Abstract #1

Cushing’s Disease Manifesting as Multiple Pituitary Adenomas With Corticotroph Hyperplasia

Anupam Srivastava, MD, and Romesh K. Khardori, MD, FACE

A 51-year-old man presented with chief complaints of proximal muscle weakness and drooping of eyelids. An initial diagnosis of seronegative myasthenia gravis was made, and he was empirically treated with corticosteroids, which made his symptoms worse. Further work-up, which included low-dose and high-dose dexamethasone suppression testing, revealed results suggestive of Cushing’s disease.

Magnetic resonance imaging (MRI) of the pituitary gland disclosed findings consistent with a microadenoma. Cushing’s disease was diagnosed, and the patient underwent transsphenoidal resection of the adenoma. He felt symptomatically better postoperatively but had similar complaints after 1 year. Repeated MRI showed a 7-mm pituitary adenoma on the left side. The patient underwent a second transsphenoidal adenomectomy.

MRI after 6 months showed several 3-mm adenomas on the left and a 6-mm adenoma on the right side of the pituitary gland. The patient underwent a third operation at a different institution.

Most patients with Cushing’s disease have a solitary corticotroph microadenoma but rarely may have diffuse corticotroph hyperplasia. Occurrence of multiple adenomas, as in our patient, is very uncommon, and in such cases, the therapeutic approach should be hypophysectomy rather than adenomectomy.

Abstract #2

Intussusception as a Cause of Acute Abdominal Pain in Diabetes

Adriano Delgado, MD

Aim: To report a case of an adolescent girl with diabetes who had multiple acute intussusceptions associated with, and probably attributable to, acute hyperglycemia and ketoacidosis.

Methods: We present the first case report of multiple intussusceptions in an adolescent girl with type 1 diabetes who had acute hyperglycemia and ketoacidosis. Clinical and laboratory data, together with ultrasonographic findings, are summarized.

Results: A 14-year-old girl with a 4-year history of type 1 diabetes mellitus came to the emergency department with a 1-day history of severe, generalized abdominal pain. She had polyuria, polydipsia, and polyphagia. She was in severe pain and was dehydrated. Her vital signs were as follows: blood pressure 140/70 mm Hg, heart rate 76 beats/min, respiratory rate 24 breaths/min, and body temperature 36.7°C. No bowel sounds were heard, and a “table” abdomen was present on palpation. She had a moderately high serum glucose level of 34.9 mmol/L (normal, 3.3 to 6.1), leukocyte count of 40,000/mm³, serum creatinine of 1.8 mg/dL, arterial pH of 6.97, bicarbonate of 3 mmol/L (normal, 12 to 16), anion gap of 34.8 mmol/L (normal, 12 to 16), and serum potassium of 5.8 mmol/L (normal, 3.5 to 5.0). Ultrasonography of the abdomen revealed images suggestive of intussusceptions. On improvement of her serum glucose concentration and her acidosis, her abdominal pain completely resolved. Follow-up abdominal ultrasonography showed normal findings.

Conclusion: Intestinal intussusception should be considered as a cause of acute abdominal pain, especially when hyperglycemia and acidosis are present. It may be more frequent in patients with type 1 diabetes than previously thought. Correction of the metabolic derangements can lead to complete resolution and avoidance of unnecessary surgical interventions. Altered gastrointestinal motility may predispose to its occurrence. More awareness is needed to determine the relationship and frequency of these conditions.

Abstract #3

Human Chorionic Gonadotropin-Induced Thyrotoxicosis

Maria S. Prelipcean, MD, Angela S. Tackett, MD, and Edward Chin, MD

Objective: To describe the diagnostic and therapeutic approach in a case of severe human chorionic gonadotropin (hCG)-induced thyrotoxicosis.

Methods: We reviewed and abstracted the patient’s medical records and also conducted a review of the pertinent medical literature.

Results: A 21-year-old woman was seen in consultation for thyrotoxicosis during her 14th week of pregnancy. She had been admitted with a 13.6-kg weight loss, protracted nausea and vomiting, tremor, palpitations, and worsening heat intolerance. Her personal history was unremarkable, and she had no family history of hyperthy-
Thyrotropin was <0.01

She did not have exophthalmos, lid lag, or tremor.

Aside from excoriations, the skin was unremarkable.

had enlargement of the right thyroid lobe and hyperreflexia, and weight loss for 8 months. The patient noted heat intolerance, increased perspiration, fatigue, and abnormal headaches. Past history included a right hemithyroidectomy for a multinodular goiter and Hashimoto’s disease.

Thyrotoxicosis complicates 1 to 2 pregnancies per 1,000. Gestational thyrotoxicosis may occur during the first trimester and is due to the thyrotropin-like effect of hCG. The severity of the syndrome is directly proportional to the magnitude and duration of the hCG peak. More than half the time, gestational thyrotoxicosis is associated with hyperemesis gravidarum. Distinction from new-onset Graves’ disease may be difficult, especially at initial assessment. Treatment is usually not required except for the most severe cases. In our patient, the large placental mass due to her twin pregnancy most likely led to unusually high hCG levels that exerted a pronounced thyrotropic effect.

Discussion: Thyrotoxicosis complicates 1 to 2 pregnancies per 1,000. Gestational thyrotoxicosis may occur during the first trimester and is due to the thyrotropin-like effect of hCG. The severity of the syndrome is directly proportional to the magnitude and duration of the hCG peak. More than half the time, gestational thyrotoxicosis is associated with hyperemesis gravidarum. Distinction from new-onset Graves’ disease may be difficult, especially at initial assessment. Treatment is usually not required except for the most severe cases. In our patient, the large placental mass due to her twin pregnancy most likely led to unusually high hCG levels that exerted a pronounced thyrotropic effect.

Abstract #4

Intractable Pruritus as the Presenting Complaint in a Patient With Graves’ Disease

Denise Teves, MD, and Lewis R. Chase, MD

Objective: To describe intractable pruritus as the initial complaint in a patient with hyperthyroidism.

Methods: We report a case of pruritus as the chief complaint in hyperthyroidism and review the related literature.

Results: A 69-year-old woman was referred by the Department of Dermatology because of persistent pruritus unrelieved by antihistaminic agents. She additionally noted heat intolerance, increased perspiration, fatigue, hyperreflexia, and weight loss for 8 months. The patient had enlargement of the right thyroid lobe and hyperreflexia. Aside from excoriations, the skin was unremarkable. She did not have exophthalmos, lid lag, or tremor. Thyrotropin was <0.01 µIU/mL, total thyroxine was 20.9 µg/dL, and triiodothyronine was 410 ng/dL. 123I uptake was 75% at 24 hours. She received 8.5 mCi of 131I and had total clinical improvement within 3 weeks after treatment.

Conclusion: Pruritus can be the initial symptom of hyperthyroidism and disappears after successful treatment. Hyperthyroidism should be included in the differential diagnosis of chronic recalcitrant pruritus.

References


Abstract #5

Thyrotropin-Secreting Pituitary Tumor and Hashimoto’s Disease: A Novel Association

Said Iskandar, MD, Alan N. Peiris, MD, PhD, FACE, and Richard Jordan, MD

Hypothalamic thyrotropin-releasing hormone (TRH) is the main positive regulator of thyrotropin (thyroid-stimulating hormone or TSH) secretion. TSH is secreted by the pituitary and stimulates several steps of thyroid hormone production. Inappropriate secretion of TSH is seen in patients who have high TSH levels despite increased serum thyroid hormone values. It usually results from either a TSH-secreting pituitary adenoma or a non-tumorous TSH hypersecretion due to thyroid hormone resistance. TSH-secreting pituitary adenomas account for 1 to 2% of functioning pituitary tumors and are an exceedingly rare cause of hyperthyroidism. We report a case of pituitary tumor inducing hyperthyroidism in the setting of Hashimoto’s disease.

Case Report: A 69-year-old man was referred because of high thyroid hormone levels. His only symptoms were mild hyperhidrosis, heat intolerance, and occasional headaches. Past history included a right hemithyroidectomy for a multinodular goiter and Hashimoto’s disease. At initial assessment, the patient had a firm, slightly enlarged left thyroid lobe. No visual abnormalities were detected, and the rest of the physical findings were unremarkable. Laboratory findings included increased values for free thyroxine, free and total triiodothyronine, TSH, and antithyroglobulin and antimicrosomal antibodies. Normal values were found for cortisol, prolactin, testos-
terone, follicle-stimulating hormone, luteinizing hormone, 
α-subunit, and thyroid-stimulating immunoglobulin. A 
thyroid 123I scan showed an increased 5-hour uptake of 
23% and a 24-hour uptake of 53%, with a diffuse uniform 
enlargement of the left side. The TSH level did not 
increase after a TRH stimulation test. Serum sex hormone- 
binding globulin was high. Magnetic resonance imaging 
of the pituitary revealed a pituitary macroadenoma with 
suprasellar extension to the optic chiasm. Histologic 
examination of the adenoma after transsphenoidal 
hypophysectomy showed positive staining for TSH and 
growth hormone. Our patient had no signs or symptoms 
suggestive of acromegaly. Six weeks postoperatively, 
TSH levels had normalized.

**Discussion:** TSH-secreting pituitary adenomas are 
a rare cause of hyperthyroidism. Approximately 25% of 
pituitary adenomas secrete one or more other pituitary 
hormones. Pituitary pseudotumor (pituitary thyrotroph 
hyperplasia) caused by unrecognized and untreated 
hypothyroidism has been described as a rare condition, 
primarily occurring in adults. To our knowledge, this is 
the first report of pituitary tumor inducing hyperthyroidism 
in the setting of Hashimoto’s disease. It is interesting to spe-
culate whether our patient’s long-term increased TSH level 
may have contributed to the development of a TSH-secret-
ing pituitary tumor and whether his growth hormone was 
biologically inactive.

**Abstract #6**

**Primary Hyperparathyroidism and Vitamin D Deficiency**

*Bharathi Raju, MD*

**Objective:** To report the effect of vitamin D deficiency 
on serum calcium and intact parathyroid hormone (iPTH) 
levels in patients with primary hyperparathyroidism.

**Background:** Although vitamin D deficiency and pri-
mary hyperparathyroidism are common disorders in the 
elderly population, many clinicians lack awareness of the 
coexistence of these diseases. The presentation of vitamin 
D deficiency is occult. Coexisting vitamin D deficiency 
can obscure the biochemical severity of primary hyper-
parathyroidism and can intensify the effects of primary 
hyperparathyroidism on bone.

**Methods:** We measured 25-hydroxyvitamin D, serum 
calcium, and iPTH levels in patients presenting to our clin-
ic with primary hyperparathyroidism.

**Results:** Patients with primary hyperparathyroidism 
and coexisting vitamin D deficiency (25-hydroxyvitamin 
D <20 ng/mL) tend to have a disproportionate increase in 
iPTH levels in comparison with serum total calcium levels 
and also have lower urine calcium levels.

**Conclusion:** Disproportionately increased iPTH in 
comparison with serum calcium levels should raise the 
possibility of coexisting secondary hyperparathyroidism. 
Clinicians should have a high index of suspicion for vita-
min D deficiency in such patients.

**Abstract #7**

**Nateglinide Improved Hemoglobin A1c Levels in 
Elderly Patients With Type 2 Diabetes Mellitus**

*Sherwyn L. Schwartz, MD, Michelle A. Barron, MD, Andrea Marcellari, MS, and D. Das Purkayastha, PhD*

**Objective:** To evaluate the effect of 12 weeks of 
nateglinide treatment versus placebo on hemoglobin A1c 
(HbA1c) in elderly patients with type 2 diabetes mellitus.

**Methods:** This double-blind, parallel-group study 
randomized 66 treatment-naïve patients with diabetes, 
who ranged in age from 65 to 90 years (mean, 74 ± 5.7 
years; baseline HbA1c, 7.6 ± 0.7%), to 120 mg of 
nateglinide or placebo before meals for 12 weeks.

**Results:** Nateglinide significantly reduced mean 
HbA1c from baseline (7.6% to 6.9%, a change of −0.7%; 
P < 0.001) and in comparison with placebo (−0.7% versus 
−0.2%; P = 0.004). Sixty-three percent of patients 
responded to nateglinide therapy (decrease in HbA1c 
≥0.5%) in comparison with 21% in the placebo group. 
There were no confirmed episodes of hypoglycemia; the 
incidence of adverse events was similar in the two groups.

**Conclusion:** Nateglinide, 120 mg before meals, was 
effective and well tolerated in elderly patients with 
diabetes, the fastest-growing diabetic subpopulation.

**Abstract #8**

**Esophageal Candidiasis in Diabetes Mellitus**

*Sachin Kumar Jain, MD, and Nagina Aggarwal, MD*

**Background:** In diabetes, esophageal symptoms of 
heartburn, water brash, and dysphagia are often ascribed to 
autonomic neuropathy (AN) or gastroesophageal reflux 
disease, for which antacids and prokinetic agents are pre-
scribed. Patients with diabetes are also susceptible to vari-
ous infections, including *Candida* infection. Can 
esophageal symptoms in patients with diabetes also be due 
to local *Candida* infection? Only a correct diagnosis will 
lead to appropriate treatment of these patients.

**Objective:** To study the prevalence of esophageal can-
didiasis in randomly selected patients with diabetes.

**Methods:** Forty randomly selected patients with dia-
betes were enrolled in the study, irrespective of the pres-
ence of esophageal symptoms. A detailed history was 
obtained, and physical examination was performed. All 
the routine investigations including tests for hepatitis B 
surface antigen and human immunodeficiency virus were 
performed. Patients taking corticosteroids, immunosup-
pressants, nonsteroidal anti-inflammatory agents, or orally 
administered iron or antibiotics were excluded from the 
study. All patients underwent upper gastrointestinal 
endoscopy, and biopsy specimens were obtained from 
local lesions, if present.

**Results:** The 24 women and 16 men had a mean age 
of 51.87 years (range, 32 to 70) and a mean duration of
Abstract #9

Milk-Alkali Syndrome: Case Presentation and Literature Review

Olasola A. Osundeko, MD, FACE, Gregory Austin, MD, and Eugena L. Wright, MD

Introduction: Milk-alkali syndrome is characterized by the triad of hypercalcemia, alkalosis, and renal insufficiency.

Case Report: A 79-year-old woman with a history of osteoporosis was taking 3,000 mg of elemental calcium daily from two different nonprescription medications. Her pertinent laboratory data were as follows: serum calcium, 17.3 mg/dL; total CO₂, 35.8 mmol/L; urea nitrogen, 35 mg/dL; creatinine, 1.3 mg/dL; undetectable intact parathyroid hormone; and normal vitamin D. Computed tomography of the brain, chest, abdomen, and pelvis showed normal findings. Mammographic findings were benign. She responded to treatment with intravenous fluids and zoledronic acid.

Conclusion: Milk-alkali syndrome, once rare, is becoming more frequent because of the increasing use of calcium supplements to treat osteoporosis and dyspepsia.

Abstract #10

Correlation Between Immunohistochemical Findings of Diabetic Skin Microangiopathy and Nephropathy in Patients With Type 1 Diabetes

Milco K. Bogoev, MD, and Biljana Bogoeva

Introduction: Diabetic microangiopathy depends on diabetic regulation and the presence of immunologic disturbances.

Material and Methods: Skin biopsy specimens from 49 patients with type 1 diabetes were analyzed histologically, histochemically, and immunohistochemically. Fourteen patients had nephropathy, diagnosed by persistence of albuminuria. All biopsy specimens were stained with hematoxylin-eosin and periodic acid-Schiff. Morphologic changes were present in all skin biopsy samples with thickening of the basement membrane. All biopsy specimens were treated with immunofluorescent anti-human IgG and IgM, and immunohistochemical staining was done for IgG and IgM by the streptavidin absorption-immunoperoxidase technique. Deposits of IgG were present in the capillary walls and at the dermoepidermal junction in 25 patients (P<0.05), and IgM deposits were present in 5 patients.

Conclusion: We found a statistically significant correlation among the degree of diabetic microangiopathy, the immunoglobulin deposits, and the diabetic nephropathy.

