

## CONFERENCE REPORT

### Report on the Fifth Jena Urinary Stone Symposium 16th–17th September 1977

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The fifth Jena Urinary Stone Symposium was held in Jena from 16th to 17th September 1977 under the direction of Professor E. Hienzsch and Dr. H. -J. Schneider. In his opening address, Professor Hienzsch (Jena) commented upon the development of premier research groups in the field of stone research and underlined the merits of collaboration in the accumulation of knowledge on urolithiasis.

On the first day, 11 papers and 11 posters of new findings on stone formation were presented with special emphasis on the nucleation, growth and aggregation of crystals.

Heide (Jena) reported on the fundamental importance of embryo formation. He highlighted the particular conditions which favour the formation of weddellite as well as the precise mechanisms of its transformation to whewellite. Further experiments may show that hydration of weddellite involves the cleavage of complete molecules at the atomic level. Frang (Pecs) showed experimentally that pH, Proteus infection and urinary flow greatly influenced the form of crystal formation and that urinary obstruction and bleeding from renal blood-vessels can contribute to calcium oxalate stone-formation. Jediny and Dsjurak (Kiev) presented observations on the structure of recurrent stones showing that there has been a change in the composition of recurrent stones. Recurrent stones now consist more frequently of calcium oxalate than of calcium phosphate. Studies with the scanning electron microscope (SEM) and ultrasound on the intrarenal crystallisation of calcium oxalate induced in rabbits by intraperitoneal administration of glyoxylic acid were described by Hienzsch. Crystallisation took place initially in the proximal tubule and was shown invariably to be whewellite which converted into weddellite.

Cifuentes-Delatte (Madrid) classified the complex structure of urinary stones by means of polarised light and SEM studies of thin sections. Stones occurring in patients with hypercalciuria, i. e. the mixed calcium

oxalate/calcium phosphate stone (laminated or amorphous) can be distinguished from the pure calcium oxalate stone and be included with the stones from hyperparathyroid patients. Similar problems were dealt with in the poster presentations by Berg and Hesse (Jena) in which the structural aspects and secondary crystallisation processes were given particular consideration; for example the dehydration of weddellite and struvite observed by thin section and SEM studies. The structural relationship between whewellite and weddellite was also studied by Schubert and Bick (Berlin) and the transformation from weddellite to whewellite interpreted as a topotactic process.

From crystallographic studies Gebhardt (Bonn) found no evidence of epitaxial growth. Heterogeneous nucleation and growth occurs when the tissues of the urinary tract are damaged. Together with Bastian (Bonn), the same author carried out crystallisation studies in a "stone simulator" and using catheter material identified orientation in the direction of the surface channels, described as "texture orientation". The introduction of fluoride for the treatment of dental caries has also influenced both the fluoride content and the structure of urinary stones (Müller et al., Karl-Marx-Stadt and Jena). Moreover, an effect of trace elements in the genesis of stones was also shown.

Seyfarth and Schneider (Mühlhausen and Jena) discussed particular aspects of the hydrodynamics of urinary flow in the renal pelvis. The importance of organic material in the crystallisation process would be especially marked in regions of urinary stasis in the renal pelvis. A distinct gap between the central and peripheral regions, shown by polarisation microscopy of thin sections, underlined the role of colloidal precipitates in the primary crystallisation process. Study of the organic matrix and amino acid analysis was also carried out by Flach et al. (Vogelsang and Jena). Different amino acid

patterns were found in each of the three stone types, whewellite, weddellite and struvite. The acidic amino acids, glutamic and aspartic, predominated. Whewellite stones were shown to contain the highest proportion of amino acids.

Brien (Berlin) reported on the topographical distribution of phases in 4000 urinary stones. Analysis of the nucleus and shell made it possible to describe the various steps in the formation of a particular stone. Tiktinsky (Leningrad) emphasised the change of mineral composition of bladder stones.

Robertson (Leeds) described a technique for calculating the risk of stone-formation in an individual from the excretion of five constituents of urine. The relative probability of stone-formation was calculated from individual "risk curves" for calcium, oxalate, pH, acid mucopolysaccharides and uric acid. The relative probability of forming stones correlated well with the observed severity of the disorder in a number of patients. This technique may be used to screen patients before treatment and to follow them during the treatment period. Calculation of the risk of stone-formation was also presented by the group from Jena. From the complex chemical interactions of seven urinary parameters (oxalate, calcium, citrate, magnesium, sulphate, sodium and potassium) in 24-hour urine collections, it was calculated that there was no significant difference between the control group and the stone patients. The two groups, however, were found to have significantly different diurnal profiles. The concentrations of calcium, potassium, oxalate, phosphate and chloride were retained in the discriminant function and this can be used in the diagnostic screening and prophylactic follow-up of the stone-patients.

