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# NUTRITIONAL ASPECTS IN OXALIC UROLITHIASIS

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**Summary**. *Nowadays the urolithiasis represents about 1-2% of all diseases and about 12-40% among kidney diseases (differences according to the authors). So, we can say that it is an extended disease because the frequency of diabetes is 1.5%, rheumatism lower than 1% and lower for tuberculosis.*
*By means of physicochemical methods one can determine the type of urolithiasis which is important for the clinical guideline and prevention of recurrence.*
*In the prophylaxis and metaphylaxis of urolithiasis the essential role of food consumption is recognized. The dietetic recommendations are: an increased daily liquid intake, a correct and balanced diet (i.e. animal and vegetal foods), three meals daily with the avoidance of a too rich dinner. If there is known the type of lithiasis in order to prevent a recurrence the diet must include food with minimum lithiasis risk.*

**Key words**: *Urolithiasis, prevention, nutrition*

## Introduction

In the last decades the frequency of urinary lithiasis increased both in adults and in children. A study performed in our country, dealing with the geographical distribution of urolithiasis, revealed an increased prevalence in the SouthWest of Romania. Research on urolithiasis in this part of the country had as a goal to reveal the chemical composition of renal stones by new accurate physicochemical methods. In the first phase of the study by means of infrared spectroscopy (IRS) the qualitative composition and type of urolithiasis were determined. The metal concentration of uroconcrements was determined by atomic absorption spectroscopy. These laboratory results on uroconcrements offer a proper quideline in the therapy, metaphylaxis of urolithiasis (1,2,3).

## Materials and Methods

Among the physicochemical methods used in the research of urolithiasis we can mention: infrared spectroscopy (IRS), X-ray diffraction spectroscopy, thermoanalysis, and atomic spectroscopy (AAS) a.o. These methods permit the obtainment of accurate data, presenting expeditiousness versus the classic ones (2,4,5).

In the first phase of the study by means of infrared spectroscopy – a physico-chemical method applied for the first time by us in the determination of the qualitative composition of the urolithiasis – the evaluation of the stones obtained from the kidney stone patients, admitted to the Urologic Clinic in Timisoara, were performed.

Preliminary to the spectroscopic investigations of the urolithiasis with unknown composition spectrograms of the chemically pure substances (present usualy in the composition of the urinary lithiasis) were recorded. There were recorded the IR spectrograms for the following compounds:

- organic: uric acid, xanthine, 2,8-dehydroxyadenine, oxalic acid, oxalates (Na and K), cystine, cholesterol;
- inorganic: phosphate anions, ammonium carbonate, ammonium cation, those were being present in some urolithiasis types.

The spectrograms of the mentioned chemically pure substances are considered "standard spectrograms".

Previous to IRS investigations the surgically obtained and spontaneously eliminated urolithiasis were processed mechanically. The resulted powder for each stone was put into a tightly closed glass recipient an has been sent to the laboratory for IRS analysis. The spectrograms were recorded after KBr pastillation and then evaluated.

More trough-going researches on urolithiasis, i.e. quantitative data with special reference to metals, which participate in urolithogenesis, were also performed. So, in order to find out the quality of alkaline, alkaline earth and trace metals in uroconcrements the atom absorption spectroscopy was used. A PYE UNICAM (serie SP 1990) apparatus made the analytical determination of the metals in the studied urolithiasis.

In the case of different types of urolithiasis the main alkaline (Na, K), alkaline earth (Ca, Mg) and trace metal (Zn, Fe, Cu, Mn, Pb) elements were found out.

## Results and Discussions

The first qualitative determinations concerning the composition of urolithiasis were performed in 78 on the stones obtained by surgical intervention or spontaneously eliminated from the kidney stone patients admitted in the Urological Clinic Timisoara. In 80's the qualitative analysis of some metals were initiated (2).

The aim of this work was to found out by physico-chemical method (IRS) the type of urolithiasis in the patients admitted at the Urological Clinic for renal stone in order to establish a correct guideline for therapy and metaprophilaxy of oxalic urolithiasis.

The medical treatment of renal lithiasis has a series of general principles of prevention, applicable teach patients but also specific measures, according to the peculiarities of the urolithiasis type (1,4,6).

Today it is unanimously recognized the role of nutrition in the appearance of renal calculus. So, it is known that a low liquid intake, excessive alcohol consumption, excessive intake of food rich in oxalates or urates etc. lead to urinary crystals and the to uroconcrements formation (2,3,5).