Abstract #11

Lipoprotein Compositional Changes With Hormone Replacement Therapy (Conjugated Estrogen and Medroxyprogesterone) in African American Women

Nauman Qureshi, MD, Diane Pace, Raymond Ke, and Thomas A. Hughes, MD

Objective: To determine whether combination hormone replacement therapy (HRT) (conjugated estrogen and medroxyprogesterone) significantly alters lipoprotein composition in healthy African American (AA) women.

Methods: Postmenopausal AA women between 45 and 65 years of age, without cerebrovascular disease, congestive heart failure, left ventricular hypertrophy, or diabetes mellitus, were randomized to daily combination HRT (0.625/2.5 mg) (N = 35) or placebo (N = 7) and underwent follow-up for 12 weeks. Lipoproteins were separated by gradient ultracentrifugation into very-low-density lipoprotein (VLDL), intermediate-density lipoprotein (IDL), low-density lipoprotein (LDL), and three high-density lipoprotein (HDL) subfractions. Apolipoprotein (apo) A-I, A-II, C-III, C-II, and C-I were measured by reverse-phase high-performance liquid chromatography. Apo B, phospholipids, triglycerides, cholesterol, and free cholesterol were measured by standard assays.

Results: Triglycerides and apo B did not change in any lipoprotein; however, the lipid-to-apo B ratios increased in VLDL and IDL (~60%; P<0.01), a finding that indicated an increase in particle size without an increase in particle number. Cholesterol ester increased in HDL-L (light) (+16%; P = 0.003) and HDL-M (medium) (+9%; P = 0.014) but not in HDL-D (dense) subfractions; the result was an increase in total HDL cholesterol (+8%; P = 0.01). Phospholipids also increased ~15% in HDL-L (P = 0.005) and HDL-D (P = 0.037). Apo A-I increased in HDL-L (23%; P = 0.004), HDL-M (10%), and HDL-D (13%), but apo A-II increased only in HDL-M (9%), an indication that the increase in HDL-L was due to an increase in the number of “A-I alone” particles. The absence of changes in the HDL lipid ratios indicated that
the composition of these particles was not altered. We noted an 8% reduction in the LDL/HDL ratio ($P = 0.035$) and a 9% reduction in the apo B/A-I ratio ($P = 0.019$). No changes were found in any of the LDL compositional measurements.

**Conclusions:** AA women had a beneficial response to HRT, demonstrated by an increase in the number of the “A-I alone” particles in HDL-L and by enlargement of their VLDL and IDL without an increase in the number of apo B-containing particles.

**Abstract #12**

**Idiopathic Nephrotic Syndrome Manifesting Soon After Diagnosis of Juvenile Diabetes: Case Report and Review of the Literature**

_Tala Dajani, MD, Khalid Hasan, MD, and Mark Joseph, MD_

**Background:** Diabetic nephropathy with nephrotic-range proteinuria is a well-known microvascular complication of diabetes mellitus (DM), which is rarely seen during the first 10 years of the disease. It develops in 20 to 30% of patients with type 1 DM within 20 years after the onset of clinical DM. Diabetic nephropathy has not been noted in children younger than 10 years old. We report a case of concomitant manifestation of idiopathic nephrotic syndrome (NS) and type 1 DM and also review previous case reports from the literature.

**Case Report:** In a 32-month-old boy, NS developed 2 weeks after diagnosis of new-onset type 1 DM. Examination demonstrated a well-nourished, well-developed 2½-year-old boy with notable ascites, scrotal edema, and pitting edema. His 24-hour urine protein was 77 mg/kg per day. He received oral corticosteroid therapy in a dosage of 60 mg/m² per day, divided for twice-a-day administration. The NS went into remission with use of this dose, and the edema was completely resolved by the fourth day of corticosteroid therapy. Thus far, the NS has remained in remission, and good control of his diabetes has been achieved.

**Discussion:** Our patient described in this report had clinical and laboratory features typical of DM and idiopathic NS. His clinical response was consistent with corticosteroid-sensitive idiopathic NS. The first such case was reported in the literature in 1961 by Robinson et al, who described an 8-year-old girl in whom corticosteroid-sensitive NS developed a few weeks after the diagnosis of DM. In 1969, Urizar described three children (ages 4.5, 5, and 8.5 years) in whom NS developed within 1 month after the onset of DM. He also noted two other children in whom NS developed at 11 months and 10 years, respectively, after diagnosis of DM. In 2000, Nakahara reported a similar case of an 8-year-old girl. NS was diagnosed initially, and a few weeks later, symptomatic new-onset DM was diagnosed with hyperglycemia and positive anti-glutamic acid decarboxylase antibodies. Nakahara theorized that a T-cell response as a result of the insulin-deficient prediabetic state may predispose such patients to the development of associated autoimmune diseases. This theory was based on insulin-regulated in vitro Th2 cytokine production, suggesting that insulin can function as a hormone regulator of T cells.

**Conclusion:** As demonstrated here, NS and DM can manifest concomitantly in children. Whether this is a coincidental association or a significant disease process remains unclear. Further investigation is needed to determine the prevalence of concurrent clinical manifestation of these two disease processes.

**Abstract #13**

**Diagnosing Sarcoidosis-Related Hypercalcemia by Bone Marrow Biopsy**

_Lisa S. Chow, MD, and Diana S. Dean, MD_

**Objective:** To report a case and review the literature to illustrate the diagnosis of sarcoidosis and sarcoidosis-associated hypercalcemia.

**Methods:** We describe the management of a 43-year-old man with symptomatic hypercalcemia from high serum levels of 1,25-dihydroxyvitamin D₃.

**Results:** Sarcoidosis was diagnosed on the basis of bone marrow biopsy, and the patient was successfully treated with prednisone.

**Conclusions:** A review of the related literature shows that hypercalcemia is present in 11% of patients with sarcoidosis and is attributed to macrophage production of excess 1,25-dihydroxyvitamin D₃. The diagnosis of sarcoidosis is rarely made by bone marrow biopsy, but this procedure is commonly used in patients with established sarcoidosis and anemia. Sarcoidosis-related hypercalcemia is usually treated with prednisone. Chloroquine, hydrochloroquine, and ketoconazole are alternative therapeutic options for patients with corticosteroid intolerance or those in whom corticosteroid therapy is ineffective.

**Abstract #14**

**Oral Contraceptive-Induced Porphyria Cutanea Tarda**

_Manju Chandran, MD, Roopa Sathyaprakash, MD, and R. Jeffrey Chang, MD_

**Objective:** To describe an unusual presentation of oral contraceptive-induced porphyria cutanea tarda (PCT).

**Method:** We present a case report and literature review.

**Results:** A 28-year-old woman, who had been using oral contraception for 8 years to control irregular menstrual bleeding, presented with increased hair growth on her face, back, and extremities. She had neither signs of virilization nor biochemical evidence of hyperandrogenism. Subsequently, increased skin fragility, in conjunction with bullae and vesicles, developed. Laboratory and biopsy...
findings confirmed the presence of PCT. Erythrocyte uroporphyrinogen decarboxylase activity was normal, she was not taking any other medications, and work-up for other inciting causes including hemochromatosis and hepatitis C was negative. Discontinuing the use of the oral contraceptive yielded some improvement in her skin lesions, but clinical and biochemical remission occurred only after multiple phlebotomies. The hypertrichosis persisted. Repeated blood studies revealed increased 17-hydroxyprogesterone levels. Because she had not had a menstrual period in 2 months, a pregnancy test was done and was found to be positive. She has now completed an uneventful first trimester of that pregnancy.

**Conclusion:** Physicians should be aware that (1) oral contraceptives can precipitate PCT in predisposed persons, (2) hypertrichosis can persist much longer after remission of other skin lesions in PCT, and (3) serum 17-hydroxyprogesterone levels may be increased in association with a normal pregnancy. Our patient’s symptoms were unusual in that they manifested after a much longer period of oral contraceptive use than has been previously reported and hypertrichosis was the first manifestation. The first trimester of pregnancy, during which PCT has been reported to worsen, was uneventful in our patient.

**Abstract #15**

**Bone Age Assessment With Use of Ultrasound Measurements**

**Professor Zvi Zadik, MD, and Professor Tzvi Bistritzer**

**Objectives:** To evaluate the ability of Sunlight BonAge™, a novel ultrasound device, to predict bone age accurately, today commonly assessed by the Greulich and Pyle method.

**Methods:** Bone age assessments were performed in 114 children (3 to 18 years of age) with use of the Greulich and Pyle and ultrasound methods.

**Results:** The accuracy of ultrasound measurements (absolute average difference with x-ray results) was 0.90 (± 0.70) year for boys and 0.86 (± 0.65) year for girls. The correlation between ultrasound and x-ray measurements was $R^2 = 0.89$ and 0.90 for boys and girls, respectively. Interoperator precision for ultrasound measurement was 0.34 year for boys and 0.25 year for girls.

**Conclusion:** Ultrasound measurements with use of the Sunlight BonAge™ ultrasound device are highly reproducible and highly correlated with conventional bone age results.

**Abstract #16**

**Effect of Vitamin D Therapy on Vitamin D-Deficient Type II Renal Tubular Acidosis, Osteomalacia, and Secondary Hyperaldosteronism**

**Emad H. Elbadawy, MD, Marina S. Marcu, MD, and Harris C. Taylor, MD, FACE**

**Introduction:** Proximal renal tubular acidosis (RTA) due to vitamin D deficiency in young adults without gastrointestinal disease in the United States is very rare. The occurrence of this disorder in association with histologically verified osteomalacia and secondary hyperaldosteronism, and the resolution of all three conditions with only vitamin D and calcium therapy, has not, to our knowledge, been previously documented with use of contemporary methods in the English literature.

**Case Report:** A 33-year-old African American woman was admitted in June 2001 with a 3-day history of bloating, abdominal distention, and colicky abdominal pain. The patient had polyuria but no vomiting or diarrhea. Her past medical history was significant for bronchial asthma, spina bifida with paraparesis, seizure disorder, and hypokalemia. Her home medications included theophylline and phenytoin. On initial examination, she weighed 45 kg and had hypoactive bowel sounds. Laboratory evaluation revealed the following: potassium 2.9 mmol/L (normal, 3.5 to 5.0), bicarbonate 25 mmol/L (normal, 23 to 33), alkaline phosphatase 1,192 U/L (normal, 40 to 136) with heat-stable isoenzyme 5% (of hepatic origin), and calcium 8.7 mg/dL (normal, 8.8 to 10.5). An abdominal radiographic series revealed fecal impaction. Repeated laboratory studies showed persistent hypokalemia despite daily replacement, hypomagnesemia, hypophosphatemia, non-anion gap metabolic acidosis (venous pH 7.26 [normal, 7.33 to 7.43]; serum bicarbonate 20 mmol/L) and positive calculated urine anion gap (+19 at urine pH of 7.5), and calculated urine ammonium of 61 mmol/L. Further investigations revealed the following results: 25-hydroxyvitamin D (25-OH-D) <5 ng/mL (normal, 10 to 60), intact parathyroid hormone (PTH) 1,620 pg/mL (normal, 10 to 60), serum aldosterone 68.4 ng/dL (normal, 4.5 to 35.4), and supine plasma renin activity (PRA) 19.8 µg/L per hour (normal, 0.5 to 1.8). A 24-hour urine collection revealed 3,425 mL, potassium 158 mmol, sodium 281 mmol, creatinine 425 mg, aldosterone 126 µg (normal, 3 to 25 with normal sodium intake), calcium 466 mg, phosphorus 586 mg, and citrate 544 mg (normal, 320 to 940). A bone mineral density study showed a lumbar spine T-score of −4.6 and femoral neck T-score of −4.9. Undecalcified tetracycline-labeled bone biopsy demonstrated severe osteomalacia with peritrabecular fibrosis and severe osteoporosis. Investigation for malabsorption including small intestinal biopsy showed normal findings. An ammonium chloride loading test changed urine pH from 6.16 at serum bicarbonate of 26 mmol/L to 4.9 at serum bicarbonate of 17 mmol/L. A bicarbonate infusion test revealed fractional excretion of bicarbonate of 11.4% and urine pH 7.6 at serum bicarbonate of 22 mmol/L. Both results are consistent with RTA type II. Therapy was initiated with orally administered vitamin D and increased to 50,000 U/wk, calcium carbonate 633 mg/day, potassium chloride 150 mEq/day, and amiloride 5 mg/day. After 14 months of therapy, laboratory evaluation revealed the following: arterial pH 7.37 (normal, 7.35 to 7.45), venous pH 7.35, bicarbonate 25 mmol/L, serum PTH 88 pg/mL, alkaline phosphatase 121
U/L, 25-OH-D 33.7 ng/mL, PRA 0.7 μg/L per hour, and serum aldosterone 15.2 ng/dL. Repeated bone mineral density studies showed a lumbar spine T-score of −2.0 and femoral neck T-score of −2.7.

**Conclusion:** Patients with paraplegia have previously been shown to be at increased risk for vitamin D deficiency. Such patients should be screened with 25-OH-D levels to avoid the end-stage disease described here.

**Abstract #17**

**Brown Tumor and Celiac Sprue: Case Report and Literature Review**

Rakesh Patel, DO, Vanessa Rodríguez, MD, and Mohsen Eledrisi, MD

**Objective:** To report the first case of brown tumor as the initial manifestation of celiac sprue.

**Methods:** A case is presented along with a MEDLINE literature review.

**Results:** A 37-year-old man requested a consultation because of pain in the right leg and diarrhea for 2 years. Radiography and magnetic resonance imaging of his right femur revealed a brown tumor. Vitamin D deficiency was noted, and after work-up including antiendomysial antibodies and biopsy of the small intestine, he was diagnosed with celiac sprue. His condition improved after institution of a gluten-free diet. In the literature, we found no previous case reports of a brown tumor as a presentation of celiac sprue.

**Conclusion:** Although brown tumor is rare, affected patients should undergo a thorough work-up, including assessment for celiac sprue.

**Abstract #18**

**“Pseudoinsulinoma”: Hyperinsulinemic Hypoglycemia Caused by a Prescription Filling Error**

Shari C. Fox, MD, and Kenneth J. Simcic, MD

**Objective:** To describe a case of severe hypoglycemia caused by a prescription filling error in a patient without diabetes.

**Methods:** We present the case of a patient referred to our hospital for positron emission tomography after numerous imaging studies had failed to localize a suspected insulinoma.

**Results:** A 76-year-old woman was transferred to our hospital for further evaluation of recurrent symptomatic hyperinsulinemic hypoglycemia, including a serum glucose level of 24 mg/dL in conjunction with a serum insulin level of 68 μU/mL. She denied having any history of diabetes or prior hypoglycemia, and she could identify the specific day that her symptoms began. She denied taking any new medications, and none of her relatives had diabetes or were health-care workers. Before she was transferred, computed tomography and magnetic resonance imaging-magnetic resonance cholangiopancreatography of the abdomen, somatostatin receptor scintigraphy, and pancreatic angiography had all shown normal findings. After she arrived at our hospital, inspection of her medications revealed that Glucovance (metformin-gliburide) had been inadvertently substituted for pravastatin. After administration of the Glucovance was discontinued, she had no further episodes of hypoglycemia, and no further evaluation was necessary. Positron emission tomographic scanning was not performed.

**Conclusions:** Although insulinoma is a rare tumor, medication errors are increasingly common. “Pseudo-insulinoma” attributable to a medication error should be considered in the differential diagnosis of every patient with hyperinsulinemic hypoglycemia—especially when the onset of hypoglycemia is acute. Failure to recognize this cause of hypoglycemia can result in unnecessary procedures, expense, and morbidity.

**Abstract #19**

**Resolution of Cushing’s Disease With Empty Sella Syndrome After Radiation Therapy: Case Report and Literature Review**

Vanessa Rodríguez, MD, Rakesh Patel, DO, and Steve Lieberman, MD

**Objective:** To report the only case of Cushing’s disease and empty sella syndrome that has resolved with radiation therapy (XRT).

