Resident Clinical Vignettes • Research Project Abstracts

Diabetes Canada/CSEM

VIRTUAL PROFESSIONAL CONFERENCE

November 22–26, 2021

2021

ORAL PRESENTATIONS

FRIDAY, NOVEMBER 26, 2021
2:00 PM – 3:30 PM ET

Moderator: Breay Paty, MD, FRCPC

2:00 pm • **INTRODUCTION**

BREAY PATY

2:05 pm • **PRESENTATIONS**

Alpelisib-Induced DKA and Successful Discontinuation of Insulin within Two Weeks of Resolution
WEI WANG, WESTERN UNIVERSITY

An Evaluation of Virtual Care for Gestational Diabetes using the Quadruple Aim Framework: Assessment of Patient and Provider Experience, Cost and Clinical Outcomes
ALEXA CLARKE, UNIVERSITY OF BRITISH COLUMBIA

Cardiac Metastases from a Follicular Variant of Papillary Thyroid Carcinoma Presenting as Acute Chest Pain in a 53-year old Male
CHARLOTTE ROSEN, MCGILL UNIVERSITY

First Report of Type II Diabetes Mellitus in an Adult with HMG-CoA Lyase Deficiency Associated with Hyperammonemia
VALERIE LAI, UNIVERSITY OF ALBERTA

2:30 pm • **DISCUSSION**

2:45 pm • **PRESENTATIONS**

Genetic Dissection of Primary Aldosteronism in a Patient with Multiple Endocrine Neoplasia Type 1 (MEN1) and Concomitant Ipsilateral Adrenocortical Carcinoma and Adenoma
STEFANIE PARISIEN-LA SALLE, UNIVERSITÉ DE MONTRÉAL

Insulin Reactions: What Do You Do When Your Treatment's the Trigger?
MADELINE EDWARDS, UNIVERSITY OF OTTAWA

Milk Alkali Syndrome as a Rare Cause of Severe Hypercalcemia in Twin Gestation
PAUL BEAMISH, UNIVERSITY OF OTTAWA

Specific medical therapies of excess steroidogenesis in a patient with primary bilateral mecronodular adrenal hyperplasia
ARIANE DE VILLERS-LACASSE, UNIVERSITÉ DE MONTRÉAL

3:15 pm • **DISCUSSION**

ABSTRACTS

115 • **JUMANA AMIR**
McGill University
Brown Tumors and Pathological Fracture in Primary Hyperparathyroidism: A Modern-Day 'Captain Charles Martell' Narrative

116 • **TAO LIU**
Queen's University
Sparsely Granulated Corticotroph Pituitary Macroadenoma Presenting with Pituitary Apoplexy and Remission of Cushing Disease

117 • **ISABELLA ALBANESE**
McGill University
Type 1 Diabetes: Evaluating a Transition Care Model from Pediatric to Adult Care

118 • **TEHMINA AHMAD**
University of Toronto
A Grave Situation: Cerebral Venous Thrombosis in the Setting of Graves' Disease

119 • **SARAH HAMIDI**
Université de Montréal
Takotsubo Cardiomyopathy Secondary to Lenvatinib Therapy for Advanced Differentiated Thyroid Cancer: A Case Report

120 • **SAMANTHA M. BRUZZESE**
Queen's University
Treatment-Induced Neuropathy of Diabetes — An Important Diagnosis in Acute Neuropathic Pain in Patients with Diabetes

121 • **JARED GALLOWAY**
University of Manitoba
Adherence to Guidelines for Inpatient Pharmacologic Management of Glucose Levels Using Written Compared to Electronic Orders

122 • **ISABELLA ALBANESE**
McGill University
Central Hypothyroidism and Adrenal Insufficiency Secondary to Retinoic Acid Therapy for Cutaneous T Cell Lymphoma

123 • **SAMUEL FINEBLIT**
University of Calgary
Metachronous Bilateral Adrenal Masses in a Patient with Familial Adenomatous Polyposis

124 • **SAMANTHA M. BRUZZESE**
Queen's University
Hyperactive Hypothalamo-pituitary-adrenocortical Axis in Patient with Generalized Seizure Disorder