In the period 1991-1995 a number of 146 urolithiasis obtained from the kidney stone patients of the Urological Clinic Timisoara were studied and the types of lithiasis determined. A synopsis of the urolithiasis types is given in table 1.

As it is seen in Table 1, there are 32 patients with simple and 59 with mixed oxalic urolithiasis. In order to obtain the data concerning the metaphylaxy of this type of lithiasis by dietotherapy we selected only the patient with simple lithiasis.

It is know that oxalate is a metabolic product which is eliminated mainly in urine. In the organism the oxalic acid has an exogene (food intake) and an endogene (e.g. metabolic pathway of carbohydrates) origin.

Diethotherapy in oxalic lithiasis recommends an acid diet, with increased protein content, without foods with increased oxalate contents. Thus, we recommended to the oxalic stone former patients to reduce the carbohydrates in their diet and first of all the potatoes, brown bread and vegetables that contain digestible cellulose in order to avoid fermentative processes in caecum which can generate oxalates. Also, we recommended to avoid the fruit juice, the Russian tea and the alkaline mineral waters.

During this research (1991-1996) more than half from the studied group (32 oxalic stone former patients) – those who respected the general and special recommendations were stone free. The other part was again admitted in the clinic and underwent to surgical or ESWL treatment.

Table 1. Types of urolithiasis (simple and mixed)

| Types of Urolihiasis | | Composition | Nr. of Cases | | |
|---|---|---|---|---|---|
| | | | Total | Men | Women |
| **Simple** | purine lithiasis | Urates (U) | 21 | 10 | 11 |
| | | Xanthine (X) | - | - | - |
| | | 2,8 dehydroxyadenine (2,8- DHA) | - | - | - |
| | | Oxalates (O) | 32 | 20 | 12 |
| | other lithiasis | Phosphates (P) | 26 | 11 | 15 |
| | | Cystine (C) | 6 | 1 | 2 |
| | | Cholesterol (CHOL) | 2 | - | 2 |
| | | Carbonates (CARB) | - | - | - |
| **Total** | **simple** | **urolithiasis** | **87** | **42** | **45** |
| **Mixed** | binary | oxalates-phosphates (O-P) | 27 | 13 | 14 |
| | | oxalates-urates (O-U) | 6 | 2 | 4 |
| | | oxalates-cholesterol (O-CHOL) | 7 | 4 | 3 |
| | | urates-oxalates (U-O) | - | - | - |
| | | phosphates-oxalates (P-O) | 10 | 3 | 7 |
| | | phosphates-carbonates (P-CARB) | 6 | 2 | 4 |
| | ternary | phosphates-oxalates-carbonates (P-O-CARB) | - | - | - |
| | | oxalates-urates-phosphates (O-U-P) | 3 | - | 3 |
| **Total** | **mixed** | **urolithiasis** | **59** | **24** | **35** |

## Conclusions

- By the infrared spectroscopy there was determined the types of urolithiasis in 146 stone former patients.
- It is very important to know the urolithiasis type in order to establish a correct guideline for therapy and metaphylaxis of urolithiasis.
- There were made general and special dietary recommendations for the patients with simple oxalic urolithiasis and followed in time.
- More than half of the patients from the studied group were stone free after two, three or four years following the surgical treatment and calculus type determination, a small part – which did not respect the recommendations was admitted again in the clinic with recurrence.

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# NUTRICIONI ASPEKTI OKSALATNE UROLITIJAZE

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Kratak sadržaj: *Ovih godina, urolitijaza predstavlja 1-2% od svih bolesti i 12-40% zastupljena je među bubrežnim bolestima (tumačenja različitih autora). Iz ovog razloga možemo reći da je urolitijaza rasprostranjena bolest, upravo zato što je učestalost dijabetesa 1.5%, reuma je još niže kotirana-1%, dok tuberkuloza zauzima jedno od zadnjih mesta.*

*Posredstvom fizičko-hemijskih metoda, može se ustanoviti tip urolitijaze, što je od velike važnosti kao klinički vodič i za prevenciju ove bolesti.*

*U profilaksi i metafilaksi urolitijaze veliku ulogu igra konzumiranje hrane. Dijetetske preporuke bile bi: pojačano dnevno uzimanje tečnosti, pravilna i umerena dijeta (npr. životinjske i biljne namirnice); tri obroka dnevno, uz izbegavanje preobilne večere.*

*Ukoliko je tip litijaze poznat, dijeta mora da uključi i hranu sa minimalnim rizikom od litijaze, da bi se sprečilo ponovo nastajanje bolesti.*

Ključne reči: *Urolitijaza, prevencija, ishrana*

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