

NOVELTIES IN ADDITIVE MANUFACTURING AND BIO-PRINTING

Diana Yonova

University Hospital "Lozenets", Bulgaria

Background: Influence of vitamin K2 treatment on some bone-related markers in patients with chronic kidney diseases (CKD) on hemodialysis treatment (HDT). Patients with CKD suffer from disturbed bone metabolism and accelerated vascular calcification, particularly those on HDT. The vitamin K-dependent matrix Gla protein (MGP) is one of the powerful inhibitors of vascular calcification and Osteocalcin (OC) is a vitamin K-dependent stimulator of osteoblasts activation, respectively improves bone metabolism. HDT patients have high levels of the inactive form of MGP (desphosphorylated-uncarboxylated-MGP, dp-uc-MGP) and higher serum uncarboxylated OC (uc-OC), and may benefit from pharmacological doses of vitamin K2 (menaquinone) to improve the calcification inhibitory activity of MGP, to decrease uncarboxylated OC and to activate carboxylate one.

Materials & Methods: To optimize the dose of menaquinone-7 (MK-7) for MGP and OC activation, 55 patients on chronic HDT were recruited to randomly receive 360 or 720 µg of MK-7 daily for 12 weeks. Dp-uc-MGP, uc-OC, sCa and sP were measured at baseline and after 12 weeks. Dietary intake of vitamin K1 and K2 was estimated based on a questionnaire.

Results: Dp-uc-MGP correlated inversely with menaquinone intake (K2) ($p=0.025$); uc-OC had a similar inverse correlation with MK-7 (K2) ($p=0.033$) (supplementation dose dependently reduced dp-uc-MGP and uc-CT). The levels decreased by 19.5% and 47% for dp-uc-MGP and by 22% and 49.6% for uc-OC in the respective groups.

Conclusion: HDT patients have high levels of inactive MGP and OC, possibly related to a low serum vitamin K2. Pharmacological doses of MK-7 dose-dependently reduces dp-uc-MGP and uc-OC. Menaquinone supplementation may be a novel approach to prevent vascular calcifications in chronic hemodialysis patients and to improve bone metabolism in CKD and HDT.

BIOGRAPHY

Diana Yonova has completed her specialty in Internal Diseases in 1985 and in Nephrology – in 1987 year. She has completed PhD 25 years ago in Medical University, Sofia, Bulgaria and postdoctoral studies at 2000/2001 year - in University Hospital "G. Maranon", Madrid, Spain as a fellow of International Society of Nephrology (ISN). She has been Head of the Dialysis Center in Medical University, Sofia from 2008 to 2016 year. She has published more than 200 papers in Bulgarian and international medical journals, and has been participant in more than 250 presentations, lectures and posters in national and international medical symposiums and congresses. She is serving as an Editorial Board Member in the National Journal of Nephrology Dialysis and Transplantation for the year 2004.

yonovad@abv.bg



Note: