Hyperuricemia and age

V. V. Povoroznyuk, G. S. Dubetska
Institute of Gerontology NAMS of Ukraine, Kyiv

Abstract

In the recent years, the problem of hyperuricemia and gout is getting a particular importance due to an increased incidence of this disease in the world population. The aim of study was to determine the uric acid level in blood serum and incidents of hyperuricemia among people of various age and sex. 510 patients aged from 18 to 89, among them 400 women and 110 men, were examined. The uric acid level in blood plasma was determined by an uricase-peroxidase method. With advancing age, the content of uric acid is observed to increase in the blood serum of women. It reaches a significant high in the age group of 80–89 years if compared to the age group of 20–29 years. Maximum increase of the uric acid content in men is typical of the age group of 60–69 years; however, it did not present any significant difference if compared to other age groups. Incidence of hyperuricemia among the women totaled 34%, among the men – 32%. The largest share of hyperuricemia in women (24.8%) and men (45.4%) was revealed in the age group of 60–69 years. Age is one of the factors contributing to the increased content of uric acid in the blood serum which leads to the hyperuricemia development. An increased content of uric acid in women gains a vital importance in the age group of 80–89 years if compared to the age group of 20–29 years, and men preserve the tendency of growing uric acid at the age of 60–69 years if compared to the age group of 20–29 years.

Key words: hyperuricemia, uric acid, age, sex

Introduction

Hyperuricemia is commonly revealed during the medical check-ups of in- and out-patients which makes doctors think first of all of the diagnosis ‘gout’. Gout is a chronic progressive disease related to the disorder of purine metabolism, which is marked by the increased content of uric acid in blood (hyperuricemia) and deposit of sodium salts (urates) in the locomotor tissues and internal organs that, in its turn, cause an acute arthritis and formation of gout nodules (tophus) [1].

Currently, medical references provide an extensive range of sources focusing on a study of hyperuricemia that develops not only in the case of a gout but in case of other morbid conditions as well; in particular, content of uric acid correlates with the development of metabolic syndrome, obesity, insulin resistance, arterial hypertension, intake of diuretics and a low-dosed acetylsalicylic acid, alcohol abuse, elderly age and renal failure [2, 6, 11].

As recommended by the EULAR, hyperuricemia is considered to be an increased content of uric acid in the
blood serum totaling over 360 mkmol/l (≤ 6 mg/dL) [5]. This rate is a reference for treatment of the patients suffering from gout with medications that reduce the content of uric acid and urates in body. Uric acid is the end product of purine outbreak and is excreted by kidneys. Within 24 hours, healthy people excrete 400–600 mg of uric acid with urine. Uric acid forms in the human body from the purine compounds supplied with the food or generated in the body in the course of nucleotide metabolism. Among the reasons of urates’ accumulating in the body, the key one is an increased formation of uric acid and reduced excretion of the urates by the kidneys. Men are more inclined to develop the gout. The disease incidence reaches its peak among the male patients at the age of 35–50, among female patients – 55–70. However, gout may develop even at a younger age, and it was also reported in children [1].

Medical studies explain that a high content of estrogens in women of the reproductive age contributes to the maintenance of a normal renal secretion of urates. During the post-menopausal period, women have the same content of uric acid as men of corresponding age; therefore study of the specific features pertaining to hyperuricemia development in this category of women is gaining an especial topicality.

In the recent years, the problem of hyperuricemia and gout is getting a particular importance due to an increased incidence of this disease in the world population. The morbidity rate in various regions varies significantly: 0.01–0.37%, and is strongly related to the peculiarities of nutrition. The high rate of morbidity is typical of the industrially developed countries; however, the gout incidence in such countries is different: 0.05% in Japan, 0.15–0.17% in China, 0.65% in Germany, in the USA this rate totals 0.84%. Medical references provide information that hyperuricemia incidence ranges from 5% to 12%. In Ukraine the incidence of gout totals 0.4% among the adult population, incidence of hyperuricemia – 15–20%. In connection therewith, timely diagnostics and treatment of gout and hyperuricemia are of a great topicality [1, 9, 12, 13].

Notwithstanding that gout is one of the oldest human diseases, mistakes while diagnosing this disease occur very frequently. As the hyperuricemia is an evidence of the gout which is associated with other morbid conditions, this pathology requires a detailed study. As of now, no study of age-specific peculiarities of hyperuricemia was carried out in Ukraine; there are only individual medical studies focusing on this pathology in connection with the patient’s gender. All the above mentioned facts motivated us to perform the present study.

**Aim of research**

To determine the uric acid level in blood serum and incidents of hyperuricemia among people of various age and sex.