125 • **ZACH RAIZMAN**
University of Calgary
Aldosterone and Cortisol Co-Secretion: A Case of Discordant and False Lateralization in Adrenal Vein Sampling

126 • **JENNIFER FU**
University of Toronto
Severe Hypocalcemia Following Enfortumab Vedotin Therapy for Metastatic Urothelial Carcinoma: A Case Report

127 • **FREDERICK WONG**
University of Toronto
A Rare Case of Ectopic Parathyroid Adenoma in the Mediastinum

128 • **NICOLE PUN**
University of Toronto
When Imaging Fails: A Case of Unexplained Hypopituitarism

129 • **JENNY GU**
University of Calgary
TB or Not TB: Hypopituitarism in a Patient with Pleural and Lymph Node Tuberculosis

130 • **HERNAN D. FRANCO LOPEZ**
Western University
ACTH Dependent Cushing's Syndrome in Metastatic Acinic Cell Carcinoma

131 • **CAROLINA SILVA**
University of British Columbia
Vitamin D Toxicity from an Unusual Source: A Case Report

132 • **ALVITA CHAN**
University of Toronto
Hypophosphatasia: A Rare Cause for Bone Loss

133 • **JEFFERY TONG**
Western University
Use of Androgen Deprivation Treatment in Deviant Sexual Behaviours — An Atypical Indication Creating a Dilemma for the Endocrinologist

134 • **RIGYA ARYA**
University of Toronto
Central Diabetes Insipidus and Partial Anterior Pituitary Dysfunction in Acute Myeloid Leukemia

135 • **RAN CHENG**
Université de Montréal
A Case of Long-term Remission of Acromegaly After Somatostatin Analog Withdrawal

136 • **RICHA PARIHAR**
McMaster University
A Rare Case of Ectopic Cushing's During Pregnancy

137 • **HANI RJOOB**
Western University
Paroxysmal Headache and High Blood Pressure Triggered by Micturition in a patient with Urinary Bladder Paraganglioma — Case Report

138 • **MELISSA GE**
University of Manitoba
Nephrogenic Diabetes Insipidus as the First Manifestation of Ectopic Adrenocorticotropic Hormone (ACTH) Syndrome

139 • **GURLEEN GILL**
University of Ottawa
Hyperglycemia-induced Chorea: A Short Case Series

140 • **SOLA MANSOUR**
University of Alberta
Post-Transplant Diabetes in Kidney Transplantation — A Single Center Study

141 • **KRISTINA PABEDINSKAS**
University of British Columbia
Severe Hypertriglyceridemia in a Child with New-Onset Type 1 Diabetes Presenting in Diabetic Ketoacidosis

142 • **ALEXA CLARK**
University of British Columbia
A Rare Case of an Adult Metastatic Sellar Region Atypical Teratoid/Rhabdoid Tumour Presenting with Vision Loss and Hypopituitarism

143 • **NOELLE MA**
University of Ottawa
An Atypical Cause of a Pituitary Mass

144 • **RYAN LE**
University of Toronto
Management of Diabetic Ketoacidosis in a Patient with Allergic Reactions to Multiple Insulin Analogues

145 • **ALEXANDRA BUSSIÈRES**
Université de Sherbrooke
Screening of Diabetes Between 1 and 7 Years after Gestational Diabetes — A Single Center Retrospective Cohort Study from 2009 to 2019

146 • **HAMNA TARIQ**
University of Alberta
Exploring Healthcare Providers' Ability to Facilitate Diabetes Screening Amongst Individuals with Experiences of Diabetes and Homelessness

147 • **KRYSTYNA Z. WANG**
University of Saskatchewan
Osteoporosis Treatment among Hip Fracture Patients at Time of Discharge: A Retrospective Quality Improvement Study

148 • **MONA VAHIDI RAD**
McGill University
Thyroid Hormone Replacement Therapy and Renal Outcomes in Mild Subclinical Hypothyroidism

149 • **BONNIE CHEUNG**
University of Toronto
Optimizing the Treatment of Inpatient Hypoglycemia at a Quaternary Care Hospital: A Quality Improvement Study

