Bone Health Rotation Goals and Objectives

Center for Advanced Medicine, 5th floor
4th Thursday, Michael Whyte, M.D. - Consultant

Medicine Multispecialty Clinic
10 Barnes West Drive, Suite 200
1st Monday, Roberto Civitelli, M.D. - Consultant
2 Wednesdays/month, Kathryn Diemer, M.D. - Consultant

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Educational goal and description of the rotation: First-year fellows will attend outpatient clinics in the Bone Health Program one half-day per week for 2 months and second-year fellows will attend outpatient clinics in the Bone Health Program one half-day per week for 1 month. Fellows will use this opportunity to learn about disorders of bone and mineral metabolism, largely but not exclusively the osteopenias, including osteoporosis and osteomalacia. This rotation typically occurs during their first year. Patients referred for consultation and those receiving ongoing care are included. Fellows seeing patients in the Bone Health Program are supervised by Drs. Civitelli, Diemer and Whyte.

Educational purpose (curriculum): All of the competency milestones are pertinent to this rotation. The specific goals (educational purposes) of this rotation are for the fellow to understand the pathophysiology of metabolic bone diseases and other disorders of calcium, phosphorous and magnesium metabolism and to develop clinical expertise in the diagnosis treatment of common disorders and diagnosis of uncommon disorders of bone and mineral metabolism. Fellows should become skilled in the cost-effective use and interpretation of conventional radiographs and sensitive measures of bone mineral density (e.g., dual energy x-ray absorptiometry, primarily, but also quantitative CT and others) in the evaluation of patients with possible metabolic bone disease. Fellows should become proficient with biochemical indices of mineral metabolism including calcium, phosphorus, magnesium, PTH, vitamin D, osteocalcin, NTX and other related diagnostic laboratory tests that help to determine the etiology of the bone disorder. Fellows should be able to perform and interpret dual energy x-ray absorptiometry (bone density tests). Fellows should be able to diagnose and treat most major types of metabolic bone disease and be able to counsel patients about lifestyle maneuvers to reduce the risk of progression of their bone loss and prevent falls. This includes diet, exercise and other lifestyle advice.

Patient Care: Fellows will develop and demonstrate the ability to obtain an accurate medical, surgical and fracture history with emphasis on factors that impact bone metabolism. Fellows will be able to perform a thorough physical examination that includes accurate measurement of height, description of the architecture of the spine, deformities of extremities and other findings pertinent to bone disorders. Fellows will be able to interpret past radiologic and laboratory tests and order pertinent tests in a cost effective manner in order to make an accurate diagnosis. Fellows will be able to synthesize data from many sources in order to make or confirm a diagnosis of abnormal bone or
mineral metabolism, to evaluate the impact of confounding illnesses and drugs (i.e. chronic kidney disease or steroids), to develop a treatment plan for individual patients. Fellows will learn cost-effective means of monitoring disease progression. Fellows will become familiar with both common and uncommon therapies for bone and mineral diseases, including calcium supplementation, nutritional and active vitamin D, anti-resorptive agents, bone forming agents, and newer biologic therapies.

**Medical knowledge:** Fellows will demonstrate knowledge of calcium and phosphorus metabolism, vitamin D metabolic pathways, bone formation and degradation pathways and the pathophysiology of common bone disorders. Fellows will understand the impact of nutritional deficiencies, other illnesses and a variety of other drugs on bone metabolism. Fellows will be expected to know the risk factors for fracture and disability in older patients and those with confounding illnesses. They will also learn the genetic bases of some inherited disorders of bone metabolism.

**Practice-based learning and improvement:** Fellows will understand the limitations of their prior knowledge and seek to improve their level of expertise in the diagnosis and treatment of metabolic bone disease. Fellows should be self-motivated to learn both basic pathways and clinical pearls relevant to bone disease. The combination of self-study with case-based discussions with the experienced faculty attending physician should provide an accelerated experience in bone and mineral disease. Fellows should learn the utility of FRAX, an on-line fracture assessment tool which is helpful in determining treatment for some patients.

**Interpersonal and communication skills:** Fellows should become proficient in the care of a wide range of patients, from occasional children to the very elderly. Fellows should display sensitivity when dealing with patients who are in pain or who are disabled from their illness. Fellows should be able to discuss both the illness and the impact of this set of disorders on daily life, and be able to appropriately counsel patients with limited physical capabilities. Fellows should demonstrate the ability to convey clinical information accurately and concisely in oral presentations and chart notes.

**Professionalism:** Fellows should demonstrate respect, compassion and integrity along with a commitment to optimal patient care and professional learning and development. Fellows should learn behaviors that respect the practice of clinicians from primary care and other specialties, since this is a clinic with a high degree of collaborative care.

**Systems-based practice:** Fellows should become familiar with the current charting methods for each facility and the ability of these methods to interact with other hospital systems. Fellows should understand how to order radiologic and laboratory tests appropriately. Fellows should learn to utilize the Sheffield FRAX index to assess risk of fracture and need for treatment.

**Teaching methods:** Teaching is based on clinical cases with discussions of pathophysiology and treatment of each patient’s problems. Case discussions and interactions with the attending physician, laboratory physicians and consulting physicians will provide excellent learning experiences. Additionally, conferences are scheduled throughout the year on this set of diseases, both basic science and clinical didactic sessions. There is a dedicated bone case discussion conference and a bone research seminar on Friday morning, which Fellows are encouraged to attend during the rotation.
**Mix of diseases:** The vast majority of patients will have osteoporosis or osteopenia, though some may have hyperparathyroidism, hypoparathyroidism, or bone disorders secondary to other illness or medications (corticosteroids, aromatase inhibitors). Other clinical presentations will include Paget’s bone disease, secondary hyperparathyroidism (from nutritional vitamin D deficiency or early stage kidney failure), oncogenic osteomalacia, or bone diseases secondary to inherited disorders of phosphorus metabolism (XLH or fibrous dysplasia). More rare conditions include osteogenesis imperfecta and other collagen of matrix disorders (Ehlers-Danlos and Marfan syndromes, among others). Many of the patients will have a prior history of fracture. Most will have been treated for some time, so understanding when to start and stop certain therapies is crucial. Some patients will have unusual genetic bone disorders.

**Reading lists and other educational materials:** Fellows will be encouraged to obtain the Primer on the Metabolic Bone Diseases and Disorders of Mineral Metabolism, published by the American Society for Bone and Mineral Research and available at low cost in bookstores or through on-line retailers. Background reading of current literature is encouraged along with current consensus statements and treatment guidelines.