

# Meet the Professor Abstracts

**6th International Conference on Osteoporosis and Bone Research: 'Meet the Professor' Abstracts**  
**Meeting Abstracts from the 6th International Conference on Osteoporosis and Bone Research, Xi'an, China, 20–23 September 2012**

## MtP2

### **The Characteristics of Primary Hyperparathyroidism in China**

*Xunwu Meng*

Department of Endocrinology, Key Laboratory of Health Ministry of China, Peking Union Medical College Hospital, Peking Union Medical College, Chinese Academy of Medical Science, Beijing, China

With the utility of multispectral automatic biochemical analyzer, the routine measurement of serum calcium as a screening tool led to a sharp increase in the incidence of hypercalcemia. More and more primary hyperparathyroidism (PHPT) patients have been found in health or disease examinations in recent 30 years. The clinical manifestations have also been changed that asymptomatic PHPT increased with time.

Classical manifestations of PHPT in Chinese population: PHPT mainly occurs in young adults who suffer from bone pain, deformities, fractures and loss of height. 70–80% PHPT characterized bone resorption in X-ray, including fibrocystic osteitis and subperiosteal resorption. The incidence of Nephrolithiasis is 40–50%. The skeletal and renal involvements are found in 30–40% patients.

Special types of PHPT: 1. PHPT with normal serum calcium levels: Approximately 10% of PHPT patients sustain with serum calcium in the normal range. Serum calcium levels in 25% of patients are intermittent mildly increased. Therefore, checking blood ionized calcium is helpful for diagnosis. Blood albumin levels, renal function, metabolic acidosis, the presence of bone library depletion, associated osteomalacia, recurrent pancreatitis and parathyroid embolism should also be considered. 2. Asymptomatic PHPT. 3. PHPT with vitamin D deficiency and/or osteomalacia. 4. PHPT in childhood. 5. Parathyroid crisis. 6. Parathyroid carcinoma. 7. Multiple endocrine neoplasia.

Localization examinations: 1. <sup>99m</sup>Tc-sestamibi scanning (<sup>99m</sup>Tc-MIBI): Coincidence rate of more than 90%. 2. High-resolution neck ultrasonography: Coincidence rate of 75%, but only for neck lesions. 3. Mediastinal CT examination when necessary.

Treatment: PHPT is cured when the abnormal parathyroid tissue is removed. It is mainly caused by parathyroid adenoma in pathological result. Less commonly (in about 20%) is caused by

hyperplasia of four parathyroid glands. Parathyroid carcinoma occurs in 6% of PHPT patients. Postoperatively, 70% of patients may experience a brief period of transient hypocalcemia who should be treated with calcium and vitamin D.

## MtP3

### **Osteoporotic Fracture and its Management**

*Hua Lin*

The Center of Research for Metabolic Bone Disease, The Affiliated Drum Tower Hospital of Medical School, Nanjing University, Nanjing, China

Osteoporosis is a major cause of morbidity and mortality through its association with age-related fractures. Although most effort in fracture prevention has been directed at retarding the rate of age-related bone loss and reducing the frequency and severity of trauma among elderly people, evidence is growing that peak bone mass is an important contributor to bone strength during later life.

Fragility fractures resulting from osteoporosis are common injuries. Despite advances in prevention and treatment of osteoporosis, the number of fracture continues to increase. Along with the three classic locations hip, spine and wrist, there are several other fractures that are commonly related to osteoporosis. The weak bone makes it difficult to achieve a stable bone-implant construct and general weakness of the patient often prevents reduction of load on the injured extremity during healing. The main treatment goal should be preservation of function even at the expense of restoration of exact anatomy. Osteoporotic fractures, including vertebral compression fractures, are associated with significant mortality, morbidity and low quality of life. Osteoporotic vertebral compression fractures (OVCFs) account for approximately one-half of all osteoporosis-related fractures. Acute OVCF management includes bracing, analgesics and functional restoration. Thorough differential diagnosis should be considered before attributing fractures to osteoporosis. Appropriate evaluation and medical treatment of underlying osteoporosis should be recommended or instituted.