150 • **CHAITANYA GANDHI**
University of Alberta
Higher Pre-surgical IGF-1 Predicts Hip and Knee Replacements, and Spinal Laminectomies in Patients with Acromegaly

151 • **JACOB ZAMORA**
University of Toronto
A Case Report of the Progressive Decline in Gonadal Function Associated with Ring Y Chromosome

152 • **ANNA LIU**
Western University
Non-Alcoholic Fatty Liver Disease in Type 1 Diabetes: A Retrospective Case Series

153 • **JESSICA MARCIANO**
University of Alberta
Long-Term Follow-up of Men with Macroprolactinomas, Managed With or Without Surgery

154 • **CHARLOTTE ROSEN**
McGill University
Cardiac Metastases From a Follicular Variant of Papillary Thyroid Carcinoma Presenting as Acute Chest Pain in a 53-year old Male

155 • **WEI WANG**
Western University
Alpelisib-Induced DKA and Successful Discontinuation of Insulin within Two Weeks of Resolution

156 • **ALEXA CLARK**
University of British Columbia
An Evaluation of Virtual Care for Gestational Diabetes using the Quadruple Aim Framework: Assessment of Patient and Provider Experience, Cost and Clinical Outcomes

157 • **VALERIE LAI**
University of Alberta
First Report of Type II Diabetes Mellitus in an Adult with HMG-CoA Lyase Deficiency Associated with Hyperammonemia

158 • **ARIANE DE VILLERS-LACASSE**
Université de Montréal
Specific Medical Therapies of Excess Steroidogenesis in a Patient with Primary Bilateral Mecronodular Adrenal Hyperplasia

159 • **PAUL A. BEAMISH**
University of Ottawa
Milk Alkali Syndrome as a Rare Cause of Severe Hypercalcemia in Twin Gestation

160 • **MADELINE EDWARDS**
University of Ottawa
Insulin Reactions: What Do You Do When Your Treatment's the Trigger?

161 • **STEFANIE PARISIEN-LA SALLE**
Université de Montréal
Genetic Dissection of Primary Aldosteronism in a Patient with Multiple Endocrine Neoplasia Type 1 (MEN1) and Concomitant Ipsilateral Adrenocortical Carcinoma and Adenoma

Brown Tumors and Pathological Fracture in Primary Hyperparathyroidism: A Modern-Day 'Captain Charles Martell' Narrative

JUMANA AMIR*,
LINE VAUTOUR,
TEODORA DUMITRA,
ELLIOT MITMAKER,
MARK H. SHERMAN

McGill University

Brown tumor is a rare manifestation of long-standing primary hyperparathyroidism (PHPT), occurring in 3% of cases and only a minority presenting with fractures. Captain Martell, historically "the first" patient diagnosed with PHPT, suffered from atraumatic fractures and bone deformities. We describe a rare case of a young patient presenting with a pathological fracture of the femur and multifocal brown tumors in the setting of undiagnosed severe PHPT. A 19-year-old woman presented with a spontaneous right femur fracture. An ER visit 10-months earlier with bone pain, elevated alkaline phosphatase (ALP) and abnormal radiographs failed to yield a diagnosis. Examination demonstrated a 3-cm left-sided neck mass. Biochemistry revealed total calcium 3.01 mmol/L, parathormone (PTH) 80 pmol/L, ALP 2238 IU/L and undetectable 25OH-vitamin-D. Plain radiographs showed right femur fracture, multiple lytic bone lesions, diffuse bone resorption, acro-osteolysis and salt-and-pepper skull appearance. She underwent open reduction and intramedullary nailing of the femur. Bone biopsy confirmed brown tumor. Parathyroid localization imaging identified a left parathyroid gland. Bone densitometry revealed a Z-score of −2.9 at the distal third radius. En-bloc resection of the left thyroid lobe, left upper and left lower parathyroid glands was performed. Pathology revealed an intrathyroidal atypical parathyroid adenoma. Post-operatively, she developed severe hungry bone syndrome requiring prolonged treatment with calcium and calcitriol. This case highlights that despite all the advancements in the diagnosis and treatment of PHPT, rare pathologies of PHPT may still occur even in young individuals.