The necessity of quality control in the analysis of urinary stones either by X-ray diffraction or by IR spectroscopy was emphasised by Rebentisch (Cottbus) in a combined study involving 9 specialised laboratories. The use of standardised controls is necessary.

On the second day, 17 lectures and 12 poster papers dealt with stone formation in children. The aetiology, epidemiology, medical treatment and prophylactic measures remain the most important problems. Frau Otto-Unger (Dessau) spoke on the necessity of proper collaboration between paediatricians and urologists. The effectiveness of a combined clinic was illustrated using statistics from 16 children's clinics. She indicated that there was a marked increase in calcium oxalate stone-formation in children of school age.

Vahlensieck (Bonn) could establish no relationship between the incidence of stones and age in 94 children with stones. Seventy per cent of stones were located in the renal pelvis and calyces and spontaneous passage through the urethra occurred in only 25 % of cases. About 41 % of cases were found to have a congenital anatomical abnormality. Approximately 20 % had recurrent stones. Minkov (Sofia) found 25 % with anomalies and 12 % with recurrent stones in 320 patients in his clinic. About 77 % were treated for their first symptoms by five years of age. Remarkably 14.5 % were uric acid stone-formers. Gross crystaluria played a large role in the aetiology of stone formation in children. Piehl (Berlin) referred to the change in the incidence of stones in children in the last 15 years. As well as the general increase in number, there was an increase among children of school age and particularly in girls. Calcium oxalate stones had increased but stones associated with anomalies had been reduced in number through better management. Infective stones were found mainly among infants.

Dershawin (Moscow) illustrated that among patients with renal anomalies, oxalate and ethanolamine excretion varied considerably. Zvara (Bratislava) found a steady incidence of stone disease in children but an increase among children of school age. In this age group there was a statistically significant increase in girls. Mehnert and Hoko (Stralsund) presented statistics on 1012 in-patients between 0-18 years of age during the year 1974 in the German Democratic Republic. In children over 9 years of age there was a move in the sex ratio towards girls. Hesse and Schneider (Jena) reviewed 850 stones (from 0-15 years old) from the central data bank of the German Democratic Republic (containing a total of 48,000 stone analyses). There was a high proportion of patients between 1 and 9 years of age. In infants, infection stones were most common; later, however, weddellite played an increasingly important role. Up to 10 years of age operations for stone predominate; thereafter, spontaneous passage was more common. In girls there was a predominance of stones on the right side. Up to 28 % were infected stones; the recurrence rate was 25 %.

Misselwitz et al. (Jena, Dessau and Leipzig) determined normal values for urinary calcium. Up to 11 years of age this was 2.5-3 mg Ca/kg body weight. In puberty there was a distinct fall compared with the value in adults. The upper limit quoted in the literature of 6 mg Ca/kg body weight in older children would seem to be too high. Schönberger (Berlin)

showed a diurnal rhythm in the calcium excretion. In 9 patients calcium excretion was highest during the first half of the day. Only uric acid, potassium, phosphate, magnesium and sodium were not influenced by diet.

Krizek and Vendl (Marienbad) discussed 250 cystine stone-formers including 62 children below 15 years of age. The problems occurred earlier in boys than in girls and diagnosis is usually made by the age of 6 years. Bladder stones are especially common (57 % in males: 28 % in females). Bilateral stones occur in 39 % of patients. Ninety-four per cent of cystine stones required surgery and several operations were often necessary. Fluid intake was shown to be of the greatest importance. Alkalinisation of urine to pH>8 is difficult to attain. D-penicillamine was only employed in 26 % of children. Joost (Innsbruck) reported his experience with the use of thiola, which was reported to be up to 30 % more effective than D-penicillamine.

In the poster presentations Unger (Jena) reported that of 110 in-patients, 60 % had Ca oxalate and up to 12 % had uric acid in their stones and Budevski (Sofia) found a strikingly high proportion of uric acid stones. Revusova (Bratislava) discussed the medical treatment of stone-formation in children and warned against long-term therapy involving Ca-deficient diets, cellulose phosphate and aluminium hydroxide.

Throughout the entire symposium much time was given to discussion. Presentations and discussions will be published in 1978 in the series entitled "Wissenschaftliche Beiträge der Friedrich-Schiller-Universität, Jena".

The sixth symposium will take place in September 1979.

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