**Methods:** We present a unique case and review the related MEDLINE literature.

**Results:** A 37-year-old woman had clinical signs and symptoms consistent with Cushing’s disease. Biochemical analysis, jugular venous sampling, and magnetic resonance imaging confirmed the diagnosis. A transsphenoidal pituitary surgical procedure was performed twice but yielded nondiagnostic samples. XRT to the sella turcica eventually resolved the Cushing’s disease 2 years after administration. A MEDLINE search revealed only three cases of Cushing’s disease with empty sella syndrome treated with XRT after an unsuccessful pituitary operation. In the only patient with at least 24 months of follow-up, remission had not been achieved.

**Conclusion:** XRT should be considered as definitive treatment for patients with Cushing’s disease and empty sella syndrome in whom surgical intervention has not been successful.
Abstract #20

Maternal and Fetal Outcome of Patients With Gestational Diabetes Mellitus Managed in an Endocrine Referral Clinic According to a Modified Protocol of the Asian Study Group on Diabetes in Pregnancy

Florence Amorado-Santos, MD, and Ma. Honolina Sero-Gomez, MD, FPCP, FPSEM, FACE

Objective: To identify maternal and fetal outcome of patients with gestational diabetes mellitus (GDM) managed in an endocrine referral clinic with use of a modified protocol of the Asian Study Group on Diabetes in Pregnancy (ASGODIP).

Methods: Patients were diagnosed with either the 75-g oral glucose tolerance test (ASGODIP criteria) or the 100-g oral glucose tolerance test (Carpenter and Coustan criteria). Seven-point profile monitoring was done initially. Insulin therapy was initiated if diet alone failed to control blood glucose, and patients participated in follow-up until the time of delivery.

Results: Fifty-three paired charts of mother and baby were retrieved of a total of 165 diagnosed patients. The maternal profile showed the following: pregestational mean body mass index of 23.7 ± 3.7 kg/m², mean total weight gain of 13.3 ± 9.2 kg, family history of diabetes in 37 (70%), and previous history of GDM in 5 (9%). Maternal complications were hydramnios in three and hypertension, preeclampsia, and intrauterine fetal death in one each. Neonatal outcome showed hypoglycemia in five, infection in three, and congenital defect and hyperbilirubinemia in one each. These complications were noted more frequently in patients who were diagnosed after 26 weeks of gestation. No correlation was found between having babies who were large for gestational age or small for gestational age and the prepregnancy weight, the weight gain of mothers, or the treatment regimen used. There was an improved maternal and fetal outcome (P<0.01) in comparison with other studies done locally.

Conclusion: Lack of correlation of prepregnancy weight with the occurrence of large for gestational age and macrosomic babies suggests that other factors may predict the neonatal outcome. Early screening and diagnosis of GDM are still warranted to improve maternal and fetal results. The use of a modified protocol in the diagnosis and management of GDM as in the ASGODIP protocol resulted in a improvement in maternal and fetal outcome.

Abstract #21

Ectopic ACTH Syndrome From Cervical Cancer

Kashif M. Munir, MD, and Richard B. Horenstein, MD

Objective: To present a case of ectopic adrenocorticotropic hormone (ACTH) attributable to a cervical cancer.

Methods: In a detailed case report, we describe a patient with Cushing’s syndrome from ectopic ACTH produced by a cervical cancer.

Results: A 57-year-old woman presented with acute mania, refractory hypokalemia, and weight loss. Midnight cortisol and ACTH levels were 149.8 µg/dL and 496 pg/mL, respectively. Her urine free cortisol was 20.079 µg/24 h. Pelvic magnetic resonance imaging disclosed a large cervical mass. Biopsy revealed a poorly differentiated squamous cell carcinoma that had neuroendocrine features and stained positive for ACTH. The patient underwent chemotherapy, and ketoconazole treatment was started for adrenal steroid blockade. Drug therapy was changed to mitotane after transaminitis developed. The patient’s clinical status eventually deteriorated, and she was moved to inpatient hospice care.

Conclusion: The ectopic ACTH syndrome can be caused by cervical cancer.

Abstract #22

Recombinant Human Thyrotropin to Facilitate Radioiodine Therapy in Functioning Metastatic Thyroid Carcinoma

Sherri E. Blackstone, MD, and Serge A. Jabbour, MD

Objective: To review and discuss the utility of recombinant human thyrotropin (rhTSH) to facilitate delivery of radioiodine therapy in a patient with metastatic thyroid carcinoma unable to produce endogenous elevation of the TSH level.

Methods: A patient with metastatic thyroid carcinoma, who received radioiodine therapy with the assistance of rhTSH, is described.

Results: A 59-year-old healthy man presented with a “mass in the sternum.” Chest radiography revealed nodules in both lungs, and a bone scan demonstrated abnormal activity in the sternum and right scapula. Biopsy of the sternal mass in September 2000 revealed metastatic follicular thyroid carcinoma. The patient underwent total thyroidectomy on September 29, 2000. Pathologic features were consistent with multifocal papillary carcinoma, follicular variant. The patient was not given levotiroxine (LT4), in preparation for future radioiodine therapy. By November 2000, the patient had completed 10 cycles of radiation therapy to the sternum and right shoulder. In December 2000, the TSH level was 7.74 µIU/mL (normal, 0.4 to 4.8), and total T4 was 7.5 µg/dL (normal, 4 to 12). In January 2001, TSH was 11.72 µIU/mL, and thyroglobulin (Tg) was 50 µg/L (no antibodies). The patient received two consecutive 0.9-mg intramuscular doses of rhTSH, and a subsequent TSH level was 72 µIU/mL. Radioiodine (200 mCi of 131I) was administered 24 hours after the second dose of rhTSH, and a postablative scan 1 week later confirmed metastatic disease involving the sternum and both lung bases. Administration of LT4 (125 µg) was then commenced, and in May 2001, the TSH level
was 18 µIU/mL and Tg was 6 µg/L. The LT₄ dose was then increased to 150 µg. In August 2001, CT of the chest (no contrast agent) revealed normal lungs and a small mass in the manubrium sterni. In November 2001, the patient received 250 mCi of ¹³¹I, again with the assistance of rhTSH. A postablative scan 1 week later was unremarkable except for mild activity in the left lung base. In May 2002, LT₄ was withdrawn, and 4 weeks later, the TSH level was 152 µIU/mL and Tg was 3.9 µg/L (no antibodies). Whole-body scanning identified no abnormalities. Currently, the patient is receiving 175 µg of LT₄ and has a suppressed TSH level (0.03 µIU/mL) and undetectable Tg (<0.9 µg/L).

**Conclusion:** rhTSH can be used in conjunction with therapeutic doses of radioiodine. Although only currently approved as a diagnostic agent, rhTSH can also be effectively implemented in the treatment of metastatic thyroid carcinoma and should be considered when endogenous elevation of the TSH level is insufficient.

### Abstract #23

**Adrenal Vein Sampling in Primary Hyperaldosteronism**

Erika L. Tapino, MD, and Serge A. Jabbour, MD

**Objective:** To review the interpretation of adrenal vein sampling in primary hyperaldosteronism.

**Methods:** A case of primary hyperaldosteronism is presented, and adrenal vein sampling is discussed.

**Results:** A 49-year-old man presented with 14 years of refractory hypertension and recurrent hypokalemia. Medications at the time of initial assessment were atenolol, furosemide, minoxidil, and potassium supplements. On examination, he was 188 cm tall, weighed 107.5 kg, and had a blood pressure of 150/90 mm Hg. Laboratory findings included a serum potassium level of 3.1 mmol/L and negative work-up for pheochromocytoma. A serum aldosterone (A) level was 22 ng/dL, and plasma renin activity (R) was 0.25 ng/mL per hour, revealing an A:R ratio of 88. A result greater than 20 suggests primary hyperaldosteronism. The patient then underwent 3 days of salt loading, and subsequent 24-hour urine sodium was 238 mmol/day and aldosterone was 17.8 µg/day. A 24-hour value of urinary sodium greater than 200 mmol/day and aldosterone in excess of 14 µg/day confirmed the presence of primary hyperaldosteronism. Computed tomography of the adrenal glands showed a 6-mm adenoma on the right and limb thickening on the left.

The patient was referred for adrenal vein sampling. Cortisol (C) and aldosterone (A) levels were measured from both adrenal veins and the inferior vena cava (IVC) after intravenous administration of 250 µg of cosyntropin (synthetic corticotropin).

<table>
<thead>
<tr>
<th>15 min after cosyntropin</th>
<th>C</th>
<th>A</th>
<th>A:C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adrenal vein</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td>959</td>
<td>6,360</td>
<td>6.6</td>
</tr>
<tr>
<td>Left</td>
<td>867</td>
<td>3,493</td>
<td>4.0</td>
</tr>
<tr>
<td>IVC</td>
<td>19.8</td>
<td>29</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Successful cannulation of the adrenal veins was confirmed by finding an adrenal vein:IVC cortisol ratio >10. The A:C ratio of the right adrenal vein in comparison with the left adrenal vein was 1.65 (6.6/4.0). This finding led to the diagnosis of bilateral adrenal hyperplasia because such ratios >4 are diagnostic for unilateral adrenal adenoma, 3 to 4 are indeterminate, and <3 confirm the presence of bilateral adrenal hyperplasia.

The patient has been treated medically with spironolactone, and his blood pressure has normalized.

**Conclusion:** Diagnosing primary hyperaldosteronism is challenging. Once primary aldosteronism has been confirmed, one can distinguish between adrenal adenoma and hyperplasia by careful performance and interpretation of adrenal vein sampling.

### Abstract #24

**Lyme Thyroiditis**

Adrienne M. Fleckman, MD, Myra Barginear, MD, Timothy Johnson, MD, Lewis Eisen, MD, Ya Ju Chang, MD, and Jayson Park, MD

**Objective:** To report a case of thyroiditis occurring in association with early disseminated Lyme disease.

**Background:** The only spirochete previously reported in the literature to be associated with thyroiditis is *Treponema pallidum*. Lyme disease is caused by the spirochete *Borrelia burgdorferi* and is known to involve the skin, the heart, and the nervous and musculoskeletal systems. Endocrine manifestations of Lyme disease have not been described previously.

**Methods:** We present data from the history, physical examination, laboratory investigations, and radiographic examinations of our patient and review the relevant literature.

**Results:** A previously healthy 31-year-old man presented with an erythematous ring-shaped rash and seventh cranial nerve palsy. Electrocardiography showed second-degree atroventricular block. Serology confirmed the presence of *Borrelia burgdorferi* antibodies. Cerebrospinal fluid analysis showed polymorphonuclear cells with positive Lyme titers. Thyroid function tests, performed because of fatigue and Bradycardia, revealed a thyrotopin
level of <0.01 µIU/mL and free thyroxine (FT₄) of 3.1 ng/dL (normal, 0.7 to 1.4). Thyroid uptake was 3.1%. Six weeks later, the thyrotropin level was 2.23 µIU/mL and FT₄ was 1.0 ng/dL.

**Conclusions:** This is the first reported case of Lyme-associated thyroiditis. Possible mechanisms include direct invasion of the thyroid gland, induction of thyroiditis by a host reaction to borrelial antigens, immunomodulation of host cells by borrelial components, or a possible autoimmune mechanism.

**Abstract #25**

**Pioglitazone Plus Sulfonylurea Reduces Circulating Very-Low-Density Lipoproteins and Free Fatty Acids in Subjects With Type 2 Diabetes Mellitus Poorly Controlled With Sulfonylurea Alone**

*Sid Rosenblatt, MD, Stephen Cichy, Clement Popovici, Jeff Zhang, PhD, Alfonso Perez, MD, and Frederick T. Murray, MD*

**Objective:** To evaluate the effect of pioglitazone (PIO) plus sulfonylurea (SU) on circulating very-low-density lipoproteins (VLDL) and free fatty acids (FFA) in patients with type 2 diabetes mellitus.

**Methods:** A multicenter, double-blind, 24-week randomized trial compared the results with use of 30 mg of PIO daily plus SU and 45 mg of PIO daily plus SU in patients with type 2 diabetes mellitus (N = 702).

**Results:** At 24 weeks, VLDL and FFA demonstrated statistically significant reductions from baseline.

<table>
<thead>
<tr>
<th>Least squares mean values</th>
<th>VLDL</th>
<th>FFA</th>
</tr>
</thead>
<tbody>
<tr>
<td>at baseline (mg/dL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 mg PIO + SU</td>
<td>36.1</td>
<td>14.96</td>
</tr>
<tr>
<td>45 mg PIO + SU</td>
<td>36.3</td>
<td>15.18</td>
</tr>
</tbody>
</table>

% change from baseline

| 30 mg PIO + SU | -7.8  | -3.27 |
| 45 mg PIO + SU | -7.6  | -2.95 |

Conclusions: The results of these two clinical trials show that only one patient per study had an ALT increase >3× the upper limit of normal; this finding suggests no drug-induced elevations in ALT levels with PIO treatment in combination with MET or SU. In addition, small mean reductions from baseline in ALT levels were noted in both studies at all PIO doses.

**Abstract #26**

**Reductions of Alanine Transaminase Levels in Patients With Type 2 Diabetes Mellitus Treated With Pioglitazone Plus Sulfonylurea or Metformin**

*Alfonso Perez, MD, John Page, MD, and Frederick T. Murray, MD*

**Objective:** To evaluate the effect of pioglitazone (PIO) plus sulfonylurea (SU) or PIO plus metformin (MET) on alanine transaminase (ALT) levels in patients with type 2 diabetes mellitus.

**Methods:** In two independent, multicenter, double-blind, 24-week randomized studies, multiple doses (30 or 45 mg) of PIO plus SU or PIO plus MET were evaluated in patients with poorly controlled type 2 diabetes (hemoglobin A1c ≥8.0%) with SU or MET therapy.

**Results:** In the PIO plus MET trial (827 patients), overall mean reductions in ALT levels from baseline were -7.0 and -6.9 U/L in the PIO 30- and 45-mg groups, respectively. Only one patient (30-mg group) had an ALT increase >3× the upper limit of normal at any time during treatment. No patients discontinued treatment because of an adverse event of increased hepatic enzymes. In the PIO plus SU trial (702 patients), overall mean reductions in ALT levels from baseline were -6.8 and -6.7 U/L in the PIO 30- and 45-mg groups, respectively. Only one patient (30-mg group) had an ALT increase >3× the upper limit of normal at any time during treatment. No patients discontinued treatment because of an adverse event of increased hepatic enzymes.

**Conclusions:** The results of these two clinical trials show that only one patient per study had an ALT increase >3× the upper limit of normal; this finding suggests no drug-induced elevations in ALT levels with PIO treatment in combination with MET or SU. In addition, small mean reductions from baseline in ALT levels were noted in both studies at all PIO doses.

**Abstract #27**

**Pioglitazone Plus Metformin Reduces Circulating Very-Low-Density Lipoproteins and Free Fatty Acids in Subjects With Type 2 Diabetes Mellitus Poorly Controlled With Metformin Alone**

*Lawrence S. Phillips, MD, Frederick T. Murray, MD, Stephen Cichy, Clement Popovici, Jeff Zhang, PhD, and Alfonso Perez, MD*

**Objective:** To evaluate the effect of pioglitazone (PIO) plus metformin (MET) on circulating very-low-density lipoproteins (VLDL) and free fatty acids (FFA) in patients with type 2 diabetes mellitus.

**Methods:** A multicenter, double-blind, 24-week randomized trial compared the results with use of 30 mg of PIO daily plus MET and 45 mg of PIO daily plus MET in patients with type 2 diabetes (N = 827).
Results: At 24 weeks, VLDL and FFA demonstrated statistically significant reductions from baseline.