VIEW POSTER

Sparsely Granulated Corticotroph Pituitary Macroadenoma Presenting with Pituitary Apoplexy and Remission of Cushing Disease

TAO LIU*,
JOHN ROSSITER,
ROBYN HOULDEN,
SARA AWAD

Queen's University

Objective: Sparsely granulated corticotroph pituitary tumor (SGCT) accounts for 19–29% of Cushing disease (CD). We describe a patient with SGCT who presented with pituitary apoplexy.

Method: Clinical, biochemical, radiographical and pathological data are presented.

Results: A 33-year-old male presented with sudden onset of severe headache, nausea/vomiting, bitemporal hemianopsia and right-sided third cranial nerve palsy. Magnetic Resonance Imaging (MRI) demonstrated a 3.2 cm pituitary macroadenoma with hemorrhage compressing the optic chiasm and invading the cavernous sinus. He underwent emergent transsphenoidal surgery (TSS). In retrospect, he reported a 3-year history of central obesity, striae, facial plethora, easy bruising, and sexual dysfunction. Initial investigations revealed plasma cortisol of 1768 nmol/L (Reference Range (RR) 65–470), FSH 3 IU/mL (RR 1–12), LH 1 mIU/ml (RR 1–12), total testosterone 1 nmol/L (RR 6–34), prolactin > 1 ug/L (RR 3–20), TSH 0.89 mU/L (RR 0.36–3.4), free thyroxine 11.7 pmol/L (RR 9–19) and IGF–1 179 ng/mL (RR 82–242). Pathology revealed a pituitary neuroendocrine tumour with regional hemorrhage and necrosis, and viable tumour exhibiting Tpit nuclear immunolabeling and weak to moderate granular cytoplasmic ACTH immunostaining, diagnostic for SGCT. Post-operatively, he developed panhypopituitarism and transient central diabetes insipidus. One-month later, he remained stable on hydrocortisone and levothyroxine with 7 kg weight loss, 13 cm decrease in waist circumference, and improved visual fields and third nerve palsy.

Discussion/Conclusions: Pituitary corticotroph adenomas are divided into densely granulated, sparsely granulated and Crooke's cell tumors. We discuss recent literature findings that suggest important clinicopathological distinction in the behaviour and treatment outcomes between these subtypes.

VIEW POSTER

Type 1 Diabetes: Evaluating a Transition Care Model from Pediatric to Adult Care

ISABELLA ALBANESE*, SAMANTHA JACOBSON, NATASHA GARFIELD,

McGill University

Background: Age 18 to 25 years is a vulnerable period for patients with type 1 diabetes (T1DM), associated with worse glycemic control, decreased clinic attendance and increased diabetes-related hospitalizations. In 2012, a formal transition clinic was initiated at our institution, with a transition coordinator responsible for managing appointment scheduling.

Aim: To evaluate a T1DM transition care model by assessing clinic attendance, glycemic control, and diabetes-related hospitalizations.

Methods: This is a retrospective cohort study of all patients with T1DM aged 18 to 25 treated at our transition clinic from 2012 to 2021 (N = 186). Chart review data includes: age, years since diagnosis, comorbidities, BMI, insulin dose/modality, use of continuous glucose monitoring, HbA1c, time between last pediatric and first adult visit, attendance, diabetes-related hospitalizations and microvascular complications.

Results: Preliminary analysis demonstrates average clinic attendance rate of 77% and mean time between last pediatric and first adult visit of 209.7 days ± 174. HbA1c at last pediatric visit, first and last transition visit were 8.9%, 9.2% and 8.7%, respectively. There was no change to frequency of diabetes-related hospitalizations after transfer to transition clinic.

Discussion: It has been previously reported that 25–65% of youths with T1DM have no medical follow-up during transition to adult care. Participation in our program was associated with better attendance, improved HbA1c, and shorter time delay to first adult visit compared to previous Canadian studies. Further research is needed to understand how to best implement transition care in T1DM.

