

D. Sturite<sup>1</sup>, I. Rasa<sup>2</sup>

<sup>1</sup>Riga Stradiņš University, Latvian Osteoporosis and Bone Metabolic Diseases Association, Riga, Latvia, <sup>2</sup>Riga East University Hospital, Riga Stradiņš University, Latvian Osteoporosis and Bone Metabolic Diseases Association, Riga, Latvia

**Background:** Primary hyperparathyroidism (PHPT) can manifest with a variety of clinical symptoms, ranging from asymptomatic cases to those with significant involvement of multiple organs, including osteoporosis and osteopenia. The literature shows variability in the prevalence of organ involvement and related conditions.

**Methods:** This LATVPHPT study included 177 PHPT patients diagnosed between January 1, 2021, and January 1, 2024. Using IBM SPSS 29.0 software, we conducted a detailed retrospective analysis of medical records, laboratory data, radiologic findings, surgical outcomes, and histopathology reports.

**Results:** 177 patients (mean age  $63.8 \pm 11.9$  years), 89% were females. 65% ( $n = 115$ ) of patients underwent parathyroidectomy, 14.7% ( $n = 26$ ) had surgery postponed due to unknown adenoma location, 1.1% ( $n = 2$ ) declined, 19.2% ( $n = 34$ )—awaiting surgery, 3—needed reoperation due to negative histopathology. Hungry bone syndrome occurred in 3 patients. 2 patients had MEN1 syndrome. Histopathological analysis and imaging in patients who underwent surgery identified a single adenoma in 94.0% ( $n = 106$ ), double adenomas—1.7% ( $n = 2$ ), hyperplasia—2.6% ( $n = 3$ ), carcinoma—1.7% ( $n = 2$ ). Among imaging modalities, contrast-enhanced ultrasonography (CEUS) showed superior performance for identifying typically localized adenomas compared to ultrasonography ( $b = -1.68$ ,  $p = 0.020$ ), scintigraphy ( $b = -1.70$ ,  $p = 0.026$ ), and 3D-CT ( $b = -1.66$ ,  $p = 0.046$ ). While SPECT/CT demonstrated a similar trend, the results did not reach statistical significance ( $b = -1.2$ ,  $p = 0.099$ ). The mean preoperative calcium was  $2.9 \pm 0.3$  mmol/L, intact parathyroid hormone (iPTH)— $251.2 \pm 242.1$  pg/mL, phosphorus— $0.8 \pm 0.2$  mmol/L, 25-OH vitamin D— $27.6 \pm 13.3$  ng/mL. The mean postoperative calcium was  $2.4 \pm 0.1$  mmol/L, iPTH— $59.9 \pm 36.5$  pg/mL, phosphorus— $1.1 \pm 0.2$  mmol/L, 25-OH vitamin D— $43.4 \pm 16.1$  ng/mL. Comorbid conditions were in 35% ( $n = 62$ ) had with osteoporosis, 54% ( $n = 95$ )—osteopenia, 15% ( $n = 26$ )—osteoporotic fractures. In 17.5% ( $n = 31$ ) of patients, PHPT was suspected and later confirmed only due to a prior diagnosis of osteoporosis or osteopenia based on DXA or QCT. 17.5% ( $n = 31$ ) of patients received oral bisphosphonates, 4.0% ( $n = 7$ )—intravenous bisphosphonates, 8.5% ( $n = 15$ )—denosumab, 1.1% ( $n = 2$ )—medication holidays. 25% ( $n = 44$ ) had kidney stones, 23% ( $n = 41$ )—gallstones. 31.1% ( $n = 55$ ) of patients were asymptomatic PHPT based on retrospectively reviewed previous medical records. Thyroid conditions included thyroid nodules in 81% ( $n = 143$ ), nontoxic goitre in 53% ( $n = 93$ ), and autoimmune thyroiditis in 29% ( $n = 51$ ). Other associated conditions included hypertension 43% ( $n = 76$ ), type 2 diabetes 14% ( $n = 24$ ), and malignancies 20% ( $n = 36$ ), most commonly breast and thyroid cancers.