<table>
<thead>
<tr>
<th>Factor</th>
<th>VLDL</th>
<th>FFA</th>
</tr>
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<tbody>
<tr>
<td>Least squares mean values</td>
<td></td>
<td></td>
</tr>
<tr>
<td>at baseline (mg/dL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 mg PIO + MET</td>
<td>35.5</td>
<td>16.55</td>
</tr>
<tr>
<td>45 mg PIO + MET</td>
<td>37.7</td>
<td>16.56</td>
</tr>
<tr>
<td>Least squares mean/mean</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% change from baseline</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 mg PIO + MET</td>
<td>-7.0</td>
<td>-2.49</td>
</tr>
<tr>
<td>45 mg PIO + MET</td>
<td>-10.1</td>
<td>-3.69</td>
</tr>
</tbody>
</table>

In addition, there were statistically significant changes from baseline (P≤0.05) in hemoglobin A1c, fasting plasma glucose, triglycerides, high-density lipoproteins, and total cholesterol that were similar to previously published data. Moreover, reductions in triglycerides, fasting plasma glucose, and FFA were significantly greater (P≤0.05) in the PIO 45-mg group than in the PIO 30-mg group.

Conclusion: This trial is one of the first to demonstrate that PIO reduces circulating VLDL and FFA levels and thus leads to diminished dyslipidemia and atherosclerotic disease associated with type 2 diabetes mellitus.

Abstract #28

Economic Evaluation of the Relationship Between Gastrointestinal Events and Bisphosphonate Therapy: Risedronate Versus Alendronate

Natalia N. Borisov, PhD, J. J. Doyle, RPh, MBA, Andrea Klemes, MD, C. P. Brezovic, BS, and R. L. Sheer, MS

Objective: To compare resource utilization and associated direct medical costs of gastrointestinal (GI)-related events for both alendronate and risedronate treatment with use of an integrated administrative, medical and pharmaceutical claims database.

Methods: A retrospective cohort study was conducted among 2,957 women and men (older than 65 years) with a new prescription for daily risedronate (5 mg/day), daily alendronate (5 mg/day or 10 mg/day), or weekly alendronate (35 mg/wk or 70 mg/wk) between November 1, 2000, and August 31, 2001. GI-related medical resource utilization and direct medical costs were assessed for a 4-month period after initiation of the bisphosphonate therapy. GI-related events or medications (or both), during a 6-month pretreatment period, were used to stratify patients by “GI history” or “no GI history.” Utilized resources (pharmacy, outpatient, inpatient, and emergency department services) were valued on the basis of 2002 US dollars.

Results: Sixteen percent of selected patients were treated with risedronate daily, 28% were treated with alendronate daily, and 56% were treated with alendronate weekly. The mean age of the study group was 76 years, and 93% of the study patients were women. During the first 4 months after initiation of bisphosphonate therapy for the group with no GI history, the average GI-related direct medical per-member-per-month cost was significantly lower for risedronate-treated patients than for patients receiving daily alendronate ($2.52 versus $7.40; P = 0.049) and those receiving weekly alendronate ($2.52 versus $7.50; P < 0.01). The major reason for the cost difference between bisphosphonate therapies was inpatient care utilization. Risedronate-treated patients had significantly fewer average number of inpatient visits (per 100 patients per month) than did patients receiving alendronate daily (0.2 versus 1.2; P < 0.01) and those receiving alendronate weekly (0.2 versus 1.6; P = 0.01). In the group with a GI history, risedronate-treated patients continued to exhibit lower costs than did alendronate-treated patients.

Conclusion: In a patient population older than 65 years and receiving osteoporosis treatment, risedronate was associated with substantially lower GI-related medical costs in comparison with both daily and weekly alendronate regimens. The main source of the GI-related cost difference between risedronate and alendronate was inpatient utilization. This finding suggests that alendronate-treated patients were experiencing clinically more severe GI side effects.

Abstract #29

Incidence of Gastrointestinal Events Among Patients With Osteoporosis Treated With Alendronate Versus Risedronate

Karen Worley, PhD, J. J. Doyle, RPh, MBA, Andrea Klemes, MD, R. L. Sheer, MS, and Michael Steinbuch, PhD

Objective: To evaluate the occurrence of gastrointestinal (GI) events in patients taking risedronate and alendronate, two orally administered bisphosphonates for the treatment of osteoporosis, in an observational setting.

Methods: We conducted a retrospective cohort study among 3,947 women and men (older than 65 years) initiating bisphosphonate therapy in an integrated medical and pharmaceutical claims database. Patients receiving a risedronate (5 mg/day) or alendronate (5 mg/day, 10 mg/day, 35 mg/wk, or 70 mg/wk) prescription between November 2000 and August 2001 were selected for analysis, and those with a bisphosphonate prescription during the prior 6 months were excluded. The occurrence of GI events (based on primary ICD-9 diagnostic codes) was assessed for risedronate and alendronate, with use of a 6-month history preceding the index prescription and a 4-month follow-up period.

Results: Patients with daily (7.8%) and weekly (8.4%) alendronate regimens were more likely than risedronate-treated patients (5.2%) to experience a GI event after initiating therapy, with adjustment for GI history. The difference was significantly higher for daily (RR = 1.57; P = 0.021) and weekly (RR = 1.66; P = 0.004) alen-
Diabetic Ketoacidosis in a Patient With Human Immunodeficiency Virus Not Receiving Protease Inhibitors: Case Report and Review of Literature

Cristina B. Guzmán, MD, Mamdooh Gayid, MD, and Fadi El-Khayer, MD

Objective: To enhance awareness of an unusual manifestation of diabetes in patients with human immunodeficiency virus (HIV) who are not receiving protease inhibitors (PIs).

Methods: We chronicle the clinical and laboratory findings in a nondiabetic patient with HIV who presented with diabetic ketoacidosis (DKA).

Results: A 36-year-old man with HIV and hepatitis B virus, who was not taking PIs, presented with new-onset diabetes and DKA. No fat redistribution was evident on physical examination. At the time of admission, his blood glucose was 930 mg/dL, acetone was 2+ mg/dL, and the anion gap was 17 mEq/L. Two days after insulin drip was initiated, the glucose level normalized, and the patient was dismissed with the following regimen: NPH (100 U in the AM and 80 U in the PM) and Humalog (30 U before meals). Additional laboratory findings were as follows: C peptide, 1.8 ng/mL; islet cell antibody, <1:4 (normal); interferon-α, <5 IU/mL (normal); and CD4, 12. Abnormalities of glucose homeostasis, including hyperinsulinemia, insulin resistance, and impaired glucose tolerance, occur frequently in association with changes in body composition (increased visceral fat and loss of subcutaneous fat) among patients with HIV receiving PIs. Despite a normal C-peptide level and no treatment with PIs, the patient had insulinopenia and DKA.

Conclusion: The primary abnormality of glucose homeostasis in HIV is insulin resistance, which may result not only from severe changes in fat redistribution but also from direct effects of antiretroviral agents. DKA may be an unexpected acute complication. Furthermore, to our knowledge, this complication has not been reported in the absence of PI therapy and fat redistribution in HIV-infected patients.

Abstract #31

An Update of Real-Time Sperm Microseparation Technology

Fu Nan Wang, MD, and Bo Young Suh, MD, FACE

Although the commonly used methods of swim-up (SU) and density gradient layer column (LC) techniques improve the sperm quality, the fertilization process and successful pregnancy depend on the motility, morphologic characteristics, chromatin homogeneity, and absence of microorganism contamination. To alleviate the concerns of possible microorganism contamination and toxic effects of silica on ovum or embryo, we have developed a newly applicable method, real-time sperm microseparation technology (Wang Tube System, RT). This method was based on the discovery of the following: (1) characteristics in sperm behavior such that a perpendicular upward migration has been noted in humans and higher class mammals, whereas downward or horizontal migration was evident in lower classes such as pig, dog, and rat; and (2) a basic biologic phenomenon that characterizes healthy spermatozoa that do not transfer microorganisms on or around their bodies as opposed to spermatozoa contaminated with bacteria and doomed to have a disturbed motility pattern. Our data revealed that RT isolated a fully and highly motile sperm (grade 3) with normal chromatin and morphologic features that enhance the possibilities of fertilization and clinical pregnancy. The RT demonstrated no contamination in terms of Neisseria gonorrhoeae, Chlamydia trachomatis, Ureaplasma urealyticum, and human papillomavirus by culture and polymerase chain reaction amplification in posttreated samples, whereas SU and LC preparations were contaminated (40% and 20%, respectively) with those organisms. The superiority of RT in comparison with SU and LC was confirmed with the hypo-osmotic swelling test, in which the percentages of total swollen sperm were 94% for RT, 76% for SU, and 50% for LC. The clinical pregnancy rate was the highest for RT (45%), in comparison with 20% for LC and 15% for SU, in infertile couples with male factors. Thus, we present the following conclusions: (1) RT separates clinically valuable, pure, and high-quality sperm; (2) RT eliminates bacteria, viruses, and other impurities in semen; and (3) these beneficial factors enhance the possibilities of clinical pregnancy.

Abstract #32

Got Milk-Alkali Syndrome?

Diana S. Dean, MD, Matthew Martinez, MD, and John M. Miles, MD

A 54-year-old man was admitted to the hospital because of hypercalcemia, acute renal failure, and anemia.
Laboratory evaluation showed the following: serum calcium, 16.6 mg/dL; creatinine, 4.9 mg/dL; bicarbonate, 34 mEq/L; phosphorus, 2.7 mg/dL; pH, 7.54; and hemoglobin, 12.7 g/dL. Physical examination revealed a firm epigastric mass (6 by 2 cm). He reported that he had symptoms of dyspepsia and had taken twelve 500-mg calcium carbonate (Rolaids) tablets daily with milk for 20 years. An extensive evaluation was noncontributory, including an appropriately suppressed level of parathyroid hormone, absent parathyroid hormone-related peptide, normal results of serum and urine protein studies, normal chest x-ray findings, and negative urine cytology. An angiotensin-converting enzyme level was normal.

An unenhanced computed tomographic scan of the abdomen and pelvis disclosed no intra-abdominal neoplasm. There was an extraperitoneal band of calcification in the anterior abdominal wall, measuring 6.0 by 1.5 cm. No evidence of osteopenia or osteolysis was found.

Our patient had the triad of hypercalcemia, renal insufficiency, and metabolic alkalosis, and a history consistent with milk-alkali syndrome. He was treated by calcium supplement cessation and has had normocalcemia for 5 months. Milk-alkali syndrome causes up to 12% of cases of hypercalcemia in hospitalized patients, making it the third most common etiologic factor after malignant disease and hyperparathyroidism.

**Abstract #33**

**Thyroid Storm and Severe Jaundice**

Kashif M. Munir, MD, and Richard B. Horenstein, MD

**Objective:** To report the case of a patient with thyroid storm and severe cholestatic jaundice.

**Methods:** We present a case summary, describing a patient with severe hyperbilirubinemia due to thyroid storm.

**Results:** A 35-year-old woman with thyroid storm and acute liver injury was transferred to our facility. She was intubated and had rapid atrial fibrillation and severe jaundice. Her initial bilirubin level was 30.0 mg/dL and peaked at 42.0 mg/dL. Treatment with propylthiouracil, corticosteroids, β-adrenergic blockers, and a saturated solution of potassium iodide resulted in eventual resolution of the thyroid storm and liver abnormalities. Liver biopsy findings were consistent with cholestasis related to hyperthyroidism.

**Conclusion:** Physicians should be aware that thyroid storm can manifest in conjunction with severe cholestatic jaundice.

**Abstract #34**

**Uncontrolled Case Study of Medical Treatment for Elimination of Hypogonadism After Androgen Cessation in a Man With Human Immunodeficiency Virus Positivity and Secondary Polycythemia Related to Continuous Testosterone Treatment for 2 Years**

Michael C. Scally, MD, Julia A. Kovacs, MD, Joseph C. Gathe, MD, and Andrew L. Hodge, MS

**Objective:** To assess the potential for prevention or minimization of clinically significant hypogonadism after androgen cessation in previously eugonadal human immunodeficiency virus-positive (HIV+) men with secondary polycythemia.

**Methods:** Medical treatment with human chorionic gonadotropin (2,500 IU subcutaneously every other day for 16 days), clomiphene citrate (50 mg orally twice a day for 30 days), and tamoxifen (20 mg orally daily for 30 days) and therapeutic phlebotomy were used in an HIV+ man with problematic secondary polycythemia due to 2 years of uninterrupted testosterone therapy.

**Results:** The combination of medical treatment and therapeutic phlebotomy was successful in normalization of the hemoglobin level (from 17.2 to 15.6 g/dL), hematocrit (from 51.2% to 45.5%), luteinizing hormone (from <0.2 to 7.3 mIU/mL), and testosterone (from >1,200 to 626 ng/dL) with no intervening period of hypogonadism after androgen cessation.

**Conclusion:** Medical treatments that would allow for the interruption of testosterone treatment and eliminate or minimize the period of hypogonadism after androgen cessation need to be explored.

**Abstract #35**

**Osteogenesis Imperfecta Complicated by Heterotopic Ossification and Myositis Ossificans**

Nnemka Ekwueme-Sturdivant, MD, Dana Fletcher, DO, and Michael Kleerekoper, MD, FACE

Osteogenesis imperfecta is a hereditary disorder characterized by increased skeletal fragility. The disorder is subclassified into five different types, depending on the phenotype and the clinical manifestations. It may be complicated by formation of hyperplastic callus, either spontaneously or after a surgical procedure or fracture. We report a case of a 34-year-old woman with osteogenesis imperfecta and multiple known fractures found to have a large, warm, firm mass on her distal femur. On examination, the patient was thought to have a callus due to possible fracture. With further radiographic studies including a bone scan, however, the mass was identified as heterotopic ossification. This entity is defined as bone formation in areas not typically containing bone, such as muscle or fat. Although exuberant callus has been well described in osteogenesis imperfecta, heterotopic ossification has not.
During the patient’s hospital admission, she had also complained of severe abdominal pain associated with nausea and vomiting. On computed tomographic scanning of the abdomen and pelvis, she was found to have a calcified mass in the pelvis, which was initially thought to be a possible sarcoma. Biopsy of the mass, however, revealed myositis ossificans of the right iliac muscle. After a thorough search of the literature, we conclude that neither heterotopic ossification nor myositis ossificans has been previously reported in association with osteogenesis imperfecta.

Abstract #36

A Case of Parathyroid Carcinoma

Abbi Lulsegged, MD, Arthur Ogunko, MD, and Orlo H. Clark, MD

Case Report: A 60-year-old woman with a past history of hypertension and iron deficiency anemia was referred with several months’ history of polyuria, fatigue, and weakness. Routine blood tests by her family physician revealed the following: corrected calcium, 3.7 mmol/L; alkaline phosphatase, 100 U/L; urea, 7.2 mmol/L; creatinine, 203 μmol/L; hemoglobin, 9.9 g/dL; mean corpuscular volume, 83 fl; erythrocyte sedimentation rate, 64 mm in 1 hour; and C-reactive protein, 7 mg/L. Findings on clinical examination were unremarkable; she was not dehydrated and had no abdominal or neurologic findings. Neck, breast, and spinal examinations disclosed no abnormalities. She denied having any family history of calcium-related problems. She had normal tumor markers and findings on myeloma screen, a serum angiotensin-converting enzyme level of 17 U/L (normal), a 24-hour urinary calcium excretion of 3.45 mmol/24 h (normal), and a dramatically increased parathyroid hormone (PTH) level of 1,370 ng/L (normal, 10 to 65). She was euthyroid. Ultrasound scan of the neck revealed a large parathyroid mass (2.6 by 4.0 cm) that was well encapsulated. The thyroid gland was noted to be normal, and no lymphadenopathy was seen. A sestamibi scan showed substantially increased uptake in the left side of the neck, the appearance of which was consistent with an adenoma of the left inferior parathyroid gland. Ultrasound scan of the renal tracts disclosed numerous cystic areas in both kidneys. In addition, concentrated honeycomb cystic areas were noted in the upper pole of the left kidney. Because of the extraordinary large size of the parathyroid mass, a decision was made at surgical intervention to perform a total thyroidectomy and parathyroidectomy of the left side of the neck. Histologic examination confirmed the presence of a clear cell adenocarcinoma. Postoperatively, the patient had hypocalemia (corrected calcium, 1.62 mmol/L) with associated weakness and a “pins and needles” sensation in the hands. Trousseau’s sign was positive. Treatment was commenced with SandoCal (400 mg, two tablets four times a day) and 1α-calcidiol (1.5 μg daily), and the results were good.