VIEW POSTER

A Grave Situation: Cerebral Venous Thrombosis in the Setting of Graves' Disease

TEHMINA AHMAD*, CHRISTINA MACMILLAN, DIANE DONAT

University of Toronto

We describe the case of a 27-year-old woman presenting at 17 weeks' gestation with 55lbs of unintentional weight-loss, palpitations, and weakness. Her background history included anxiety, bulimia, and cerebral venous thrombosis (CVST) at 9 weeks' gestation. Her first trimester investigations demonstrated transaminitis with alanine transferase 214 (ref 10–40 U/L), aspartate transferase 105 (ref 13–37 U/L), negative antiphospholipid antibody testing, TSH $<$ 0.01, and a normal liver ultrasound. Repeat investigations in her second trimester demonstrated transaminitis, and showed thyrotoxicosis TSH $<$ 0.01, Free T4 $>$ 95 (ref 12–21 pmol/L), Free T3 45 (ref 4–6.8 pmol/L), TRAb negative. No exophthalmos or thyroid bruit noted on exam; her thyroid was symmetrically enlarged with no palpable nodules. Thyroid ultrasound suggested goitre with signs of thyroiditis. She was treated with methimazole, propranolol and Lugol's iodine. Her Free T4 and Free T3 initially decreased to 25 pmol/L and 19.3 pmol/L respectively. By 30 weeks' gestation, she appeared to be failing medical therapy. Her TRAb remained $<$ 2.0 U/L. ENT was consulted for thyroidectomy; pathology confirmed Graves' Disease.

Autoimmune Graves' Disease presents in 0.2% of all pregnancies. Thyroid disease is reported in $<$ 2% of all CVST cases. Although pregnancy is a risk factor for stroke, CVST typically presents in third trimester of pregnancy or post-partum. Our patient presented with CVST in early pregnancy, where there is insufficient evidence to recommend for or against universal screening for abnormal TSH concentrations. This case underscores the importance of recognizing TRAb negative Graves' Disease, and the growing association with CVST.

Takotsubo Cardiomyopathy Secondary to Lenvatinib Therapy for Advanced Differentiated Thyroid Cancer: A Case Report

SARAH HAMIDI,*
ANDRÉE BOUCHER,
GENEVIÈVE RONDEAU,
HORTENSIA MIRCESCU,
RÉBECCA LEBOEUF,
BERNARD LEMIEUX,
XUAN KIM LE

Université de Montréal

Background: As targeted therapies become more widely used for the treatment of advanced thyroid carcinomas, it is important for physicians to be aware of potentially fatal adverse effects of these agents.

Case presentation: A 69-year-old female without previously known cardiovascular risk factors was treated with Lenvatinib 20 milligrams daily for a metastatic thyroid carcinoma. After 111 days of treatment, she was brought to the emergency room following an episode of presyncope. Bedside echocardiography showed regional wall motion abnormalities (RWMA) with a reduced left-ventricular ejection fraction (LVEF). Patient was euthyroid. Emergent cardiac catheterisation showed no significant coronary atherosclerotic lesion but revealed a typical aspect of Takotsubo cardiomyopathy (TC) on ventriculography, with a LVEF of 25%. Patient required a ten-day hospitalization at the cardiac intensive care unit with transient vasopressor support and non-invasive ventilation. Lenvatinib was permanently discontinued upon admission. On transthoracic echocardiogram (TTE) on the day of discharge, LVEF had increased to 50% and only a few apical RWMA remained. Follow-up TTE three months later showed a LVEF of 65% with normal ventricular contractility.

Conclusion: Although a few cases of TC have been reported with other agents targeting the vascular endothelial growth factor receptor, there is to our knowledge only one other case of TC with Lenvatinib described in the literature. Physicians should be aware of this potentially life-threatening complication of Lenvatinib therapy, which occurred shortly after treatment initiation in our previously healthy patient. Further reports are needed to better understand the timing and risk factors underlying this adverse event.

VIEW POSTER

Treatment-Induced Neuropathy of Diabetes — An Important Diagnosis in Acute Neuropathic Pain in Patients with Diabetes

SAMANTHA M. BRUZZESE*,
SARA AWAD,
SHIRLEY SHUSTER

Queen's University

Background/Objective: Treatment-induced neuropathy of diabetes (TIND) is a rare acute small-fibre neuropathy that presents with neuropathic pain and is precipitated by rapid improvement in glycemic control (> 2% decline in HbA1C over 3 months).