Vertebral compression fractures frequently result in both acute and chronic pain as well as leading to progressive vertebral collapse. Nonsurgical management of the spinal fracture should focus on pain control and maximizing functional outcome. The role of surgical treatment remains controversial and should be reserved for patients who fail initial nonsurgical management options. Percutaneous vertebral augmentation (vertebral kyphoplasty) has become a popular practice in the treatment of painful OVCFs. The incidence of recurrent fracture after kyphoplasty is substantial at 10% within the first 90 days.

Proximal femoral fractures (or hip fractures) usually occur as a result of a low-energy fall from a standing height. Hip fracture is a major issue due to an ever-ageing population. As the population survives longer, the incidence is increasing. Hip fracture is the most serious consequence of osteoporosis. Approximately 30% of hip fractures occur in men, and risk of death in the year after hip fracture is greater in men (33%) than in women (20%).

The management of hip fractures: Operate on patients with the aim of allowing them to fully bear the weight (without restriction) in the immediate postoperative period;

Perform replacement arthroplasty (hemiarthroplasty or total hip replacement) in patients with a displaced intracapsular fracture;

Offer total hip replacements to patients with a displaced intracapsular fracture who were able to walk independently out of doors with no more than the use of a stick, who are not cognitively impaired and who are medically fit for anesthesia and the procedure;

Use a proven femoral stem design rather than Austin Moore or Thompson stems for arthroplasties;

Use cemented implants in patients undergoing surgery with arthroplasty;

Consider an anterolateral approach in favor of a posterior approach when inserting a hemiarthroplasty;

Use extramedullary implants such as a sliding hip screw in preference to an intramedullary nail in patients with trochanteric fractures above and including the lesser trochanter;

Use an intramedullary nail to treat patients with a subtrochanteric fracture.

The osteoporotic fracture repair is dependent on factors of biology, machine and pharmacology. Mechanical and biological factors contribute to the healing processes of bone and are affected by age and osteoporosis. Callus formation is the natural repair and fixation response to a fracture in the absence of artificial fixation devices, including casts or osteosynthetic materials. Callus response is also an expression of fracture healing, and by quantifying the increase in size of the callus it is possible to measure the healing process. The mechanical strength of the bone following bridged healing indicates a reduction in the completion of healing. Clinical observations indicate that fragility fractures heal despite the abnormality of bone remodeling in osteoporosis. Osteoporotic fracture healing appears to be delayed with respect to callus mineralization and biomechanical properties. The timing of the postoperative administration of bisphosphonates does not appear to affect the rate of healing of an intertrochanteric fracture or the incidence of complications.

The mainstay of current strategies to prevent fractures is to screen for osteoporosis by bone densitometry and then treat people with low bone density with antiresorptive or other bone-specific drugs. However, the strongest single risk factor for fracture is falling and not osteoporosis.

Orthopedic surgeons manage most of these fractures and are often the only clinician seen by the patient. However, the majority of the orthopedic surgeons lacked sufficient training in osteoporosis now.

#### MtP4

#### Mechanical Signal, Regulatory Mechanism and Bone Formation

Yixian Qin

Orthopedic Bioengineering Research Laboratory, Department of Biomedical Engineering, Stony Brook University, Stony Brook, NY, USA

