Outpatient metabolic evaluation of twenty-seven patients with high recurrence risk urolithiasis at the Centro Médico ISSEMYM


ABSTRACT

Introduction: Outpatient metabolic evaluation is a useful diagnostic focus in the approach to urolithiasis, a disease that should be considered to be a metabolic pathology with tendency to recur.

Objective: To diagnose metabolic alterations and determine their prevalence in high recurrence risk patients along with their impact in relation to sex and age.

Methods: Descriptive study of twenty-seven patients (sixteen men and eleven women) presenting with high recurrence risk lithiasis was carried out. Calcium, uricosuria, phosphaturia, oxaluria, citraturia, and creatininuria were quantified in 24-hour samples. Serum levels of calcium, uric acid, phosphorous, and parathyroid hormone were also determined. Student’s t test was used in the statistical analysis and statistical significance was a P ≤ 0.05.

Results: At least one metabolic alteration was diagnosed in 74.04% (20/27) of patients and 40.7% (11/27) presented with two or more metabolic alterations. The most frequent were hypercalciuria 29.62% (8/27), hypocitraturia 29.62% (8/27), hyperoxaluria 25.9%

RESUMEN

Introducción: La evaluación metabólica ambulatoria es un enfoque diagnóstico útil para abordar a la urolitiasis, la cual debe ser considerada una enfermedad me-tabólica con tendencia a la recurrencia.

Objetivo: Diagnosticar y determinar la prevalencia de alteraciones metabólicas en pacientes de alto riesgo de recurrencia así como su impacto según sexo y edad.

Métodos: Estudio descriptivo de 27 pacientes (16 hombres y 11 mujeres), con urolitiasis de alto riesgo de recurrencia. Se cuantificó calciuria, uricosuria, fosfatúria, oxaluria, citraturia y creatininuria en muestras de 24 horas. Así como niveles séricos de calcio, ácido úrico, fósforo y HPT. Para el análisis estadístico se utilizó t de Student considerando significativo p ≤0.05.

Resultados: Se diagnosticó al menos una alteración metabólica en 74.04% (20/27) de los pacientes; 40.7% (11/27) presentó dos o más alteraciones metabólicas. Las alteraciones más frecuentes fueron la hipercaleciuria (8/27) 29.62%, hipocitraturia (8/27) 29.62%, hiperoxaluria (7/27) 25.9%, hiperuricemia (6/27) 22.2%. No se observó diferencias significativas de edad o sexo entre los grupos.
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Discussion: Reported worldwide figures for metabolic diagnoses in these patients vary from 70-95%, results that are similar to those found in the present study.

Conclusions: A total of 74.04% of patients were diagnosed with some type of metabolic change, demonstrating the need for carrying out metabolic studies in high risk patients, since specific medical management of these alterations for reducing lithiasis recurrence already exists.

Keywords: Urolithiasis, metabolic study, metabolic evaluation, Mexico.

INTRODUCTION

Urinary lithiasis is a pathology with 12-13% prevalence in men and 6-7% prevalence in women in the United States. Without medical treatment, there is 30-40% recurrence at 5 years and 70% recurrence at 20 years. There is a predominance in men with a 3:1 man-to-woman ratio. Women are usually older than fifty when they present with first episode of lithiasis, which increases recurrence possibility in men; however, multiple factors such as race, hygienic-dietary factors, and geographic and hereditary aspects have modified this. This recurrence tendency makes it necessary not only to resolve the acute disease but also to prevent it with medical treatment based on an appropriate metabolic evaluation. A method was described in 1985 and simplified and recommended in 1997. It is inexpensive and provides necessary information for selective and reasonable medical therapy in treating urinary lithiasis. Multiple randomized studies have recently corroborated a dramatic reduction of 50-70% in urolithiasis recurrence rates, with medical and dietary treatment, emphasizing the positive cost-benefit impact out-patient metabolic evaluation can have on certain health models.

OBJECTIVE

To diagnose and determine the prevalence of metabolic alterations in patients with high risk for urinary lithiasis recurrence, to analyze the different metabolic alterations and their impact according to age and sex, to reproduce and compare internationally published figures with respect to diagnosis of this pathology, and finally to have particular experience in the feasibility of arriving at metabolic disorder diagnosis.

METHODS

A descriptive study of 27 patients (16 men and 11 women) with high risk for lithiasis recurrence was carried out at the Centro Médico ISSEMyM from 2004-2010.

Inclusion criteria were patients with high recurrence risk urinary lithiasis. These included active or recurrent stone-formers, children or adolescents, patients with only one kidney, coraliform lithiasis, bilateral lithiasis, first-time stone-former with family history of lithiasis, patient with gastrointestinal or bone disease, gout, recurrent urinary tract infections, kidney failure, and nephrocalcinosis. In addition study patients were required to complete medical history, urinalysis, urine culture, and plain abdominal film.

Patients underwent metabolic study that consisted of the collecting of 24-hour urine that was used to quantify calcium, uricosuria, phosphaturia, oxaluria, citraturia, and creatinuria, as well as fasting serum levels of calcium, uric acid, phosphorus, and parathyroid hormone (PTH) in the case of hypercalciuria. If cystine lithiasis was suspected from radiological image, cystinuria was quantified.