Methods: Clinical and laboratory data are presented.

Results: A 25-year-old male presented with sudden onset burning sensation in his feet, 4 weeks following the diagnosis of type-1 Diabetes (HbA1C at diagnosis 14.7%) and initiation of insulin. His symptoms progressed to hyperalgesia and neuropathic pain in the upper and lower extremities as well as diarrhea and urinary retention. Neurological exam revealed normal muscle bulk and strength, normal sensation to light touch and pinprick, but reduced vibration and temperature distally with reduced reflexes (1+). Investigations revealed improved HbA1C of 10.9%; 2-weeks following insulin initiation, unremarkable rheumatologic screen, normal lower extremity MRI, but reduced velocity on nerve conduction studies confirming distal neuropathy. He was diagnosed with diffuse small-fibre neuropathy consistent with TIND, given recent onset relative to the diagnosis of diabetes and marked glycemic improvement. He was started on duloxetine and amitriptyline, which resulted in symptomatic improvement. On subsequent follow-up at one year, his HbA1C was 6.1% and he had persistent, but improved, neuropathic symptoms allowing for continued down-titration of the neuropathic medications.

Conclusion: The case demonstrates the importance of considering TIND in patients presenting with early-onset small-fibre neuropathy in the context of rapid glycemic control with new onset diabetes. Management of TIND includes anti-neuropathic medications and sustained glycemic control. Symptom resolution is usually gradual, although may be incomplete.

Adherence to Guidelines for Inpatient Pharmacologic Management of Glucose Levels Using Written Compared to Electronic Orders

JARED GALLOWAY*, CASANDRA DOLOVICH, ELIZABETH SALAMON

University of Manitoba

Background: Canadian Diabetes Association (CDA) glycemic control guidelines for non-critically ill patients with type 2 diabetes (T2DM) provide recommendations for in-hospital glucose management. Hypo- and hyperglycemia have both been associated with increased morbidity, mortality, and prolonged hospitalization. The purpose of this study was to ascertain compliance with CDA guidelines and whether there was a difference in guideline adherence or glycemic control between two clinical sites that use written records versus electronic medical records (EMR) by the same residents.

Methods: Patients with T2DM receiving insulin or oral anti-hyperglycemics who were not admitted for events related to their diabetes were retrospectively identified. Admission orders, first three days of blood sugars and any response to any hyperglycemic or hypoglycemic events were collected. Standard parametric testing was performed.

Results: 109 adult patients with T2DM admitted to clinical teaching units at two tertiary hospitals which use either written or electronic orders were retrospectively reviewed. There was no statistically significant difference comparing the total number of hyperglycemic events between the two sites ($p = 0.542$) or in compliance with CDA guidelines. Type of insulin correction factor used between sites was significantly different ($p < 0.001$).

Conclusions: We suspect that EMR did not make any difference in number of glycemic events following admission as there was no response to these events for changing medications and the insulin correction factor was not being customized for each patient with electronic orders. We propose that forced reassessment of insulin orders automatically triggered through an EMR may be required to show improved glycemic control.

VIEW POSTER

Central Hypothyroidism and Adrenal Insufficiency Secondary to Retinoic Acid Therapy for Cutaneous T Cell Lymphoma

ISABELLA ALBANESE*, STÉPHANIE LAROSE

McGill University

Background: Retinoids are signaling molecules and biologically active derivatives of vitamin A. Alitretinoin (9-cis-retinoic acid) is used for the treatment of cutaneous T cell lymphoma (CTCL) to inhibit CTCL cell proliferation and induce apoptosis. Retinoic acid receptors (RARs) are expressed widely in the anterior pituitary. Retinoids have been reported to decrease multiple pituitary hormones such as TSH, ACTH, GH, LH and prolactin.

