Subcutaneous Administration of Synthetic B-Type Natriuretic Peptide in Dogs

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Effects of natriuretic peptides become blunted with chronicity and progression of heart disease.

In the Literature

Oyama MA, Solter PF, Thorn CL, Stern JA. Feasibility, safety, and tolerance of subcutaneous synthetic canine B-type natriuretic peptide (syncBNP) in healthy dogs and dogs with stage B1 mitral valve disease. *J Vet Cardiol.* 2017;19(3):211-217.

FROM THE PAGE ...

Several natriuretic peptides have been identified, and their use as adjunctive heart failure therapy is under investigation. B-type natriuretic peptide (BNP) has been studied most extensively in cats and dogs. It is normally released by atrial tissue; in heart disease, it is also released from ventricular tissue.[1] BNP binds to natriuretic peptide receptors, which results in activation of the secondary messenger molecule cGMP. Ultimately, BNP blocks the harmful effects of the renin-angiotensin-aldosterone system, inducing diuresis and natriuresis; these effects become blunted with advanced heart disease.[2] Administration of BNP in humans has been shown to be beneficial in acute congestive heart failure therapy.[3]

The primary goal of this study* was to evaluate the feasibility, tolerance, and safety of subcutaneous administration of synthetic canine BNP (syncBNP) in

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healthy dogs and dogs with mild heart disease. Pilot data were also collected for markers of biologic activity, particularly neurohormonal activity.

Six client-owned dogs were divided into 2 groups. The first group was given 2.5 µg/kg SC syncBNP followed by 5 µg/kg SC syncBNP 2 hours later. After no major adverse effects were observed, the second group was given 5 µg/kg SC syncBNP followed by 10 µg/kg SC syncBNP. Blood and urine samples were obtained from all dogs at baseline, 45, and 120 minutes after administration of the 5 µg/kg dose to evaluate for natriuresis, neurohormonal activity, and effects on renal function.

Overall, syncBNP was well tolerated in all patients. There was a significant increase in plasma cGMP concentration at both 45 and 120 minutes following subcutaneous administration of 5 µg/kg syncBNP, which suggests active binding of syncBNP to natriuretic peptide receptors. There was no significant change in any of the other blood and urine variables assessed, although there was a trend toward decreased plasma renin activity and increased fractional sodium excretion.

… TO YOUR PATIENTS

Key pearls to put into practice:

1. Natriuretic peptides are released in higher concentrations in patients with heart disease and are beneficial for antagonizing the harmful effects of renin-angiotensin-aldosterone system while promoting diuresis and natriuresis.
2. Effects of natriuretic peptides become blunted with chronicity and progression of heart disease.
3. Administration of syncBNP may be a promising therapy for congestive heart failure; it has been shown to be beneficial in humans with congestive heart failure and to be well tolerated in healthy dogs and dogs with mild heart disease.

References

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Administration of syncBNP may be a promising therapy for congestive heart failure.