**Material and methods**

The study was carried out at the department of clinical physiology and pathology of bone and joint disease of the national “Gerontology Institute of the National Academy of Medical Sciences of Ukraine” and Ukrainian Scientific and Medical Centre of Osteoporosis. 510 patients aged from 18 to 89, among them 400 women and 110 men, were examined. The average age of women was 64.3 ± 0.8, of men – 54.1 ± 0.5.

The uric acid level in blood plasma was determined by an uricase-peroxidase method, statistical analysis performed with the Statistica 6.0 software.

**Results and discussion**

With advancing age, the content of uric acid is observed to increase in the blood serum of women. It reaches a significant high in the age group of 80–89 years if compared to the age group of 20–29 years (Fig. 1). Maximum increase of the uric acid content in men is typical of the age group of 60–69 years; however, it did not present any significant difference if compared to other age groups (Fig. 2).

Incidence of hyperuricemia among the women totaled 34%, among the men – 32% (Figs. 3, 4). The largest share of hyperuricemia in women (24.8%) and men (45.4%) was revealed in the age group of 60–69 years (Figs. 5, 6).

Medical studies provide information that hyperuricemia, and later gout, is a more prevalent condition among men. This fact is considered to depend on the hereditary factors, as well as other hormonal and gender peculiarities of the uric acid formation and excretion. If a congenital defect (hypoxanthine guanine phosphoribosyl transferase (HGPT) deficiency, increased activity of phosphoribosyl-pyrophosphate synthetase) is present, it affects the purine metabolism, and hyperuricemia and gout may appear in a young age, in particular in case of Lesch-Nyhan syndrome or Kelly-Seegmiller syndrome – recessive, X-linked HGPT deficiency of various degrees of severity,
Hyperuricemia and age

FIG. 1. Uric acid level in the blood serum of the examined women in connection with their age

FIG. 2. Uric acid level in the blood serum of the examined men in connection with their age

FIG. 3. Incidence of the hyperuricemia among women

FIG. 4. Incidence of the hyperuricemia among men

FIG. 5. Hyperuricemia developing among the women of various ages

FIG. 6. Hyperuricemia developing among the men of various ages

with hyperuricemia and neural disorders. This is the reason why this disease develops in men, and approximately 25% of male relatives have hyperuricemia [2]. Analysis of the data given in the scientific references proves that the hyperuricemia and gout, during the recent years, are increasingly more often developing in the patients of older age groups, which may be caused by the endogenic synthesis of purines, on the one hand, and the reduced excretion of uric acid, on the other hand. In particular, findings of the research carried out on the British popula-
tion show that the morbidity peak is observed in the age group of 75–84 years. The findings of Framingham study prove that one in six men and one in three women with a hyperuricemia (uric acid ranging 7–7.9 mg%) developed gout, and if hyperuricemia exceeded 8 mg%, the incidence of gout in men reached 36.7%. Women did not show such a high level of uricemia [1].

According to our data, a reduced content of uric acid at the age of 70–79 is an evidence of an age-specific selection: patients with a lower content of uric acid may have a longer life.

**Conclusion**

Our findings are similar to the ones of the British study, except for the age group with a higher content of uric acid: 75–84 years in the British selection, 60–69 years – in our selection, which may be associated with a shorter average lifespan of the Ukrainian population (in Ukraine, average lifespan totals 68 years: women – 75 years, men – 62; in the Great Britain – 78.7: men – 76.2, women – 81.3).

Age is one of the factors contributing to the increased content of uric acid in the blood serum which leads to the hyperuricemia development. An increased content of uric acid in women gains a vital importance in the age group of 80–89 years if compared to the age group of 20–29 years, and men preserve the tendency of growing uric acid at the age of 60–69 years if compared to the age group of 20–29 years.

**References**


Received: June 11, 2012
Accepted: September 10, 2012
Santrauka

Pastaraisiais metais vis dažniau diagnozuojama hiperurikemija ir podagra.

**Tikslas**. Nustatyti įvairaus amžiaus vyrų ir moterų šlapimo rūgšties koncentraciją kraujyje ir hiperurikemijos dažnumą.

**Tyrimo dalyviai ir metodika.** Į tyrimą buvo įtraukti 510 paientų, kurių amžius buvo nuo 18 iki 89 metų. Ištirta 400 moterų ir 110 vyrų. Šlapimo rūgšties koncentracija kraujyje buvo nustatyta taikant urikazės-peroksidazės metodą.


**Išvados.** Amžius yra vienas iš šlapimo rūgšties padidėjimą ir hiperurikemiją sukeliantį veiksnį.

Didesnė šlapimo rūgšties koncentracija yra nustatoma 80–89 metų moterų grupėje palyginti su 20–29 metų grupe, ir 60–69 metų vyrų grupėje palyginti su 20–29 metų grupe.

**Raktažodžiai:**

Hiperurikemija, šlapimo rūgštis, amžius, lytis