Case: An 86-year-old man with a history of Sezary syndrome (a CTCL subtype) diagnosed 6 months ago and treated with alitretinoin and high potency topical corticosteroids presented to hospital with a several-week history of generalized weakness, decreased energy, and orthostasis. His bloodwork demonstrated decreased TSH (0.31 mIU/L) and free T4 (5.7 pmol/L). His central hypothyroidism began after initiation of alitretinoin therapy, with normal thyroid function tests prior. He also had a low AM cortisol of 29 nmol/L, with cortisol response to 250 mcg ACTH stimulation test of 241, 371 and 522 nmol/L at 30, 60 and 90 minutes, respectively. The sample of ACTH measurement on arrival was inadvertently cancelled. The patient's energy and orthostasis improved after initiation of hydrocortisone.

Discussion: Patients with CTCL treated with retinoids have been described to develop central hypothyroidism, likely secondary to RAR-mediated thyrotropin suppression. This patient is also thought to have central adrenal insufficiency, most likely secondary to alitretinoin-mediated ACTH suppression. To our knowledge, this is the first reported case of combined central hypothyroidism and adrenal insufficiency due to alitretinoin.

Metachronous Bilateral Adrenal Masses in a Patient with Familial Adenomatous Polyposis

SAMUEL FINEBLIT*,
VICKY PARKINS

University of Calgary

A 76-year-old female with a history of familial adenomatous polyposis, prior prophylactic colectomy, and a prior left adrenalectomy for a 4.8 cm benign adenoma 23 years ago, presented with an enlarging right adrenal mass. This mass was first discovered 13 years before her current presentation and periodic imaging showed gradual enlargement of the lesion initially, with more rapid growth over the past 5 years. The imaging characteristics also changed from being generally reassuring to demonstrating hyperattenuation, nodular enhancement and ≤ 60% absolute washout. The radiologic differential included adrenal hemorrhage, hemangioma, malignancy and collision lesion. There was no evidence of hormonal hypersecretion. The patient strongly wished to avoid surgery. An FDG-PET/CT showed only mild metabolic activity in the adrenal lesion that was less prominent than physiologic hepatic activity, with a tumor: liver standardized uptake value max ratio of 0.89. Although this did not completely exclude low-grade malignancy, the absence of metastasis after 13 years, the history of a benign contralateral adrenal mass, and the lipid-rich appearance on previous imaging, were all thought to be reassuring findings. As such, we plan to continue to follow with observation alone at this time. This case reinforces that adrenal lesions are common in familial adenomatous polyposis, may be bilateral, and are most often benign in the literature. It also showcases a unique differential diagnosis for an enlarging adrenal mass with atypical imaging characteristics. Finally, it demonstrates the potential utility, as well as the limitations of FDG-PET/CT to help exclude adrenal carcinoma when surgical resection is undesirable.

VIEW POSTER

Hyperactive Hypothalamo-pituitary-adrenocortical Axis in Patient with Generalized Seizure Disorder

SAMANTHA M. BRUZZESE*, ROBYN HOULDEN

Queen's University

Objective: Epilepsy is a common neurologic disease. We report a case of a patient with a generalized seizure disorder who was found to have an elevated ACTH.

Methods: Clinical, biochemical, and radiographic data are presented.

Results: A 60-year-old woman with a history of a seizure disorder was found to have a 4 mm cyst in her posterior pituitary on MRI, suggestive of a Rathke cleft cyst. Investigations revealed an elevated ACTH of 51.1 pmol/L (normal < 14.0) and morning cortisol of 383 nmol/L (normal 135 to 537). TSH, free thyroxine, and prolactin were normal. LH and FSH were elevated in keeping with postmenopausal status. A 24-hour urine for free cortisol was 98 nmol/day (normal < 275). A short ACTH stimulation test with 250 mcg of cosyntropin revealed a normal stimulation response, suggesting she did not have primary adrenal insufficiency as cause of elevated ACTH. An overnight dexamethasone suppression test (1.0 mg) revealed a non-suppressed morning cortisol of 374 nmol/L. A CT scan of the chest showed no abnormalities to suggest ectopic ACTH syndrome. On history, the patient reported long standing anxiety and predominantly nocturnal generalized tonic-colonic seizures that occurred several times a month despite clobazam, carbamazepine, and levetiracetam. An EEG captured a left frontotemporal delta slowing consistent with an area of focal cortical abnormality.