**Conclusions:** High rates of skeletal complications and malignancies in PHPT emphasize its clinical impact. Precise imaging, timely diagnosis, and appropriate treatment are essential for managing its complex manifestations. It is important to exclude the possibility of rule out PHPT in patients with osteopenia and osteoporosis.

## P653

### THE EFFECTS OF TIBIA FRACTURE AND INTRAVENOUS STEM MESENCHYMAL CELLS AT DIFFERENT TIMES AFTER SURGERY ON MAXILLARY ALVEOLAR BONE LOSS

I. Soloviova<sup>1</sup>, V. Luzin<sup>1</sup>, V. Ryabkov<sup>1</sup>, S. Kovalenko<sup>1</sup>, N. Muzychuk<sup>1</sup>

<sup>1</sup>FSBEI HI ST. LUKA LSMU of MOH of Russia, Lugansk, Russia

**Objective:** Aim of the study is to test maxillary alveolar bone loss after tibia fracture modeling and intravenous injection of mesenchymal stem cells (MSC) at different times after surgery.

**Material and methods:** 162 male rats with the body weight of 190–225 g were distributed into 7 groups: group 1—controls, group 2—animals with tibia fracture, and groups 3–7 for the animals with the same tibia fracture that received intravenous injections of 5 million MSC per injection at 3rd, 10th, 15th, 24th and 45th days after surgery. Bone marrow cells were obtained from the tibia and phenotyped according to standard methods. Upon expiration of observation terms (7, 15, 30, 60 and 90 days) the animals were withdrawn from the experiment. Measurements of linear distance (mm) between the cement-enamel junction (CEJ) and the alveolar bone crest (ABC) of the mesial root of the first molar were performed on the buccal and the palatal surfaces.

**Results:** In group 2 the buccal CEJ-ABC exceeded that of the group 1 by 6.23%, 9.59%, 10.54%, and 5.16% in the period from the 15th to the 90th day and the palatal CEJ-ABC—by 5.80%, 6.21%, 12.17%, 9.72%, and 6.60% in the period from the 7th to the 90th day. In group 3 palatal CEJ-ABC was lowered than that of the group 2 by 6.42%, 5.69% and 5.16% in the period from the 30th to the 90th day, and on the buccal side by 30th and 60th day—by 5.11% and 6.21%. In group 4 the palatal CEJ-ABC was lowered than that of the group 2 by 6.07%, 8.85%, 7.07% and 7.08% in the period from the 15th to the 90th day, and on the buccal side by 4.63%, 6.71% and 8.64% in the period from the 15th to the 60th day. In the groups 5–7 the restoration maxillary alveolar bone were expressed to a significantly lesser extent.

**Conclusion(s):** Administration MSC into the defect of the tibia at different times after surgery was accompanied by a faster recovery of the maxillary alveolar bone. The most effective was administration of MSC on the 10th day after surgery.

## P654

### CONSEQUENCES OF FALLS IN ELDERLY

L. Tamuliūte-Morozovienė<sup>1</sup>, J. Dadoniene<sup>1</sup>, R. Stukas<sup>1</sup>, M. Tamuliūte<sup>2</sup>, V. Alekna<sup>1</sup>

<sup>1</sup>Faculty of Medicine of Vilnius University, Vilnius, Lithuania,

<sup>2</sup>National Osteoporosis Center, Vilnius, Lithuania

**Objective:** This study aimed to evaluate physical and psychological consequences among older adults living in the community.

**Materials and methods:** People, aged 60 years and above, who attended the National Osteoporosis Center for diagnostic or treatment purposes, participated in interviews. According to these interviews, the outcomes and healthcare measures related to falls experienced in the previous 12 months were documented. There was used a specially prepared questionnaire for demographic and falls data, fear of falling questionnaire “Falls Efficacy Scale International” (FES-I) and physical activity questionnaire “Physical Activity Scale for the Elderly” (PASE).

