PP-128

Detailed micro-analysis of PH and non-PH stones reveals critical differences in morphology and composition

D. Jacob[1], B. Hoppe[2], M. Gessner[2], B. Beck[2], B. Grohe[3]

[1] *Johannes Gutenberg University, Mainz, Germany*

[2] *University Hospital Cologne, Cologne, Germany*

[3] *University of Western Ontario, London, Canada*

Introduction: There are currently 3 types of primary hyperoxaluria known. All are rare autosomal-recessive inherited disorders of the glyoxylate metabolism. They manifest with varying degrees of nephrolithiasis and/or nephrocalcinosis and also early progression to ESRD in PHI. The diagnosis is frequently delayed and often only made in ESRD. Until now urine excretion parameters and mutation analysis led to the diagnosis. This study characterized the stones in detail to understand their formation better.

Methods: Kidney stones from PH and non PH-patients (subtypes PHI and PHIII) were compared. Fragments of stones were embedded in epoxy resin, polished with diamond paste and analyzed by reflected light microscopy, Raman spectroscopy, electron microprobe analyser and scanning electron microscopy.

Results: Stones from patients diagnosed with a PH subtype consist of Calcium-oxalates and are typically light-coloured and distinctly more porous than Ca-oxalate stones from non-PH patients. They show heterogeneous crystal sizes and contain a considerable amount of large weddellite (COD) crystals, thus, are distinctly different from non-PH stones. PH-Stones developed by patients under treatment consist mainly of fine-grained COM crystals and are much denser. Crystals at PH stone- surfaces (untreated patients) show an organic coating, while the organic content in inner parts of the stones is generally low. In contrast, non-PH-stones exhibit organic sections within stones rather than a coating of stone surfaces. Quantitative Electron Microprobe measurements (WDS system) reveal high magnesium concentrations for PH I stones from treated patients. Most PH stones from untreated patients and all PH III stones have high P/Ca ratios and distinctly lower Mg contents than non-PH and PH I (treatment) stones.

Conclusion: PH stones differ significantly in morphology and composition from non-PH stones. The main difference is their composition mainly consisting of COD which transforms into COM with prolonged residence in the body or with administering of crystallization inhibitors.

As published in the *Supplement of AFJU, Volume 18 (2012), 1st ESD "Experts in Stone Disease" Conference* (page 84)