Patients with hypercalciuria were classified according to PTH values. If values were normal or low they were classified as having absorptive hypercalciuria.
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Results

Of the original 35 patients studied, 27 fit the inclusion criteria. There was slight predominance in men, with 16 men (59.2%), 11 women (40.8%), with a man-to-woman ratio of 1.45:1. Mean age was 47.6 years in men and 40.6 years in women, with a range of 22-72 years. Mean urinary volume was 2181 mL/day. Ten patients (37%) were identified with urinary volume under 2 liters per day, corroborating that low urinary volume is a real risk factor in urinary lithiasis. At least one metabolic alteration was diagnosed in 74.04% (20/27) of patients.

Results were categorized by sex and by three age groups and analyzed parametrically with Student’s t test. Statistical significance was considered when $P \leq 0.05$.

Table 1. Most frequent metabolic alteration combinations.

<table>
<thead>
<tr>
<th>Metabolic alteration combinations</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypocitraturia + hyperoxaluria</td>
<td>3</td>
</tr>
<tr>
<td>Hypercalciuria + hyperoxaluria</td>
<td>3</td>
</tr>
<tr>
<td>Hypercalciuria + hyperuricosuria</td>
<td>3</td>
</tr>
<tr>
<td>Hypocitraturia + hyperuricemia</td>
<td>2</td>
</tr>
<tr>
<td>Hypercalciuria + hypocitraturia</td>
<td>1</td>
</tr>
<tr>
<td>Hyperuricemia + hyperuricosuria</td>
<td>1</td>
</tr>
</tbody>
</table>
40.7% (11/27) presented with two or more metabolic alterations; and only one patient presented with a combination of four metabolic disorders (Image 1). The most frequent alterations were hypercalciuria (8/27) 29.62%, hypocitraturia (8/27) 29.62%, hyperoxaluria (7/27) 25.9%, and hyperuricemia (6/27) 22.2%. Of the patients with hypercalciuria, 6 (22.2%) were diagnosed with absorptive hypercalciuria, 1 (3.7%) with renal hypercalciuria, and 1 (3.7%) with primary hyperparathyroidism (Image 2). In the group presenting with metabolic changes, many possible combinations were found (Table 1). No patient imaging studies were suggestive of cystine stone. Hyperuricemia was the only entity showing significant difference in relation to tendency in men (Image 3). In the other metabolic alterations there were no differences associated with age distribution or sex (Tables 2 and 3).

## DISCUSSION

In the present study, no metabolic alteration was diagnosed in 25.96% of patients, which contrasted with the descriptions of Pak,16 Verbaeys,17 and Amaro,18 who reported less than 10%. However, the present results were similar to those reported in Argentina,19 Venezuela,20 and Chile.21

The available international literature shows a higher incidence of urinary lithiasis in men than in women,22 and the present study results concur with this information. However, in relation to metabolic alterations according to sex and age group, no significant differences were observed. It should be kept in mind that the present study population was small and so results need to be interpreted in that context.

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**Table 2. Metabolic alteration frequency by sex.**

<table>
<thead>
<tr>
<th>Variable (Metabolic alteration)</th>
<th>Total N (%)</th>
<th>Men N (%)</th>
<th>Women N (%)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypercalciuria</td>
<td>8 (29.6)</td>
<td>5 (31.2)</td>
<td>3 (27.2)</td>
<td>0.567</td>
</tr>
<tr>
<td>Hypocitraturia</td>
<td>8 (29.6)</td>
<td>5 (31.2)</td>
<td>3 (27.2)</td>
<td>0.947</td>
</tr>
<tr>
<td>Hyperuricemia</td>
<td>6 (22.2)</td>
<td>6 (37.5)</td>
<td>0 (0)</td>
<td>0.002</td>
</tr>
<tr>
<td>Hyperuricosuria</td>
<td>5 (18.5)</td>
<td>2 (12.5)</td>
<td>3 (27.2)</td>
<td>0.686</td>
</tr>
<tr>
<td>Hyperphosphatemia</td>
<td>1 (3.7)</td>
<td>1 (6.2)</td>
<td>0 (0)</td>
<td>0.245</td>
</tr>
<tr>
<td>Hyperoxaluria</td>
<td>7 (25.9)</td>
<td>5 (31.2)</td>
<td>2 (18.1)</td>
<td>0.161</td>
</tr>
</tbody>
</table>

**Table 3. Metabolic alteration frequency by age.**

<table>
<thead>
<tr>
<th>Variable (Metabolic alteration)</th>
<th>20 – 39 years N (%)</th>
<th>40 – 59 years N (%)</th>
<th>60 – 75 years N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypercalciuria</td>
<td>3</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Hypocitraturia</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Hyperuricemia</td>
<td>1</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Hyperuricosuria</td>
<td>2</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Hyperphosphatemia</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Hyperoxaluria</td>
<td>1</td>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>
CONCLUSIONS

Outpatient metabolic evaluation in patients at high risk for urinary lithiasis recurrence is a simple and complete approach with reproducible usefulness. It provides specific diagnosis that orients preventive medical therapy, obliging the urologist not only to implement surgical management but also medical management, and thus reduce urolithiasis recurrence.

ACKNOWLEDGEMENTS

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BIBLIOGRAPHY