**Results:** The study population consisted of 972 community-dwelling elderly people (mean age  $73.7 \pm 5.9$  years). Falls were reported by 361 (37.14%) of respondents. One in three of the interviewed people had fallen two or more times in the period of one year. Most of all fallen elderly reported various injuries and 79 (23.3%) of them experienced bone fractures. Fear of falling was reported by 272 (74.1%) respondents. Almost half (42.7%) of fallers restricted their everyday activities. The primary self-reported cause of restriction of everyday activities was identified as pain.

**Conclusions:** Fear of falling was reported by 75.4% of respondents who experienced a fall in the past 12 months. Furthermore, all older

adults who sustained hip or vertebral fractures subsequently restricted their daily activities.

## P655

### REFERENCE INTERVALS FOR SERUM CONCENTRATIONS OF OSTEOCALCIN FOR GREEK ADULT MEN AND WOMEN

I. Tryfonidi<sup>1</sup>, P. Lukas<sup>2</sup>, S. Tournis<sup>3</sup>, C. Croupis<sup>4</sup>, E. Vasilidis<sup>5</sup>, E. Cavalier<sup>2</sup>, E. Chronopoulos<sup>3</sup>, K. Makris<sup>6</sup>

<sup>1</sup>KAT GENERAL HOSPITAL, ATHENS, Greece, <sup>2</sup>Department of Clinical Chemistry, University of Liege, CHU de Liege, Liege, Belgium, <sup>3</sup>Laboratory of Research of Musculoskeletal System “Th. Garofalidis”, KAT General Hospital, Medical School, University of Athens, Athens, Greece, <sup>4</sup>Department of Clinical Biochemistry, Atikon University General Hospital, Medical School, University of Athens, Athens, Greece, <sup>5</sup>Third Department of Orthopaedic Surgery, KAT General Hospital, Medical School, University of Athens, Athens, Greece, <sup>6</sup>Clinical biochemistry Department, KAT General Hospital, Kifissia, Laboratory of Research of Musculoskeletal System “Th. Garofalidis”, KAT General Hospital, Medical School, University of Athens, Athens, Greece

**Background-objective:** Bone turnover markers (BTMs) reflect the metabolic activity of bone tissue and can be used to monitor osteoporosis therapy. To adequately interpret BTMs, method-specific and population specific reference intervals are needed. We aimed to determine reference intervals (RI) for serum concentrations of Osteocalcin (OC) for the Greek adult population.

**Methods:** We collected samples from 431 apparently healthy Greeks (142 men, 150 pre- and 139 postmenopausal women), who volunteered to participate in our study. Data on socio-demographic characteristics, medical histories and medications were collected and subjects with clinical conditions or receiving medications affecting bone metabolism were excluded. Dual-energy X-ray absorptiometry (DXA) was used to measure bone mineral density (BMD) in all participants. All blood collections were performed in the morning after overnight fast. Serum OC concentrations were measured by an automated immunoassay on the IDS-iSYS analyzer (Immunodiagnostic Systems, Boldon, UK). The RI was defined as the central 95% range and determined according to CLSI guideline C28-A3 and using the MedCalc Software.

**Results:** The mean ages of men, pre- and post-menopausal women were 50.7, 40.7 and 58.4 years respectively. DXA results revealed that 348 participants had normal BMD, 73 were osteopenic, while 10 who had osteoporosis were excluded from analysis. Since our data were not normally distributed (Shapiro-Wilk test) in any group and we used the non-parametric method suggested by the CLSI guide in order to determine the RI. Subjects with osteopenia, regardless of sex, exhibited significantly higher values for OC compared to those with normal BMD [median (25.75 percentiles)] 16.78 ng/mL (13.51–20.72) vs 20.06 ng/mL (15.08–27.13). Post-menopausal women exhibited significantly higher values 18.42 ng/mL (14.84–26.65) compared to pre-menopausal women 16.31 ng/mL (12.47–20.42) and men 17.17 ng/mL (13.59–21.11). Separate RI were calculated and suggested for subjects with normal BMD (8.67–39.2 ng/mL), with osteopenia (8.37–48.01 ng/mL) as well as for men (9.77–39.81 ng/mL), pre-menopausal (7.62–35.12 ng/mL) and postmenopausal women (10.52–50.24).