Discussion: Parathyroid carcinoma is a rare cause of hyperparathyroidism, accounting for 0.5 to 2% of cases. It is an aggressive tumor. Parathyroid carcinomas have a tendency to recur and can also metastasize, commonly to the cervical lymph nodes (40%), lungs, and liver. Typically, recurrence is noted within 3 years after surgical treatment, and the mean survival after recurrence is 7 to 8 years. Recommended treatment is en bloc resection. These tumors tend not to be radiosensitive, although some studies dispute this finding (1). Unfortunately, only about 30% of patients have a long-term disease-free outcome. The main cause of death is usually related to the effects of hypercalcemia. A novel calcimimetic agent, which acts as an agonist at the calcium-sensing receptor, has shown promise in controlling calcium concentrations by producing a dose-dependent decline in PTH levels (2). Postoperatively, serum calcium, phosphate, and PTH levels should be assessed at 2 weeks, 3 months, and 6 months for the first year and then annually for at least 5 years. Baseline magnetic resonance imaging of the thyroid bed, neck, and chest is advisable, in light of the risk of recurrence and the metastatic potential. Recurrence tends to manifest as increased PTH levels. Another therapeutic option is to continue oral administration of calcium in an effort to suppress PTH levels and hence prevent disease recurrence.

References


Abstract #37

The Use of Pure Gold Electrodes to Improve Self-Monitoring of Blood Glucose

Barry H. Ginsberg, MD, PhD, C. C. Young, PhD, Jane McGonigle, BA, Michael Gibney, RN, MA, CDE, CS, and James Sidwell, PhD

Objectives: Widespread adoption of self-monitoring of blood glucose (SMBG) has been limited somewhat by pain and inconvenience, but reductions in sample size and in the time to perform the assay have increased the usability of SMBG systems. Increased applicability of SMBG has been accomplished, in part, by the use of biosensor technology; however, limitations existed because of the intrinsic electrical properties of commonly used carbon-platinum electrodes. We now report the use of pure gold electrodes to reduce sample size (to minimize the pain of lancing), to decrease the time to measure glucose, and to improve accuracy.

Methods: Strips are prepared by a multilayered approach with glucose oxidase on GoldEtch™ electrodes. In trial 1, strips produced by good manufacturing practices
Hypercalcemia caused by increased production of PTHrP by malignant cystic teratoma is well appreciated. Although very rare, PTHrP-producing benign cystic teratoma should be considered in the differential diagnosis of hypercalcemia. In such circumstances, hypercalcemia may be resistant to medical management, whereas surgical resection of the tumor results in normalization of calcium levels. Hypercalcemia in our patient was exacerbated by development of amiodarone-induced hyperthyroidism. Hyperthyroidism is known to cause mild to moderate hypercalcemia, but if the patient has an underlying hypercalcemic diathesis, it can precipitate symptomatic and severe hypercalcemia.

Abstract #39
McCune-Albright Syndrome in Conjunction With Acromegaly and Subclinical Hyperthyroidism

Manju Chandran, MD, Eric N. Gold, MD, FRCP(C), Roopa Sathyaprakash, MD, and Leonard J. Deftos, MD

Objective: To describe a case of McCune-Albright syndrome associated with the rare complication of acromegaly and asymptomatic nonautoimmune hyperthyroidism.

Method: A case is reported, and the pertinent literature is reviewed.

Results: A 25-year-old man with documented severe McCune-Albright syndrome presented with worsening prognathism and frontal bossing. Physical examination revealed acromegalic features and stigmas of underlying McCune-Albright syndrome, including orbital asymmetry, proptosis, limb length discrepancy, and a large café au lait spot on his left scapula. No thyromegaly was evident on palpation. Insulin-like growth factor (IGF-I) and growth hormone (GH) levels were high and failed to suppress after a standard oral glucose tolerance test. Magnetic resonance imaging of the sella revealed a 5-mm pituitary microadenoma. Other significant laboratory findings included a suppressed level of thyrotropin in association with normal free thyroxine and triiodothyronine levels. Thyroid-stimulating immunoglobulin was undetectable, and the thyroid peroxidase antibody titer was within normal limits. A radioactive iodine scan of the thyroid was performed, and a hot spot was identified in the right thyroid lobe. The patient underwent surgical resection of the right thyroid lobe, and the pathologic examination confirmed the presence of a 5-mm microadenoma. Postoperatively, the patient’s symptoms improved, and his growth hormone levels normalized. The patient has been followed for 3 years with no recurrence of symptoms or hyperthyroidism.

Conclusion: This case highlights the rare complication of acromegaly and subclinical hyperthyroidism in a patient with McCune-Albright syndrome. The presence of acromegaly and hyperthyroidism in a patient with McCune-Albright syndrome suggests the need for careful monitoring and management of these conditions to prevent further complications.

Abstract #38
Benign Ovarian Teratoma Causing Humoral Hypercalcemia

Roopa Sathyaprakash, MD, Manju Chandran, MD, Douglas W. Burton, MD, and Leonard J. Deftos, MD

Objective: To describe a case of parathyroid hormone-related peptide (PTHrP)-mediated hypercalcemia without malignant disease.

Method: A case report and literature review are presented.

Results: A 43-year-old African American woman had a 1-month history of nausea, vomiting, fatigue, palpitation, intermittent diarrhea, and weight loss (4.5 kg). Her medical history was notable for ischemic cardiomyopathy, congestive heart failure, and chronic renal insufficiency. Her medications included amiodarone, digoxin, bumetanide, spironolactone, metoprolol, and benazepril. Important findings on physical examination were sinus tachycardia, a nontender mildly enlarged thyroid gland, dry mucous membranes, and a firm and slightly tender right adnexal mass. Laboratory tests showed a serum calcium concentration of 14.0 mg/dL, phosphorus of 3.7 mg/dL, and creatinine of 2.0 mg/dL. Intact parathyroid hormone was suppressed. Results of urine and serum electrophoresis were normal, as were the 1,25-dihydroxvitamin D and 25-hydroxvitamin D levels. The PTHrP level, as measured by immunoassay, was not elevated. The patient also had suppressed thyrotropin and high free thyroxine and total triiodothyronine levels. The serum interleukin-6 level was increased. Magnetic resonance imaging of her abdomen showed a possible right ovarian dermoid cyst. The working diagnosis at this stage was severe hypercalcemia attributable to ovarian tumor and worsened by amiodarone-induced type 2 hyperthyroidism. The hyperthyroidism resolved within a month after administration of amiodarone was discontinued. Subsequently, she underwent surgical resection of the right adnexal mass. Pathology examination confirmed the diagnosis of mature benign cystic teratoma, measuring 10.3 by 9.5 by 8 cm. Immunohistochemical study of sections of the tumor for PTHrP showed intense staining by many cellular elements. The hypercalcemia resolved after excision of the tumor.

Conclusion: The unusual feature of this case is the benign ovarian lesion that produced PTHrP and caused hypercalcemia, only the second case report of its kind. Hypercalcemia caused by increased production of PTHrP by malignant cystic teratoma is well appreciated. Although very rare, PTHrP-producing benign cystic teratoma should be considered in the differential diagnosis of hypercalcemia. In such circumstances, hypercalcemia may be resistant to medical management, whereas surgical resection of the tumor results in normalization of calcium levels. Hypercalcemia in our patient was exacerbated by development of amiodarone-induced hyperthyroidism. Hyperthyroidism is known to cause mild to moderate hypercalcemia, but if the patient has an underlying hypercalcemic diathesis, it can precipitate symptomatic and severe hypercalcemia.

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gland revealed normal uptake and no evidence of hot or cold nodules. Transphenoidal resection of the pituitary adenoma was technically difficult because of the extensive skull involvement attributable to fibrous dysplasia. The adenoma was only partially resectable and was found to stain positive for GH. Postoperatively, the patient had persistently increased GH and IGF-I levels. Therapy was begun with long-acting octreotide injections and low-dose propylthiouracil. IGF-I and GH levels as well as results of thyroid function tests normalized within 6 months after initiation of treatment.

**Conclusion:** McCune-Albright syndrome is a rare sporadic condition characterized by skin dysplasia with café au lait spots, polyostotic fibrous dysplasia, precocious puberty, and multiple autonomous endocrinopathies. To date, a complex combination of multiple endocrine abnormalities has been described in association with this syndrome. Only three other cases of McCune-Albright syndrome associated with acromegaly and hyperthyroidism have been reported in the English literature, and they were associated with multinodular goiters. To our knowledge, our case is the first report of McCune-Albright syndrome in which the acromegaly was associated with occult subclinical hyperthyroidism in a patient without any nodular thyroid abnormality.

**Abstract #40**

**Parathyroid Hormone-Related Peptide and B-Cell Lymphoma: A Case Report and Literature Review**

*Rakesh Patel, DO, Stephanie Shaw, MD, Darren Lackan, MD, and Randall Urban, MD*

**Objective:** To describe a case of malignant hypercalcemia due to parathyroid hormone-related peptide (PTHrP) in a patient with B-cell lymphoma and review the associated literature.

**Methods:** A case is presented along with a MEDLINE literature review.

**Results:** A 36-year-old man with anal condyloma and acquired immunodeficiency syndrome (AIDS) presented with confusion and a rectal mass. He had increased serum calcium and PTHrP levels, normal vitamin D levels, and a suppressed level of parathyroid hormone. A rectal biopsy revealed B-cell lymphoma and positive PTHrP stains. The patient underwent abdominopерineal resection and is receiving CHOP chemotherapy (cyclophosphamide, hydroxydaunomycin [doxorubicin], Oncovin [vincristine], and prednisone). We reviewed the pathophysiologic features of hypercalcemia in non-Hodgkin’s lymphoma and summarized 16 other cases from the literature.

**Conclusion:** Hypercalcemia associated with malignant disease attributable to PTHrP, although unusual, should be considered in patients with B-cell lymphoma.

**Abstract #41**

**Normalization of Insulin-Like Growth Factor-I With Pegvisomant in a Subset of Patients With Acromegaly Previously Treated With Octreotide**

*Mary Lee Vance, MD, Paul M. Stewart, MD, Pia Burman, MD, and Philip E. Harris, MD*

**Background:** Pegvisomant, a new growth hormone receptor antagonist, offers a novel treatment for acromegaly. In clinical trials, pegvisomant normalized insulin-like growth factor-I (IGF-I) levels in up to 97% of patients with acromegaly. Octreotide has been reported to normalize IGF-I in 20 to 68% of patients with acromegaly.

**Objective:** To evaluate, by means of retrospective analysis, whether additional reductions in IGF-I concentrations occurred in a long-term extension trial of pegvisomant in a subset of patients who were receiving octreotide at enrollment.

**Methods:** Of the 109 patients receiving pegvisomant, 44 had received octreotide subcutaneously up to the time of enrollment. IGF-I concentrations determined at the following time points were used in the analysis: (1) at screening before cessation of subcutaneous octreotide therapy (indicator of octreotide treatment effect), (2) at baseline at least 2 weeks after discontinuation of subcutaneous octreotide therapy and before commencing pegvisomant treatment (indicator of treatment-free baseline IGF-I concentrations), and (3) at the end of the study after pegvisomant therapy (indicator of pegvisomant treatment effect).

**Results:** The percentage of patients with IGF-I concentrations within the normal range for age was 93% for pegvisomant treatment in comparison with 39% for octreotide treatment. The mean percentage reductions in IGF-I concentrations from baseline to screening (octreotide treatment effect) and from baseline to final study visit (pegvisomant treatment effect) were 29% and 50%, respectively.

**Conclusions:** The unique mechanism of action of pegvisomant results in highly effective biochemical control in patients with acromegaly. The findings from this retrospective analysis suggest that, in a subset of patients with acromegaly who did not have optimal control with octreotide therapy, pegvisomant results in further lowering and normalization of IGF-I concentrations in most patients.

**Abstract #42**

**Management of a Mediastinal Parathyroid Adenoma in Conjunction With Severe Symptomatic Primary Hyperparathyroidism in an Elderly Patient**

*Aparna Mahakala, MD, Sridevi R. Pitta, MD, Gina Sleilati, MD, and Michael Kleerekoper, MD, FACE*

**Objective:** To report and review the management of primary hyperparathyroidism attributable to a mediastinal parathyroid adenoma in an elderly woman.
**Case Report:** A 68-year-old woman initially presented because of hypercalcemia found on laboratory work-up for dizziness and weakness. She was diagnosed as having primary hyperparathyroidism (calcium, 14.2 mg/dL; phosphorus, 1.9 mg/dL; and parathyroid hormone [PTH], 729 pg/mL). She underwent surgical removal of an enlarged left superior parathyroid gland. Bilateral neck exploration failed to reveal other abnormal parathyroid tissue. Postoperatively, the hypercalcemia persisted (serum calcium, 11.5 mg/dL). Two years later, she was readmitted with progressive generalized muscle weakness and right hip pain after a fall. On physical examination, the patient had right hip tenderness and restricted leg movements. Her laboratory values showed a calcium concentration of 11.6 mg/dL, phosphorus of 2.7 mg/dL, intact PTH of 1,111 pg/mL, and 25-hydroxyvitamin D of 6 ng/mL. X-ray films of her hands revealed mediastinum at the level of the aortic arch. The patient was reluctant to consider a surgical procedure, mainly because of concerns about the intrathoracic location.

**Discussion:** This case allows us to address the challenges of the management of a mediastinal parathyroid adenoma in conjunction with severe primary hyperparathyroidism. Mediastinal parathyroid adenomas are uncommon and constitute 3 to 5% of ectopic parathyroid adenomas. They are usually detected by sestamibi parathyroid scintigraphy. Surgical treatment is the most effective single intervention. Traditionally, it has been performed with a midsternotomy incision and thoracotomy; more current reports have described video-assisted thoracoscopic resection. Angiographic ablation has also been performed in a few patients. Medical therapy is used in patients who are not surgical candidates. No effective medical alternative exists for patients with severe symptomatic primary hyperparathyroidism. Hormone replacement therapy has yielded modest improvement in bone mineral density in postmenopausal women with mild primary hyperparathyroidism but not severe primary hyperparathyroidism. Bisphosphonates were shown to lower serum calcium levels and decrease bone resorption but in association with an increase in PTH, which may be deleterious to bone. Alendronate has been shown to improve bone mineral density greatest at the lumbar spine and less at the radius and hips and can be used as supportive therapy in patients with mild primary hyperparathyroidism. Compounds that interact with parathyroid calcium-sensing receptors and that mimic calcium, called calcimimetics, offer promising results as medical treatment of primary hyperparathyroidism.

**Conclusion:** The management of severe primary hyperparathyroidism in a nonsurgical candidate remains controversial, and limited data are available on the efficacy of medical alternatives.

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**Abstract #43**

**Pituitary Tuberculoma: Back With the Old Foe**

**Bien J. Matavaran, MD, Judith D. Llonin, MD, and Honolina Gomez, MD, FACE**

**Objective:** To present a rare case of pituitary tuberculoma in a 40-year-old Filipino woman, including initial clinical manifestations, perioperative course, and antituberculosis therapy.

**Methods:** A case report of a pituitary tuberculoma is presented, and trends in the reported cases in the literature are summarized.

**Results:** A previously healthy 40-year-old Filipino woman presented with a 1-month history of diplopia, anorexia, headache, and nausea. Because of the impression of an intracranial mass, cranial computed tomographic scanning was done, which showed a suprasellar mass at the optic chiasm, and magnetic resonance imaging revealed a pituitary adenoma. Results of pituitary function tests were within normal limits. A transsphenoidal surgical approach was used, and gross total excision of the pituitary tumor was accomplished. Histopathologic examination revealed caseation, consistent with tuberculosis. The patient was treated with isoniazid, rifampicin, pyrazinamide, and ethambutol. Six months after surgical resection and while the patient was receiving antituberculosis therapy, panhypopituitarism developed.

