

## Controlling Keratomalacia

Matrix metalloproteinases (MMPs) are present in inactive forms in the normal cornea. Once activated, their major functions are degrading and remodeling the stroma and controlling resynthesis of epithelial basement membrane. In the normal cornea, these degradation properties are antagonized by metalloproteinase tissue inhibitors. If an imbalance occurs between the MMP and their tissue antagonists, keratomalacia develops from disruption, disintegration, or digestion of the corneal extracellular matrix.

To halt continued degradation, exogenous MMP inhibitors are commonly used. MMP 2 and MMP 9 are important in corneal degradation and remodeling. MMP 2 is present in the normal cornea and upregulated in the diseased cornea; MMP 9 is produced only in the diseased state. Both digest type IV collagen, which

is primarily found in the corneal basement membrane. Serum contains known MMP-inhibitory capabilities but may not be practical to produce in some clinics. The MMP inhibitory capabilities of canine fresh frozen plasma (FFP) compared with serum are unknown. In this study, the MMP inhibitory function of canine serum, FFP, canine freeze-thaw-cycled plasma (FTCP), and a commercial product (Solcoseryl, a protein-free hemodialysate and ultrafiltrate of calf blood) were compared in vitro. Serum, FFP, and FTCP significantly inhibited both MMP 2 and MMP 9, although MMP 2 inhibition was more profound. Serum, FFP, and FTCP had similar inhibitory activity against both MMP 2 and MMP 9. Solcoseryl caused marked MMP 9 inhibition but minimal MMP 2 inhibition, which makes it inadequate as a sole agent for controlling keratomalacia.

### Commentary

Keratomalacia is common in brachycephalic dogs. Perforation can occur in as few as 24 to 48 hours. Therefore, controlling keratomalacia is often

considered as important as controlling corneal sepsis. This in vitro study further supports clinical use of serum or plasma to treat keratomalacia and suggests that, for some forms of MMPs, plasma may be a more effective inhibitor than serum. It also supports the clinical practice of collecting serum or plasma from another dog or the patient and, if not immediately required, storing individual red- or purple-topped tubes by freezing or refrigerating. Frequency of application is similar to that of topical antibiotics, with at least 5 minutes between drops. Vials are discarded after a few days or if contaminated.—*Paul Miller, DVM, DACVO*

### Source

Chow DWY, Chau Y, Yeung WK, Westermeyer HD. In vitro evaluation of the inhibitory effect of canine serum, canine fresh frozen plasma, freeze-thaw-cycled plasma, and Solcoseryl on matrix metalloproteinases 2 and 9. *Vet Ophthalmol*. 2015;18(3):229-233.

## Postoperative Antibiotics

Surgical site infections (SSIs) are an important cause of patient morbidity and mortality in veterinary and human surgical practice. However, conflicting evidence exists in both veterinary and human medicine regarding the effects of empirical postoperative antimicrobial therapy.

This randomized, blinded trial compared use of a perioperative and a 5-day postoperative course of antibiotics to perioperative antibiotics alone in dogs undergoing clean orthopedic surgery using implants. Enrolled dogs ( $n = 400$ ) were divided into 2 groups: those receiving both peri- and postoperative antibiotics

and those receiving only perioperative antibiotics. Data were also analyzed for tibial plateau leveling osteotomy (TPLO) vs other implant procedures. Short-term (2 and 6 week) and long-term (>1 year) follow-up was obtained by examination or client questionnaire. The short-term infection rate was 3.54% for dogs treated with postoperative antibiotics compared to 5.24% not treated. Long-term ( $n = 182$  dogs), 8.24% of dogs treated with postoperative antibiotics developed SSI compared to 7.22% not treated. No significant difference in SSI rates was noted between groups at any time point or when comparing TPLO surgery vs other surgical procedures using implants.

### Commentary

Several recent studies specifically focused on TPLO surgery have reported a protective effect of postoperative antimicrobials on SSI in dogs. This

contradicts the historic body of literature and past guidelines for perioperative antimicrobial use only. However, these reports have been uncontrolled retrospective studies, and SSI pathogenesis in orthopedic surgery is likely multifactorial. This study suggests a 5-day postoperative antibiotic course does not reduce the incidence of short- or long-term SSI in dogs. Further work is necessary to understand if other methods of antiseptic prophylaxis or operative strategies are beneficial in limiting the impact of SSI in patients.—*Jason Bleedorn, DVM, DACVS*

### Source

Aiken MJ, Hughes TK, Abercromby RH, Holmes MA, Anderson AA. Prospective, randomized comparison of the effect of two antimicrobial regimes on surgical site infection rate in dogs undergoing orthopedic implant surgery. *Vet Surg*. 2015;44(5):661-667.