Mechanotransduction has demonstrated potentials for tissue adaptation and regeneration under *in vivo* and *in vitro* cellular conditions. The mechanical signals define the structure and function of almost every tissue in the human body, especially in musculoskeletal tissues, where loading has been known to mediate skeletal adaptation. Osteopenia, a condition of diminished bone mass, becomes osteoporosis when mechanical demands exceed the ability of the skeletal structure to support them. While poor bone quantity and quality are principal factors in osteoporosis, consequences of the disease are exacerbated by a functional and age-related decrease in muscle strength and postural stability, markedly increasing the risk of falling and injury. Yet the mechanism(s) through which cells sense mechanical stimulation and convert that stimulus into a biochemical response is less defined. The potentials of mechanotransductive intervention to promote bone regeneration are still not fully understood. While the majority of treatment strategies for osteoporosis are pharmaco-centric, the objective of this overview is focused on the potential of exercise in general, and dynamic mechanical signals in particular, as the basis of a non-drug strategy to prevent bone loss and restore function of the musculoskeletal system. A review of the current status of mechanobiology, focusing on cellular activities as well as the potential mechanotransduction pathways and their interaction, will be discussed. Finally, future directions in musculoskeletal research related to mechanotransduction and tissue regeneration will be explored.

#### MtP5

#### Management of Osteopenia

Decai Chen

West China Hospital, Sichuan University, Chengdu, China

Osteopenia is defined as the stage of low bone density that precedes osteoporosis. At this stage, bone density is below average but not as low as it occurs with osteoporosis. Epidemiological data showed that osteopenia occur in 210 million Chinese. Low bone density is directly linked to the increase of fracture risk in all sites. Although the fracture rate is higher in osteoporotic population, more fracture events occur in much enormous people with osteopenia. Successful management of osteopenia will delay the progression of osteoporosis and consequently decrease fractures. Identification of true osteopenia in target population (postmenopausal women and men aged 50 years) is the first step in the management of osteopenia. Exclusion of any confounding factors, such as compressive fracture, hyperosteoegeny and abnormal bone size, is crucial in correct interpretation of DXA scanning results. Meanwhile,

laboratory tests should be performed to differentiate other diseases that caused secondary osteoporosis. All patients with osteopenia should be counseled on the importance of regular weight-bearing exercise and adequate daily intake of calcium and vitamin D. Nonpharmacologic therapy to reduce the non-skeletal risk factors for fracture should be considered. Patients with advanced osteopenia (T score is between  $-2.0$  and  $-2.5$ ) will progress into osteoporosis in about 1 year, while the time for people with mild or moderate osteopenia vary from 4 to 10 years. Thus, pharmacologic therapy including bisphosphonate should be given to patients with advanced osteopenia to stabilize or increase bone density and reduce fracture risk. In addition, people with advanced osteopenia response medicine better than those with T score between  $-1$  and  $-2.0$ . Chinese guideline also recommends patients with osteopenia and at least one risk factor to start anti-osteoporotic therapy. DXA scanning is called for once patients begin to receive or change osteoporotic medicine or every 2 years during follow-up. It should be noticed that patients with 'osteopenia', according to DXA results, combined with fragile fracture should be considered and treated as severe osteoporosis. In brief, management of osteopenia should be both comprehensive and individualized.

### MtP6

#### Guideline for Glucocorticoid Induced Osteoporosis in China

*Dongbao Zhao*

Department of Rheumatology & Immunology, Changhai Hospital affiliated to the Second Military Medical University, Shanghai, China

Glucocorticoid-induced osteoporosis (GIOP) is one of the most important causes of secondary osteoporosis and is associated with an evident clinical impact due to increased fracture risk. Although awareness of the condition has grown in recent years, it remains under-diagnosed and under-treated in China. The need for updated guidelines for China was recognized by the Chinese Rheumatology Association, which set up a joint Guideline Working Group in August 2012. The aim of this group was to make specific recommendations for GIOP in China. The guideline covers the management of GIOP in men and women aged 18 years or over, in whom continuous oral glucocorticoid therapy at any dose is considered. In this review, the epidemiology of GIO is reviewed. The distinct characteristics are discussed in detail. The cellular and molecular mechanisms of bone metabolism, the pathophysiology of GIOP and the intervention options to prevent GIOP are summarized. Particularly, assessment of risk used a fracture probability based approach, and the intervention thresholds are based on 10-year probabilities using FRAX. All interventions approved for GIOP worldwide are included.