**Conclusion:** Tuberculosis of the central nervous system can involve the sellar and parasellar regions in numerous ways. With the advent of antituberculosis drugs, the involvement of the pituitary as a site of tuberculosis is currently quite rare. Nevertheless, there seems to be an increased incidence of pituitary tuberculoma, attributable to an increased number of resistant strains of tuberculosis, which warrants vigilant monitoring by physicians. Our current patient demonstrates that the pituitary gland can be a primary site of tuberculosis among healthy persons.

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**Abstract #44**

**Repaglinide Versus Nateglinide Monotherapy: A Randomized, Multicenter, Open-Label Study**

**Mohammed F. Saad, Julio Rosenstock, MD, FACE, Naum Khutoryansky, and Paula Hale**

**Objective:** To report the results of a parallel-group, open-label, randomized, multicenter, 16-week clinical trial that compared the efficacy and safety of repaglinide monotherapy and nateglinide monotherapy, in patients with type 2 diabetes previously treated with diet and exercise.

**Methods:** Enrolled patients (N = 150) had hemoglobin A1c (HbA1c) values >7% but ≤12% during treatment with diet and exercise in the previous 3 months. Patients were randomly assigned to receive monotherapy with...
were measured.

**Results:** Mean baseline HbA1c values were similar in the two groups (8.9%). Final HbA1c values were lower for repaglinide monotherapy than for nateglinide monotherapy (7.3% versus 7.9%, respectively). Mean end-of-study reductions of HbA1c were significantly greater for repaglinide monotherapy than for nateglinide monotherapy (~1.6% versus ~1.0%, respectively; P = 0.002). Mean reductions of fasting plasma glucose values also demonstrated significantly greater efficacy for repaglinide than for nateglinide (~57 mg/dL versus ~18 mg/dL, respectively; P < 0.001). In postprandial testing after a liquid test meal at baseline and at the end of the study, the two treatments showed comparable changes of area under the curve values for glucose or insulin, when the area under the curve was calculated relative to the time of meal initiation. Median final doses were 6 mg/day for repaglinide and 360 mg/day for nateglinide. The incidence of patients with minor hypoglycemic episodes (blood glucose <50 mg/dL) was 7% for repaglinide and 0% for nateglinide. No episodes of major hypoglycemia (requiring assistance of another person) occurred in either group.

**Conclusions:** In patients with type 2 diabetes previously treated with diet and exercise, repaglinide and nateglinide had similar postprandial glycemic effects, but repaglinide monotherapy was significantly more effective than nateglinide monotherapy in reducing HbA1c and fasting plasma glucose values.

**Abstract #45**

Resource Utilization and Patient Preference Using InnoLet® Versus Vial and Syringe in a Subgroup of Elderly Patients With Diabetes

**Methods:** Enrolled patients had hemoglobin A1c (HbA1c) values >7% but ≤12% during previous treatment with a sulfonylurea, metformin, or low-dose Glucovance (glyburide ≤2.5 mg and metformin ≤500 mg). After 4-week metformin run-in therapy (doses escalated to 1,000 mg twice a day), 192 patients were randomly assigned to addition of either repaglinide (1 mg/meal; maximum of 4 mg/meal) or nateglinide (120 mg/meal; reduced to 60 mg if needed) to their metformin regimen for 16 weeks. Repaglinide doses were adjusted during the first 2 weeks of therapy (glycemic targets: self-monitored blood glucose guided the dose adjustments to reach preprandial glycemic targets of 90 to 140 mg/dL.

**Results:** The mean daily costs associated with injections were $114 for the InnoLet®-using patients and $196 for the patient using a vial and syringe (P < 0.001). Fifty-three percent of patients were independent of nursing or caregiver assistance for injection during use of InnoLet®, versus 20% with a vial and syringe. The median daily cost of nursing or caregiver assistance was $0 for the InnoLet® users and $240 for the vial and syringe users. A majority of patients (82%) indicated a preference for the InnoLet® device (P < 0.001). Treatment satisfaction increased significantly with InnoLet® (P < 0.0001) in comparison with a vial and syringe. Most patients using the InnoLet® device responded positively about satisfaction, convenience, flexibility, and ease of use with their treatment as well as about satisfaction with understanding of their diabetes.

**Conclusions:** InnoLet® use was associated with savings that significantly offset the cost of treatment, and it fostered independence in patients who had difficulty with self-injection using a vial and syringe. Switching elderly patients with diabetes from syringe to InnoLet® resulted in reduced fear of self-injection, reduced daily barriers to effective insulin self-management, and improved treatment satisfaction.

**Abstract #46**

Efficacy and Safety of Combination Therapy: Repaglinide Plus Metformin Versus Nateglinide Plus Metformin

**Objective:** To compare the efficacy and safety of combination regimens of repaglinide or nateglinide plus metformin in a 16-week, open-label, parallel-group, randomized, multicenter trial of treatment of type 2 diabetes.

**Methods:** Enrolled patients had hemoglobin A1c (HbA1c) values >7% but ≤12% during previous treatment with a sulfonylurea, metformin, or low-dose Glucovance (glyburide ≤2.5 mg and metformin ≤500 mg). After 4-week metformin run-in therapy (doses escalated to 1,000 mg twice a day), 192 patients were randomly assigned to addition of either repaglinide (1 mg/meal; maximum of 4 mg/meal) or nateglinide (120 mg/meal; reduced to 60 mg if needed) to their metformin regimen for 16 weeks. Repaglinide doses were adjusted during the first 2 weeks of therapy (glycemic targets: self-monitored blood glucose preprandial values of 80 to 140 mg/dL).

**Results:** Median final doses were 5 mg/day for repaglinide and 360 mg/day for nateglinide. Mean end-of-study reductions of HbA1c were significantly greater (P < 0.001) for repaglinide plus metformin therapy (~1.28%) than for nateglinide plus metformin therapy (~0.67%). Final mean HbA1c values were lower for
repaglinide plus metformin therapy (7.1%) than for nateglinide plus metformin therapy (7.5%). Mean reductions in fasting plasma glucose values also indicated significantly greater efficacy ($P = 0.002$) for repaglinide plus metformin (–39 mg/dL) than for nateglinide plus metformin (–21 mg/dL). Liquid meal testing at baseline and at the end of the study revealed comparable changes in area under the curve of glucose or insulin for the two treatments (area under the curve relative to $t = 0$). Similar numbers of patients in the two treatment groups had minor hypoglycemic episodes (blood glucose <50 mg/dL): 7% for repaglinide and 2% for nateglinide.

Conclusions: When either agent was added to a regimen of metformin, repaglinide was significantly more effective than nateglinide in reduction of HbA1c and fasting plasma glucose values. The two regimens showed comparable safety.

Abstract #47

Successful Resection of a Skull Metastatic Lesion From Papillary Thyroid Cancer After Arterial Embolization

Marzieh Salehi, MD, Eric Elowitz, MD, Alejandro Berenstein, MD, and Adrienne M. Fleckman, MD

Objective: To present a case of a 72-year-old woman with a recurrent solitary skull metastatic lesion from follicular variant of papillary thyroid carcinoma, which was treated with preoperative arterial embolization and then surgical resection.

Background: The prognosis of patients with bone metastatic lesions from differentiated thyroid carcinoma is poor. Palliative treatment options include surgical resection, radioiodine (RAI) therapy, and external irradiation. Although complete surgical resection is desirable, this strategy can be complicated by the site and the vascularity of the lesion. Embolization is used to relieve symptoms and to prevent tumor growth. It is infrequently utilized as a preoperative modality.

Methods: We reviewed the patient’s medical record, angiographic findings, and intraoperative photographs and related reports in the literature.

Results: The patient presented with a skull metastatic lesion in 1993, treated with total thyroidectomy and 235 mCi of RAI (131I). A recurrent skull mass in 1996 was treated with 171 mCi of 131I, with partial response. After preoperative embolization, clinical and radiographic tumor enlargement was treated surgically, with no blood loss. The thyroglobulin level declined from 700 ng/dL preoperatively to 10 ng/dL.

Conclusion: Preoperative embolization of bone metastatic lesions of differentiated thyroid carcinoma may favorably affect prognosis by reducing surgical complications and allowing complete resection.

Abstract #48

Misleading Elevations of Urinary Free Cortisol Measurements in the Diagnostic Evaluation of Cushing’s Syndrome

Andrea Ferenczi, MD, Arsalan Sheikh, DO, Leonid Poretsky, MD, and Adrienne M. Fleckman, MD

Objective: To present discrepancies among urinary free cortisol (UFC) measurements by different methods, leading to diagnostic difficulties in two patients with suspected Cushing’s syndrome.

Background: UFC is considered the most reliable index of adrenal hyperfunction. Nevertheless, interfering substances sometimes make interpretation of this measurement difficult.

Methods: We report an overview of laboratory data and review the pertinent literature.

Results: The following results illustrate the potential discrepancies in UFC 24-hour measurements determined by various methods—in this instance, high-performance liquid chromatography (HPLC) and mass spectrometry (MS):

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<td>Lab 1*</td>
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<td>A: 1</td>
<td>162.3</td>
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<td>2</td>
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*5-50 µg/24 h.
†5-55 µg/24 h.
‡2-9-34 µg/24 h.

Conclusions: If the 24-hour UFC level is high, without adequate correlation with the clinical picture or the rest of the biochemical data, the test should be repeated in a different laboratory or by using a different assay before a time-consuming and costly investigation is undertaken or an incorrect diagnosis is reached.
Abstract #49

Primary Hyperparathyroidism and Nonmedullary Thyroid Cancer

Rafael Bravo-Vera, MD, Leonid Poretsky, MD, and Adrienne M. Fleckman, MD

Objective: To present two cases of primary hyperparathyroidism and coexisting nonmedullary thyroid carcinoma.

Background: Primary hyperparathyroidism and medullary thyroid cancer are recognized features of multiple endocrine neoplasia type 2. Nevertheless, the association of primary hyperparathyroidism and follicular cell-derived thyroid carcinomas has also been reported. The nature of this association is unclear, but several hypotheses exist.

Methods: The findings in two patients are summarized, and a literature review was conducted.

Results: In a 50-year-old woman, papillary thyroid cancer was diagnosed during preoperative evaluation for a parathyroid adenoma. In a second case, a 39-year-old man with primary hyperparathyroidism, follicular thyroid cancer was diagnosed during surgical intervention for a single parathyroid adenoma.

Conclusion: In light of the possibility of an association between nonmedullary thyroid cancer and primary hyperparathyroidism, careful preoperative and intraoperative thyroid evaluations are important in patients undergoing a parathyroid surgical procedure.

Abstract #50

Pheochromocytoma Manifesting as Bilateral Varicoceles: A Case Report

Jennifer Wojtowicz, DO, Chris Ng, MD, and Christian E. Nasr, MD, FACE

Objective: To report a case of adrenal pheochromocytoma manifesting as bilateral varicoceles.

Methods: We present a clinical case together with laboratory, imaging, and histologic data.

Results: A 60-year-old woman presented with a subacute course of psychosis and dementia. Admitted to a county mental hospital, she was resistant to most antipsychotic therapies. She later had a seizure and consequent aspiration pneumonia—which precipitated thyroid storm. Her clinical picture was consistent with prior case reports of Hashimoto’s encephalopathy, and her psychosis completely resolved with corticosteroid therapy.

Conclusion: Hashimoto’s encephalopathy is a rare, life-threatening, treatable condition, which is important to recognize because of its response to corticosteroid therapy. Because the mechanism of this clinical entity is uncertain, the term “autoimmune thyroid disease-associated encephalopathy” is more appropriate.
Abstract #52

Calciphylaxis Without Renal Failure in the Setting of Hyperparathyroidism

Pat Audia, MD, Arsalan Sheikh, DO, Aaron Walfish, MD, Richard Amerling, MD, Ya Ju Chang, MD, and Adrienne M. Fleckman, MD

Objective: To report a case of calciphylaxis without renal failure in the setting of hyperparathyroidism.

Methods: We present the history, physical findings, results of laboratory studies, and pathology data in our patient and review the associated literature.

Results: A 50-year-old woman with hypertension and diabetes had been admitted 1 year earlier because of painful indurated lesions on her right medial thigh. A punch biopsy showed findings suggestive of calciphylaxis. Hepatitis B, hepatitis C, and hypercoagulation work-up (antinuclear, anti-Sm, and antiphospholipid antibodies; protein C and S; and antithrombin III) was negative, with the exception of a mildly increased homocysteine level of 17.6 µmol/L (normal, 5 to 15). She now presented with a necrotic ulcer of the left foot. Laboratory findings were as follows: creatinine clearance, 52 mL/min; bioiintact parathyroid hormone, 349 pg/mL (normal, 6 to 40); total calcium, 9.6 mg/dL; ionized calcium, 5.90 mg/dL (normal, 4.60 to 5.50); 25-hydroxyvitamin D, < 7 ng/mL (normal, 10 to 68); and 1,25-dihydroxyvitamin D, 26 pg/mL (normal, 15 to 60). She underwent left first toe amputation, and the pathology report revealed dystrophic calcification and focal medial calciification of blood vessels, consistent with calciphylaxis.

Conclusion: Our case illustrates a middle-aged woman without end-stage renal disease or chronic renal failure who had two episodes of pathologically diagnosed calciphylaxis. We found only eight previously reported cases of calciphylaxis associated with primary hyperparathyroidism in the absence of end-stage renal disease.

Abstract #53

False-Positive 131I Whole-Body Scan Due to a Lactating Breast in a Patient With Thyroid Cancer

Puneet S. Arora, MD, and Manfred Blum, MD

Case Report: A 30-year-old woman with a history of total thyroidectomy and radioactive therapy for papillary thyroid carcinoma was referred to us after a routine withdrawal 131I whole-body scan that showed uptake in the right side of the chest. She had undergone childbirth 1 year previously and had been breast-feeding exclusively from the right breast until 1 month before the current assessment. On examination, the right breast was still lactating. A repeated 131I scan showed the uptake to be in the right breast. Positional modifications of the right breast showed corresponding changes in the location of the uptake. Subsequent scans after cessation of milk expression were negative.

Conclusion: We conclude that this is a case of a false-positive 131I whole-body scan due to a lactating breast. On searching the literature, we found 2 case reports and a resultant retrospective analysis from Saudi Arabia involving 20 scans done within 1 week of cessation of breast-feeding that confirm this phenomenon (1). We recommend that lactation attributable to any cause be excluded before performance of such scanning studies.

Reference


Abstract #54

Limitation of Imaging Studies in the Localization of Pheochromocytoma

Aleksandra Kraeher, MD, Mohsen Eleddrisi, MD, Steven Lieberman, MD, and Andrzei Kudelka, MD

Objective: To report a case of pheochromocytoma that led initially to the inaccurate diagnosis of localized recurrent tumor in the sympathetic ganglia but on further careful evaluation was found to be metastatic disease in the lumbar vertebrae.

Methods: We present a case report, including clinical, laboratory, and radiologic findings. The data are presented in chronologic order, reflecting the results of various investigations conducted during the stages of evaluation.

Results: On initial presentation, a 55-year-old woman was diagnosed with pheochromocytoma on the basis of clinical manifestations and high urinary levels of metanephrines and catecholamines. Magnetic resonance imaging (MRI) and 131I metaiodobenzyguanidine (MIBG) scanning revealed a 3-cm left adrenal mass, for which adrenalectomy was performed. The patient remained free of disease for 4 years, after which she presented with manifestations of recurrence in conjunction with back pain. Urinary catecholamines and metanephrines were substantially increased, and 131I MIBG scanning showed increased uptake in multiple areas along the midline, suggestive of tumor recurrence in the sympathetic ganglia. MRI of the spine, however, revealed numerous lesions involving the lumbar vertebrae, consistent with metastatic disease; these bony lesions corresponded to the areas of increased uptake on the 131I MIBG scan.

