of some complications, hyperglycemia was the only metabolic complication that could have interfered with PN administration. Prevention of mechanical complications and concurrent administration of enteral feeding are essential for improving patient outcome. Overall, PN adequately met the resting energy requirement for many critically ill animals.

**Commentary:** Although PN can be a lifesaver when enteral feeding is not an option for critically ill patients, it invariably includes some "real world" concerns. First, to administer TPN, a large-gauge catheter must be aseptically placed in either the caudal vena cava or jugular vein. When PPN with a small-gauge catheter is elected, daily patient monitoring for phlebitis also is necessary. In addition, catheter place-

ment requires special training, and the patient may need to be sedated or lightly anesthetized. Second, PN must be ordered individually for every patient (ideally by a veterinary nutritionist) and requires daily monitoring of serum electrolytes, glucose, and phosphorus. Individual bags only last up to 24 hours and thus can be cost-prohibitive for some clients. On the other hand, PN raises the bar for clinical excellence when incorporated into a practice. Practitioners who choose PN need to emphasize its importance in a patient that is hospitalized for more than 48 to 72 hours.—*Heather Troyer, DVM, Diplomate ABVP, CVA*

Factors associated with adverse outcomes during parenteral nutrition administration in dogs and cats. Queau Y, Larsen JA, Kass PH, et al. *J VET INTERN MED* 25:446-452, 2011.

## Otitis in a Rabbit

A 7-year-old rabbit was presented for scratching the right ear. Examination was consistent with otitis externa. Clinical signs resolved after 1 month of topical treatment with enrofloxacin but recurred 1 month after cessation of treatment. Periosteal reaction was noted in both bullae on radiographic evaluation and culture of the right ear revealed *Pseudomonas aeruginosa* susceptible to marbofloxacin, amikacin, and gentamicin, with intermediate sensitivity to enrofloxacin. Oral marbofloxacin was administered for 1 month and topical enrofloxacin for 2 months, after which the rabbit began to exhibit signs of pain. Computed tomography (CT) of the skull revealed that the right tympanic bulla was enlarged, misshapen, and filled with material consistent with an exudate. The rabbit was anesthetized and a unilateral total ear canal ablation and lateral bulla osteotomy were performed. Polymethylmethacrylate (PMMA) beads containing either

gentamicin or cefazolin were placed within the bulla or surrounding soft tissue. Within 2 weeks, the rabbit was exhibiting normal behavior and was not scratching its ear.

**Commentary:** Most literature on treatment of otitis in rabbits is in exotic animal or laboratory medicine journals or books. This excellent descriptive article on the management of otitis externa/media is a truly helpful contribution. For example, rabbits do not have a horizontal ear canal. The vertical ear canal extends ventrally to the external acoustic meatus without changing direction.

Several major take-home points are also made: First, the overall approach to otitis externa/



media for rabbits is similar to that for dogs and cats. Second, apparently recognition of otitis media in rabbits can be equally as difficult. Although the rabbit in this study reportedly had clinical signs for about 4 months, the findings on CT suggested that the problem had existed much longer. Finally, rabbits are different from cats and dogs with respect to otic exudate, which must be considered when selecting treatment measures. Rabbits produce caseous debris that increases chances for recurrent infection; thus PMMA beads must be used for local antimicrobial treatment.—*Karen Moriello, DVM, Diplomate ACVD*

Total ear canal ablation and lateral bulla osteotomy for treatment of otitis externa and media in a rabbit. Chow EP, Bennett RA, Whittington JK. *JAVMA* 239:228-232, 2011.

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