**Conclusion:** We provide RI for OC concentrations in serum for the Greek adult population using an automated immunoassay. Our data may aid to interpret bone turnover in the Greek adult population.

## P656

### REFERENCE INTERVALS FOR SERUM CONCENTRATIONS OF TARTARATE RESISTANT ACID PHOSPHATASE 5B FOR GREEK ADULT MEN AND WOMEN

I. Tryfonidi<sup>1</sup>, P. Lukas<sup>2</sup>, S. Tournis<sup>3</sup>, C. Croupis<sup>4</sup>, E. Vasilidis<sup>5</sup>, E. Cavalier<sup>2</sup>, E. Chronopoulos<sup>3</sup>, K. Makris<sup>6</sup>

<sup>1</sup>KAT GENERAL HOSPITAL, ATHENS, Greece, <sup>2</sup>Department of Clinical Chemistry, University of Liege, CHU de Liege, Liege, Belgium, <sup>3</sup>Laboratory of Research of Musculoskeletal System “Th. Garofalidis”, KAT General Hospital, Medical School, University of Athens, Athens, Greece, <sup>4</sup>Department of Clinical Biochemistry, Atikon University General Hospital, Medical School, University of Athens, Athens, Greece, <sup>5</sup>Third Department of Orthopaedic Surgery, KAT General Hospital, Medical School, University of Athens, Athens, Greece, <sup>6</sup>Clinical biochemistry Department, KAT General Hospital, Kifissia, Laboratory of Research of Musculoskeletal System “Th. Garofalidis”, KAT General Hospital, Medical School, University of Athens, Athens, Greece

**Background-objective:** Bone turnover markers (BTMs) reflect the metabolic activity of bone tissue and can be used to monitor osteoporosis therapy. Tartrate-resistant acid phosphatase, isoform 5b (TRACP5b) is a bone resorption marker not influenced by renal function or food intake and can be measured in serum by immunoassays. We aimed to determine reference intervals (RI) for serum concentrations of TRACP5b for the Greek adult population.

**Methods:** We collected samples from 431 apparently healthy Greeks (142 men, 150 pre- and 139 post-menopausal women), who volunteered to participate in our study. Data on socio-demographic characteristics, medical histories and medications were collected and subjects with clinical conditions or receiving medications affecting bone metabolism were excluded. Dual-energy X-ray absorptiometry (DXA) was used to measure bone mineral density (BMD) in all participants. All blood collections were performed in the morning after overnight fast. Serum TRACP5b concentrations were measured by an automated immunoassay on the IDS-iSYS analyzer (Immunodiagnostic Systems, Boldon, UK). The RI was defined as the central 95% range and determined according to CLSI guideline C28-A3 and using the MedCalc Software.

**Results:** The mean ages of men, pre- and post-menopausal women were 50.7, 40.7 and 58.4 years respectively. DXA results revealed that 348 participants had normal BMD, 73 were osteopenic, while 10 who had osteoporosis were excluded from analysis. Since our data were not normally distributed (Shapiro-Wilk test) in any group, we used the non-parametric method suggested by the CLSI guideline in order to determine the RI. Subjects with osteopenia, regardless of sex, exhibited significantly higher values for TRACP5b compared to those with normal BMD [median (25.75 percentiles)] 3.22 U/L (2.71–3.83) vs 2.41 U/L (1.96–3.13). Post-menopausal women exhibited significantly higher values 3.19 U/L (2.63–3.83) compared to pre-menopausal 2.19 U/L (1.75–2.70) and men 2.48 U/L (2.07–3.13). Separate RI are calculated and suggested for subjects with normal BMD (1.11–4.78 U/L), with osteopenia (1.24–5.47 U/L) as well as for