Conclusion: 131I MIBG scanning can falsely lead to the diagnosis of pheochromocytoma involving the sympathetic ganglia in patients who, in fact, have metastatic bone disease. Imaging studies performed during the assessment of patients with pheochromocytoma should be interpreted with caution and in the context of careful clinical evaluation.
Abstract #55

Successful Treatment of Sulfonylurea-Induced Prolonged Hypoglycemia With the Use of Octreotide

Priya Chinnappa, MD, Mario Skugor, MD, and Elias S. Siraj, MD

Introduction: Sulfonylurea-induced hypoglycemia is a common problem that, in most circumstances, is easily managed by using the different forms of intravenously administered dextrose. On rare occasions, patients may not tolerate continuous intravenous fluid infusion; therefore, adequate management of severe and prolonged hypoglycemic episodes with use of dextrose solutions may be impossible. Even though octreotide is a known inhibitor of pancreatic insulin secretion, only a few isolated cases of its use in sulfonylurea-induced hypoglycemia have been reported.

Objective: To demonstrate the successful use of octreotide in the treatment of sulfonylurea-induced hypoglycemia.

Methods: Two case reports of patients with sulfonylurea-induced hypoglycemia, along with the pertinent laboratory data, the management strategy, and the patient’s responses, are provided. In addition, the published literature on the use of octreotide in the treatment of sulfonylurea-induced hypoglycemia was reviewed.

Results: Case 1: A 57-year-old woman with type 2 diabetes was admitted to the hospital with exacerbation of heart failure and acute renal failure. She was taking glimepiride, 4 mg daily. At the time of admission, the patient had a blood glucose level of 23 mg/dL. Despite treatment with 50% dextrose, she continued to have recurrent hypoglycemic episodes for almost 24 hours and required 11 ampules of 50% dextrose. Continuous intravenous infusion of dextrose was not an option because she had profound fluid overload. Subcutaneous administration of octreotide was begun at a dosage of 50 µg every 8 hours. The patient required 2 additional ampules of 50% dextrose after the initiation of octreotide therapy. The blood glucose concentration then gradually increased and reached 350 mg/dL. Therapy was discontinued after four injections.

Case 2: A 77-year-old woman without diabetes who had squamous cell carcinoma of the tongue was admitted to the hospital after an endoscopic surgical procedure. She was inadvertently given a 10-mg dose of glipizide, which precipitated prolonged hypoglycemia (lasting more than 24 hours). She required 8 ampules of 50% dextrose before treatment was begun with octreotide at 50 µg subcutaneously every 8 hours. The patient had only one episode of hypoglycemia after the initiation of octreotide therapy. The blood glucose concentration gradually increased to 126 mg/dL, and octreotide therapy was discontinued after four injections.

Conclusion: Our cases demonstrate that octreotide, a synthetic somatostatin analogue, is an effective agent for the treatment of sulfonylurea-induced prolonged hypoglycemia.

Abstract #56

Nurse Management of Diabetes Mellitus in Low-Income Population (Project Dulce) Improved Clinical Outcomes and Standards of Care

Athena Philis-Tsimikas, MD, Chris Walker, MPH, Aaron Neinstein, and Todd Gilmer, PhD

Objective: To measure diabetes-related outcomes in a group of medically indigent adults using the Project Dulce (PD) nurse-managed program.

Methods: For a 1-year period, we compared 213 patients in the PD group and 185 matched patients in the county health system who used medical services during the year before the availability of PD.

Results: Patients in the PD group demonstrated the following improvement: hemoglobin A1c (HbA1c), −0.945%; systolic blood pressure, −6.007 mm Hg; diastolic blood pressure, −7.896 mm Hg; cholesterol, −27.109 mg/dL; and low-density lipoprotein cholesterol, −17.327 mg/dL. Furthermore, utilization data for the 1-year study period demonstrated more frequent testing by the PD group than by the county health system group for the following factors: HbA1c (2.42 versus 1.64); lipids (92% versus 17%); and eye examinations (81% versus 28%).

Conclusion: We conclude that the PD management program improved the ongoing care and the clinical outcomes in patients with diabetes.

Abstract #57

Glycemic Management Protocol Based on Knowledge of Previous Insulin Sensitivity in Adult Patients Undergoing a Heart Surgical Procedure

Robert W. Kirby, MD, FACE, Gunjan Gandhi, MD, Monica Hall, BSN, and Diane Burge, BSN

Objective: To evaluate a protocol for glycemic management incorporating insulin sensitivity in the treatment of postoperative heart patients in the setting of a community hospital.

Methods: A protocol for insulin infusion is an option for the physician of record. Serum glucose values of 20 postoperative heart patients will be compared with glucose values in a second group of 20 consecutive patients treated with the new protocol.

Results: Data collection is continuing. The results will be presented.

Conclusion: We hope to improve the quality of care by demonstrating the value of an insulin dosing protocol based on the degree of the patient’s previous insulin sensitivity. Although similar protocols are in use, little information is available about their applicability and effective-
ness in the setting of a community hospital. If we can determine their value in this setting, interest may prevail in wider adoption of these protocols or the principles on which they are designed, providing opportunities for improved care by reducing costs and minimizing morbidity and mortality.

**Abstract #58**

Symptomatic Macroprolactinemia—Believe It or Not?

Israel B. Orija, MD, Manjula K. Gupta, PhD, and Charles Faiman, MD, MACE

**Case Report:** Macroprolactinemia, a condition in which hyperprolactinemia is associated with circulating large molecular forms of prolactin (PRL), is usually asymptomatic. We describe a 25-year-old woman with symptomatic hyperprolactinemia-macroprolactinemia and raise the question of optimal diagnostic evaluation and management of such cases. The patient presented to her gynecologist with prolonged amenorrhea and galactorrhea, after the birth of her fifth child. Serum PRL was 65 ng/mL (repeated test, 80 ng/mL), and thyrotropin was 3.5 µIU/mL. Magnetic resonance imaging (MRI) of the pituitary showed a questionable lucent area (2 by 3 mm) and a partially empty sella. Administration of bromocriptine, 2.5 mg twice a day for 3 months, resulted in a diminution of the PRL level to 18 ng/mL, and a successful pregnancy ensued. Review at our Endocrine Clinic at 6 months’ gestation revealed a PRL of 124 ng/mL and thyrotropin of 2.5 µIU/mL. Throughout the pregnancy, PRL levels stabilized between 124 and 147 ng/mL. After delivery, amenorrhea and galactorrhea redeveloped, and bromocriptine therapy was restarted. Regular menses resumed, but mild galactorrhea persisted. Findings on a repeated pituitary MRI were unchanged. PRL levels during bromocriptine therapy ranged from 63 to 238 ng/mL. Nonetheless, she became pregnant and delivered, after which menses resumed and were regular. A PRL level of 191 ng/mL, once again, did not respond to administration of bromocriptine. Macroprolactinemia was documented by polyethylene glycol (PEG) precipitation. Values for PRL of 159 and 164 ng/mL were 33 and 39 ng/mL, respectively, in the PEG-treated serum supernatants. The patient of 159 and 164 ng/mL were 33 and 39 ng/mL, respectively, in the PEG-treated serum supernatants. The patient

Conclusion: Macroprolactinemia is usually found in asymptomatic patients with hyperprolactinemia, but there are reports of its coexistence with prolactinoma and other causes of hyperprolactinemia. In our experience, most patients with macroprolactinemia are asymptomatic; however, supernatant PRL values are usually in the normal range. It is plausible that our patient had the hyperprolactinemia syndrome associated with macroprolactinemia and a pituitary microadenoma. Such exceptional cases warrant additional attention.

**Abstract #59**

Telomerase Activity in Benign and Malignant Thyroid Lesions

Josefina Mora, Francisco Alvarez, MS, Juan Ybarra, Enrique Lerna, Jose Rodrigues-Espinosa, and Alberto de Leiva, MD, PhD

Objective: To measure the telomerase activity in a total of 30 thyroid tissue specimens (5 follicular carcinomas, 17 papillary carcinomas, and 8 follicular adenomas) and 30 fine-needle aspiration (FNA) samples (26 benign lesions including 1 chronic thyroiditis, 1 normal, and 3 insufficient material).

Methods: Telomerase activity was assayed by the telomerase polymerase chain reaction enzyme-linked immunosorbent assay, based on the original TRAP method.

Results: In tissue samples, positive telomerase activity was detected in 5 of 5 follicular carcinomas (100%), in 7 of 17 papillary carcinomas (41%), and in 1 of 8 follicular adenomas (12.5%). In contrast in benign FNA lesions, telomerase activity was detected only in the chronic thyroiditis sample.

Conclusions: Telomerase activity in follicular carcinoma may correlate with its unfavorable prognosis. In papillary carcinomas, detection of telomerase seems to be most frequently associated with advanced stages. In FNA samples with no lymphoid infiltrate, a positive telomerase result could contribute to a cytologic diagnosis in those samples with suspicious results or insufficient material.

**Abstract #60**

PTEN Promoter Methylation Is Specifically Detected in Differentiated Thyroid Cancers

Francisco Alvarez, MS, Helena Bussaglia, PhD, Monica Vilar, Juan Ybarra, Alberto de Leiva, MD, PhD, and Xavier Matias-Guiu

Objective: To elucidate the role of PTEN promoter epigenetic changes (methylation) in thyroid cancer.

Methods: We tested 50 papillary carcinomas, 9 follicular carcinomas, and 8 follicular adenomas. After sodium bisulfite treatment, hypermethylated islands are recognized by specific polymerase chain reaction amplification with use of three different sets of primers, based on the promoter PTEN pseudogene homology.

Results: PTEN promoter methylation was detected in 23 of 50 papillary carcinomas (46%), in 9 of 9 follicular carcinomas (100%), and in 6 of 8 follicular adenomas (75%). To assess whether promoter methylation inhibits PTEN expression in these thyroid tumors, we performed an immunohistochemistry assay with use of anti-PTEN antibodies in paraffin-embedded tissue samples.
Conclusion: Our results in differentiated thyroid cancers demonstrate that the frequency of the PTEN promoter hypermethylation is higher than reported in other tumors; this finding suggests that it may be involved in tumorigenesis. Moreover, our results show that there is no interference with the promoter of the PTEN pseudogene.

Abstract #61
A Rare Coincidence of TSH-oma and Thyroid Carcinoma

Neda Rasouli, MD, Behzad Molavi, MD, Lawson E. Glover, Jr., MD, FACE, and Fred Faas, MD

Objective: To report a rare coexistence of a pituitary adenoma and thyroid carcinoma.

Methods: Clinical and laboratory findings along with a review of the literature are presented.

Results: A 61-year-old man with central hyperthyroidism underwent a transsphenoidal surgical procedure followed by irradiation for a pituitary macroadenoma that secreted both thyrotropin (thyroid-stimulating hormone [TSH]) and somatotropin (growth hormone). Despite normal levels of thyroxine and insulin-like growth factor, the TSH concentration remained high postoperatively. Subsequently, a papillary carcinoma of the thyroid and several local recurrences developed. The abnormal pituitary feedback made the suppression of TSH challenging. Adjuvant medical therapy (octreotide) was used to maintain euthyroidism and control TSH secretion.

Conclusion: This combination of a pituitary adenoma and a papillary thyroid carcinoma may raise the possibility that TSH or growth hormone (or both) may be involved in tumorigenesis in the thyroid gland.

Abstract #62
Challenging Diagnosis of Adrenocorticotropin Insensitivity in a Patient With Allgrove’s Syndrome

Marzieh Salehi, MD, and Leonid Poretsky, MD

Background: Adrenal insufficiency due to adrenocorticotropic (ACTH) insensitivity, achalasia, and alacrima are the main features of Allgrove’s syndrome. ACTH insensitivity may manifest at a variable time after birth. Diagnosis and appropriate treatment of ACTH insensitivity are important. The results of a high-dose ACTH stimulation test can be misleadingly normal in affected patients.

Case Report: During an evaluation for ACTH insensitivity, a patient with Allgrove’s syndrome had a normal response to a high-dose (250 µg) ACTH stimulation test (HDT) but an abnormal response to a low-dose (1 µg) ACTH stimulation test (LDT).

Date (mo/yr) | Cortisol*: | ACTH‡:
--- | --- | ---
| 0/15/30/60 min | 0 min |
| 3/00 | 20/.../.../... | 37 |
| 3/01‡ | 5/.../.../29 | ... |
| 4/02‡ | 3/.../.../23 | 16 |
| 6/02§ | 10/14/8/... | ... |
| 8/02§ | 7/17/12/10 | 29 |
| 10/02§ | 4/14/11/8 | ... |
| 10/30/02/ | 7/17/16/12 | 28 |
| 10/30/02‡ | 13.7/22.7/24.8/18.8 | 28 |

*Serum cortisol (µg/dL), tested in AM.
‡Serum ACTH (pg/mL).
§HDT.
¶LDT.
¶On October 30, 2002, LDT in a normal control subject.

Conclusion: A low-dose stimulation test may have a role in diagnosing partial ACTH insensitivity.

Abstract #63
Propylthiouracil-Induced Vasculitis

Mamta S. Shah, MD, Robert A. Schwartz, MD, and Maya P. Raghuwanshi, MD, FACE

We describe a 28-year-old African American woman with Graves’ disease who had been taking propylthiouracil (PTU), 300 mg/day, for 20 months and in whom fever and rash developed. She was noted to have multiple tender, palpable, purpuric lesions on her lower extremities, some with ulceration and serosanguineous discharge. Serologic studies showed the following high titers: cytoplasmic-staining antineutrophil cytoplasmic autoantibodies (cANCA) 1:1,280 (normal, <1:40), perinuclear-staining ANCA (pANCA) 1:160 (normal, <1:40), and anticardiolipin IgM titer 130 MPL (normal, <5.9). Rheumatoid factor, lupus anticoagulant, antinuclear antibodies, and hepatitis panel were negative, and complement levels, chest radiography, and urinalysis showed normal findings. A skin biopsy specimen demonstrated leukocytoclastic vasculitis. On discontinuation of PTU, the skin lesions spontaneously resolved during a period of 3 weeks. Antibody titers 6 months later showed that cANCA had decreased to 1:320, pANCA became negative, and anticardiolipin IgM titer decreased to 7 MPL. Although ANCA positivity has been described in 60% of patients with Graves’ disease being treated with antithyroid drugs, only 20+ cases of thionamide-induced vasculitis have
been reported. In our case and in the previous literature, symptoms decreased with PTU withdrawal, and glucocorticoids were rarely necessary. Because PTU is commonly prescribed for control of thyrotoxicosis, PTU-induced vasculitis must be considered in patients presenting with fever, arthralgias, rash, hemoptysis, hematuria, or some combination of these findings. PTU-induced vasculitis is amenable to treatment, but without recognition, it can cause substantial morbidity.

Abstract #64

A Case of Hyperparathyroid-Induced Calciphylaxis

Lisa C. Moore, MD, and Pejman Cohan, MD

Objectives: To report a case of severe hyperparathyroid-induced calciphylaxis and to review the literature detailing this rare condition.

Methods: We describe the history, treatment strategy, and outcome in our patient and review the literature.

Results: In a 37-year-old woman with a history of end-stage renal disease attributable to reflux nephropathy and with secondary hyperparathyroidism, multiple necrotizing soft tissue infections developed involving the buttocks and lower extremities. The patient was initially treated with dressing changes, parathyroidectomy, vancomycin, and phosphate binders without appreciable improvement. After multiple surgical débridements, skin-grafting procedures, and administration of long-term broad-spectrum antibiotics, the patient’s condition improved, and dismissal from the hospital was possible.

Conclusion: Calciphylaxis is a rare disorder resulting from hyperparathyroidism. It is associated with high morbidity and mortality and best treated with a multidisciplinary approach.

Abstract #65

The Natural History of Insulin Secretion in Patients With Type 2 Diabetes

Farhad Zangeneh, MD, Puneet S. Arora, MD, Peter James Dyck, MD, Claudia C. Powell, MS, Ann L. Oberg, PhD, and Robert A. Rizza, MD

Objective: To gain insight into the natural history of insulin secretion in type 2 diabetes mellitus.

