

Summary of the Book "Urolithiasis in the Western Region of Saudi Arabia: A clinical, biochemical and epidemiological study" by Rabie E. Abdel-Halim et al, published by King Abdul Aziz City for Science and Technology" , 1996

The book contains the internationally peer-reviewed final report of a major multidisciplinary research project on urinary stone disease in the Kingdom of Saudi Arabia sponsored by King Abdel-Aziz City For Science and Technology in Riyadh.

The project included an epidemiological study with the distribution of 49087 self-administered questionnaires, the response rate of which was 58.3%. It showed a high prevalence of urolithiasis in the western region of Saudi Arabia (4.9%). It also demonstrated a correlation between age and sex with the prevalence rate of stones. In addition to some regional variations in the prevalence rates between Makkah (4.7%), Jeddah (5.3%) and Taif (4.6%), this epidemiological study showed significant correlation between an increased prevalence and sedentary occupations or drinking of soft water.

The clinical study in the form of 512 stone-clinic sheets was in accordance with the above mentioned epidemiological results, and showed that urolithiasis is an adult upper tract disease. In addition it showed a relatively higher incidence of family history of stones with a positive correlation between it and sex of the patient, some urinary disturbances (hypercalcuria and hyperuricosuria) and recurrence. Meanwhile, it confirmed the very low incidence of urinary tract infection in this region, which is in accordance with the very low relative frequency percentage of infection stones shown in this study and in previous studies. Furthermore, while the exposure to sun seemed of an insignificant role in urolithiasis, the body mass index percentage showed a more tendency towards overeating in the patients than in the control group.

In addition, the dietary study (224 dietary sheets) showed a higher protein, fat and energy intake in the patients than in the controls, especially those with hyperuricosuria.

The biochemical study in this project showed multiple and/or single urinary disturbances in both patients and controls. However, in the former group, these urinary disturbances were in opposite correlation to those present in controls, denoting an alteration in the normal ionic relationship, which was also found in the stones.

In addition there was also some correlations between stone recurrence and some urinary disturbance (hyperphosphaturia and hypermagnusuria), as well as some blood changes (hypomagnesemia, hypophosphatemia and hyperproteinemia). Otherwise, blood constituents were within normal ranges.

Meanwhile, citrate and mucopolysaccharide levels were lower in patients than controls. Also, as regards the latter, it was higher in those with hyperuricosuria than with other urinary disturbances. However, no correlation with stone type was evident, although the latter finding

may explain the high incidence of organic matrix (miscellaneous components) in the uric acid stones demonstrated in this study.

Also this project included a chemical analytical study of 542 urinary stones. Accordingly, a proposed classification based on the ionic content and another on the content of total organic carbon, hydrogen, and nitrogen for samples of > 60 mg and < 60 mg respectively, was described.

Also the chemical structure of 89 whole large stones (some of them with inside cavities) was described. Meanwhile, the relative frequency percent of the various stone types were identified (22.7 % uric acid stones, 62.3 % oxalate and 15.1 phosphate), and showed a very low (4.1%) relative frequency percent of infection stones. Also, by means of the proposed classification, we were able to identify eight variants within all the stone types, except for the oxalate stones. Furthermore, the relative frequency percent of each variant was also estimated and showed a higher frequency percent of uric acid dihydrate and carbonyl phosphate stones.

Furthermore, trace elements within the stones were also studied, and their correlation with other ions within the stone were suggested and discussed.

Meanwhile characterization of the oxalate salt (mono or dihydrate) by means of infra-red spectroscopy was performed satisfactorily, and also confirmed our classification by the elemental microanalytical and wet chemical analytical techniques for the various stone types.

In addition, chemical analysis of the various drinking-water sources (76 samples) was undertaken, and its correlation with the prevalence rate of urolithiasis, as mentioned above, was studied