Methods: We measured basal fasting C-peptide (CP) and 6-minute post-glucagon-stimulated C-peptide (CPS) concentrations in study subjects every 2 years. As part of the population-based Rochester Diabetic Neuropathy Study, 317 patients with diabetes participated in longitudinal follow-up (mean duration, 7.1 years; range, 1.9 to 16.4). At entry, 56 subjects with a basal CP <0.17 nmol/L and a 6-minute CPS increment (CPI) <0.07 nmol/L were classified as having type 1 diabetes. Of these, 10 subjects subsequently had at least one basal CP >0.17 nmol/L or CPI >0.07 nmol/L. Of the remaining 261 subjects who were classified as having type 2 diabetes, 126 (73 men and 53 women) had at least 6 years of follow-up and were included in the study (median, 12 years; range, 6 to 15).

Results: In study subjects, CP and CPS averaged 0.58 ± 0.38 (mean ± standard deviation) and 1.06 ± 0.68 nmol/L, respectively, at the beginning of the study and decreased (P<0.001) to 0.41 ± 0.33 and 0.71 ± 0.58 nmol/L by the end of the study. The median rate of decline (slope) over time of the CP, CPS, and CPI was −0.006, −0.01, and −0.006 nmol/L per year, respectively (P<0.001), with considerable variability noted among individual study subjects. Furthermore, 33% of the study subjects had CP slopes ≥0. Hemoglobin A1c also decreased (P<0.001) from 10.0 ± 2.9% to 9.1 ± 1.8%, whereas body mass index (29.3 ± 5.8 kg/m² to 30 ± 6.7 kg/m²) and creatinine (0.99 ± 0.20 mg/dL to 1.22 ± 0.38 mg/dL) changed minimally. Of interest, 18 study subjects had CP or CPI less than 0.17 or 0.07 nmol/L on at least one occasion. Three of the 16 patients who had a subsequent follow-up visit had CP or CPI values greater than these thresholds.

Conclusion: We conclude that insulin secretion declines over time in type 2 diabetes. The rate of decline, however, is highly variable, and the decrease does not occur in all patients. These data also point out the errors that are likely to result when a single measurement of fasting CP and CPS is used to distinguish between type 1 and type 2 diabetes.

Abstract #66

Bone Pain With Scintigraphic Evidence Suggestive of Widespread Osseous Metastatic Disease—Do Not Forget Osteomalacia

Farhad Zangeneh, MD, and Bryan McIver, MB, ChB, PhD, MRCP(UK)

Background: Vitamin D deficiency due to gastrointestinal disease has now become one of the major causes of osteomalacia in the United States, accounting for almost two-thirds of all cases. We describe a 60-year-old man with a history of debilitating bone pain, colon cancer, and osteoporosis refractory to combination therapy, who presented with scintigraphic evidence suggestive of widespread osseous metastatic disease.

Methods: We present a case report, laboratory results, and radiologic findings along with a review of the literature.

Results: A 60-year-old man with a 2-year history of sigmoid resection for stage T3 N0 MX adenocarcinoma of the sigmoid colon presented with progressive skeletal pain, an increase in carcinoembryonic antigen (CEA) levels, and multiple “cannonball” foci of uptake on a whole-body bone scan. He complained of a 12-year history of progressive musculoskeletal pain in the upper and lower extremities, muscle weakness, difficulty walking, and a
waddling gait. He required crutches or a wheelchair for ambulation. He had undergone a jejunoileal bypass for obesity 23 years previously, which had resulted in weight reduction of 63.5 kg (40%) during a 2-year period. Development of nodules on the dorsum of his hands and skeletal pain led to the diagnosis of seronegative rheumatoid arthritis a decade later. Aggressive treatment with nonsteroidal anti-inflammatory drugs in combination with local and systemic corticosteroids led to interstitial nephritis and mild renal insufficiency. Bilateral hip fractures (subsequent to falls), numerous rib fractures, and a 12-cm loss of vertical height had warranted bone mineral density (BMD) studies. The lumbar spine T-score was −4.0, and osteoporosis was diagnosed. Treatment was commenced with bisphosphonates, calcitriol, calcium (1,500 mg), and vitamin D (400 IU). Subsequently, testosterone replacement therapy was initiated when repeated BMD studies showed further decline.

On examination, the patient was frail and weak. His gait was unstable, he had diminished muscle strength in the proximal muscle groups of the upper and lower extremities, and he demonstrated tenderness to palpation of the pelvis and lower extremities. Laboratory findings included the following (normal ranges shown parenthetically): calcium, 7.6 mg/dL (8.9 to 10.1); ionized calcium, 4.52 mg/dL (4.65 to 5.30); alkaline phosphatase, 1,593 U/L (98 to 251) all of which was of skeletal origin; parathyroid hormone, 29 pmol/L (1 to 5.2); phosphorus, 3 mg/dL (2.5 to 4.5); 25-hydroxyvitamin D, <5 ng/mL (8 to 38); 1,25-dihydroxyvitamin D, <10 pg/mL (22 to 67); creatinine, 2.2 mg/dL (0.9 to 1.4); CEA, 11 ng/mL (0 to 5); and 24-hour urinary calcium, 17 mg (25 to 300). Deficiencies of other fat-soluble vitamins were also present. A skeletal survey revealed diffuse osteopenia, cortical thinning with pseudofractures, and several bone fractures of various ages. Skeletal scintigraphy confirmed the previous findings.

The patient was diagnosed with severe vitamin D as well as other fat-soluble vitamin deficiencies due to chronic malabsorption attributable to complications of the ileojejunal bypass surgical procedure. The antiresorptive therapy and testosterone replacement were discontinued. He was treated appropriately for multiple fat-soluble vitamin deficiencies. Further evaluation revealed no evidence of recurrence of the colon cancer, and he underwent a successful takedown reversal procedure of the ileojejunal bypass.

Conclusion: Osteomalacia can occur as a complication of intestinal malabsorption. Reduced BMD with thinning of the cortex is the most common finding, but it is very nonspecific. Bone density measurements will not distinguish osteoporosis from secondary hyperparathyroidism due to osteomalacia. 25-Hydroxyvitamin D measurements will confirm the diagnosis and guide the therapeutic strategies. The diversity of the manifestations, however, can be misleading and can result in delayed diagnosis or implementation of a thorough investigation for possible underlying neoplasms.

Abstract #68

Quantitative Effect of Improving Glycemic Control on Lipids and Lipoproteins in Type 2 Diabetes Mellitus: Is It Predictable?

A. M. Wägner, MD, J. Ordóñez-Llanos, R. Bonet, M. Hernández, M. J. Barahona, Alberito de Leiva, MD, PhD, and A. Pérez

Background and Aims: Data on quantitative prediction of lipid changes with glycemic improvement in type 2 diabetes are scarce. The aim of this study was to quantify the predictive value of reduction of hemoglobin A1c (HbA1c) on lipid and lipoprotein concentrations in patients with type 2 diabetes.

Material and Methods: The study group consisted of 73 subjects with type 2 diabetes. The group was characterized as follows: 44% women, mean age 60.9 ± 10.7 years, mean body mass index (BMI) 25.6 kg/m² (range, 18.4 to 40.4), mean diabetes duration 6.0 years (range, 0 to 40), and mean HbA1c 9.9% (range, 6.2 to 16.0%). Total triglycerides and cholesterol, low-density lipoprotein (LDL) cholesterol, high-density lipoprotein (HDL) cholesterol, apolipoprotein A-I (apo A-I), and apolipoprotein B (apo B) were measured at baseline and after improvement of glycemic control (reduction in HbA1c of at least 1% and final HbA1c ≤8.0%) with use of different treatments. Variables were compared by using the Student t test for paired data and the Wilcoxon test. In order to predict changes in lipid variables with improved glycemic control, bivariate and multiple correlations were performed. Using the regression equations obtained for the best predictions, we calculated the changes expected for a 1% decrease in HbA1c.

Results: After a median follow-up of 3 months, HbA1c decreased to 6.7% (range, 3.8 to 8.0%), whereas BMI increased to 26.5 kg/m² (range, 20.8 to 38.5) (P = 0.005). Apo A-I (1.24 g/L [range, 0.64 to 1.93] versus 1.39 g/L [range, 0.80 to 2.01]) and HDL cholesterol (1.12 mmol/L [range, 0.48 to 2.68] versus 1.32 mmol/L [range, 0.67 to 3.19]) increased (P<0.0005), whereas triglycerides (1.55 mmol/L [range, 0.59 to 5.47] versus 1.25 mmol/L [range, 0.36 to 6.69]; P = 0.002) and apo B (1.06 ± 0.27 g/L versus 1.00 ± 0.23 g/L; P = 0.01) decreased. Only HDL cholesterol (r = −0.358; P = 0.001) and apo A-I (r = −0.355; P = 0.003) correlated significantly with the decrease in HbA1c. After correction for potential confounding variables (age, gender, and change in BMI), for each percentage-point reduction in HbA1c, there was an increase in HDL cholesterol and apo A-I of 0.007 mmol/L and 0.087 g/L, respectively.

Conclusions: HDL cholesterol and apo A-I are the variables most closely associated with reduction in HbA1c. Quantitative estimation allows a prediction of the potential benefit of improving glycemic control on lipid components.
Abstract #69

Osteitis Fibrosa Cystica, Brown Tumors, and “Salt and Pepper” Skull: A Case of Advanced-Stage Primary Hyperparathyroidism—Plain Films and a Literature Review

Matthew R. Skelton, MD, Lisa Chow, MD, and Diana S. Dean, MD

Objectives: To highlight the x-ray findings in primary hyperparathyroidism and review the pathophysiologic features of osteitis fibrosa cystica and brown tumors.

Methods: A case report and overview of the associated literature are presented.

Results: An 84-year-old woman was admitted to the medical service with confusion and diffuse aches. Initial laboratory assessment included a serum calcium concentration of 13.2 mg/dL, creatinine of 1.9 mg/dL, and parathyroid hormone of 110 pmol/dL. A bone survey revealed multiple brown tumors in the long bones; x-ray films of the hands showed acro-osteolysis and osteitis fibrosa cystica. Skull radiography displayed the classic “salt and pepper” changes. An 8.4-g parathyroid adenoma was resected.

Conclusions: Osteitis fibrosa cystica, brown tumors, “salt and pepper” skull, and acro-osteolysis all involve a similar pathophysiologic process, reflecting a complex interaction among osteoclasts, osteoblasts, the fibrovascular bone tissue, and inflammatory cells.

Abstract #70

Supervised Autonomy With Diabetes Self-Management by Using Telemedicine Allows Better Glycemic Control in Patients With Diabetes

M. Rigla, E. Brugués, E. Gómez, E. Hernando, A. García, J. Perdices, V. Torralba, and Alberto de Leiva, MD, PhD

Background: The Multi-Access Services for Diabetes Management (M2DM) system, funded by the European Commission, is an integrated platform of information technologies based on Web servers. It was designed to provide medical assistance to patients with diabetes and is now under clinical evaluation. By using a modem, the patient can send self-monitored data (glucose values, insulin doses, diet changes, and exercise data) stored in a reflectometer. The physician reviews the monitoring data and has the opportunity to propose further treatment adjustments. Furthermore, the system is provided by an e-mail service.

Objective: To evaluate the effect of using the M2DM system on glycemic control in a group of insulin-treated patients.

Patients and Methods: Twenty-six patients with type 1 diabetes and 4 with type 2 diabetes were randomly assigned to continue their planned follow-up visits as usual or to use, in addition, the M2DM system during a 12-month period. Four patients chose to discontinue participation in the study and have been excluded from the analysis.

Results: Baseline characteristics did not differ between the M2DM group (N = 14 [8 men and 6 women], mean age 36 ± 14 years, mean body mass index [BMI] 22.7 ± 1.9 kg/m², mean age at diagnosis of diabetes 24.5 ± 9 years, 50% treated with insulin pump, and mean hemoglobin A1c [HbA1c] 8.3 ± 1.6%) and the control group (N = 12 [4 men and 8 women], mean age 47 ± 2 years, mean BMI 23.0 ± 2.2 kg/m², mean age at diagnosis of diabetes 24.5 ± 12 years, 50% treated with insulin pump, and mean HbA1c 7.5 ± 1.8%). During the study period, M2DM patients sent a median of 312 glucose values (range, 128 to 548), 264 insulin values (range, 36 to 440), and 3 e-mails (range, 0 to 14). Interim analysis performed at a median follow-up of 153 days (range, 55 to 244) showed a significant decrease in HbA1c values in the M2DM group (7.7 ± 1.6%; P = 0.004), which was not observed in the control group (7.4 ± 1.5%; no significant difference).

Conclusion: Preliminary results suggest that the additional use of the M2DM system improves glycemic control relative to conventionally scheduled follow-up visits in insulin-treated patients with diabetes.

Abstract #71

Bone Mineral Density in Young Normal Subjects and in Patients With Type 2 Diabetes in India

Shailesh U. Pitale, MD, DNB, DAB, Ketan C. Pande, MS, DNB, MCh, and E. Veeraji, MBBS, DNB

Objectives: A deficiency of insulin causing decreased stimulation of insulin-like growth factor receptors and leading to low bone mineral density (BMD) in type 1 diabetes mellitus has been noted. Whether hampered action of insulin due to insulin resistance in type 2 diabetes mellitus has a similar effect on BMD is not well documented. Hence, we studied the BMD in young normal subjects and in patients with type 2 diabetes in India.

Methods: As an ongoing project, digital x-ray radiogrammetry (Pronosco X-posure System V.2) was used to determine BMD of the metacarpals in 262 normal subjects (152 premenopausal women and 110 men younger than 50 years) and in 30 patients with type 2 diabetes (12 premenopausal women and 18 men younger than 50 years).

Results: The mean values were as follows: in the normal group—women 0.565 ± 0.05 g/cm², men 0.60 ± 0.05 g/cm²; in the group with diabetes—women 0.576 ± 0.04 g/cm², men 0.581 ± 0.048 g/cm². Osteopenia was found in 21 women (13.8%) and 18 men (16.4%) in the normal
group and in 2 women (16.7%) and 2 men (11.1%) in the group with diabetes.

**Conclusions:** The BMD in the population in India is low in comparison with that reported for the western population. No significant difference in BMD was noted between normal subjects and patients with type 2 diabetes. The reasons for this finding could be that (1) the sample size was small (ongoing study); (2) the hyperinsulinemia may compensate for the insulin resistance seen at the insulin-like growth factor receptor level; and (3) the duration of diabetes may be briefer in comparison with the previous BMD studies in patients with type 1 diabetes mellitus.

**Abstract #72**

**A Rare, Sporadic Case of Multiple Endocrine Neoplasia Type 1**

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**Objectives:** To present a detailed assessment of a patient with a rare case of multiple endocrine neoplasia type 1 (MEN 1A) and review the current literature.

**Methods:** A case presentation and findings on review of the pertinent literature are provided.

**Results:** A 40-year-old woman with a history of hyperparathyroidism presented with acute pancreatitis, rapid weight gain, amenorrhea, hyperglycemia, and hypertension. Further evaluation with abdominal computed tomography revealed a mass at the tail of the pancreas and an adrenal tumor. Hormonal evaluation confirmed the presence of a cortisol-producing adrenal adenoma. Although she had no family history of MEN, she had a constellation of endocrine tumors consistent with a diagnosis of MEN 1A. The details of her manifestations, biochemical and radiographic features, and treatment, in addition to a review of the current literature, supported the diagnosis of MEN 1A.

**Conclusion:** MEN 1A may manifest sporadically, and even though neoplasms of the parathyroids, anterior pituitary, and pancreatic islet cells are commonly involved, other tumors may be present—including adrenocortical adenoma, gastrinoma, and bronchial carcinoid tumor. Evaluation and management of patients with MEN 1 should be systematic, thorough, and detailed.

*Note: Abstracts 67 and 73 through 110 did not meet the publication deadline but will be available in the AACE 2003 Annual Meeting Syllabus.*