Conclusion: This case suggests nocturnal epilepsy as a cause of hyperactive hypothalamo-pituitary-adrenocortical axis, characterized by elevated ACTH and failure of cortisol to suppress with an overnight dexamethasone suppression test.

VIEW POSTER

Aldosterone and Cortisol Co-Secretion: A Case of Discordant and False Lateralization in Adrenal Vein Sampling

ZACH RAIZMAN*, GREGORY KLINE, JANICE PASIEKA, MARTIN HYRCZA, BENNY SO, ALEXANDER A. LEUNG

University of Calgary

VIEW POSTER

Introduction: Primary aldosteronism (PA) can coexist with mild autonomous cortisol excess. Recognition is important because this condition is associated with increased risk of cardiometabolic complications, however, diagnosis can be challenging.

Case: A 64-year-old woman with a 13 year history of uncontrolled hypertension had an elevated aldosterone-to-renin ratio > 576, aldosterone of 576 picomoles per liter, renin < 1 milli-international units per liter (normal < 60). 1mg dexamethasone suppression test showed a cortisol of 119 nanomoles per liter (normal < 50). Computed tomography showed a left adrenal adenoma measuring 1.6 cm × 1.4 cm, and unremarkable right adrenal. Cannulation of adrenal veins was confirmed with adrenal vein sampling (AVS). There was reverse lateralization to the right at baseline but not following adrenocorticotropic stimulation with a lateralization index of 4.22 and 1.09, respectively. These were driven by elevated cortisol in the left adrenal vein, concordant with the nodule, suggesting false localization. Norcholesterol scan revealed increased radiotracer uptake within the left nodule, supporting autonomous steroidogenesis. Following left adrenalectomy, there was postoperative biochemical adrenal insufficiency, but ongoing evidence of aldosterone excess. Immunohistochemistry of the specimen confirmed enzymatic expression for cortisol production (CYP11B1) from the nodule, but numerous aldosterone-producing cell clusters (CYP11B2) only in surrounding tissue, consistent with primary aldosteronism from micronodular disease and likely bilateral albeit asymmetric aldosterone excess.

Conclusion: AVS is assumed to be the reference standard for subtyping in PA but can be misleading. Co-secretion of aldosterone and cortisol can result in discordant subtyping from false lateralization. Simultaneous aldosterone and cortisol excess is present in 5–10% of cases in AVS.

Severe Hypocalcemia Following Enfortumab Vedotin Therapy for Metastatic Urothelial Carcinoma: A Case Report

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DI (MARIA) JIANG,
SHEREEN EZZAT

University of Toronto

Background: Enfortumab vedotin (EV) is a novel nectin-4 directed antibody-drug conjugate (ADC) that delivers the microtubule-disrupting agent monomethyl aristatin E (MMAE) intracellularly, causing metastatic urothelial carcinoma (mUC) tumor cell death. EV has been approved by Health Canada (HC) for treatment of mUC progressing after platinum chemotherapy and immunotherapy, and accessible through a HC Special Access Program since June 2021.

Case Presentation: A 55-year-old man with mUC was hospitalized on C1/D27 of EV therapy (1.25mg/kg) for myocardial infarction. He had Grade 3 hypocalcemia (total calcium 1.41 mmol/L, albumin 26 g/L), Grade 3 hypophosphatemia (0.35 mmol/L), elevated PTH (110 pmol/L), as well as low 25– and 1,25-dihydroxyvitamin D levels (13 nmol/L and 46 pmol/L, respectively). Prior to EV, he had known lytic bone metastases, normal calcium, phosphate, and renal function. His serum calcium quickly normalized with calcium and calcitriol treatment.

Discussion: To our knowledge, this is the first report of severe hypocalcemia as a potential adverse effect of EV. Our patient had pre-existing compensated vitamin D deficiency, and EV initiation coincided with a marked decline in serum calcium level, which corrected with calcitriol. Microtubule disrupting agents can interfere with intestinal calcium absorption and disrupt vitamin D 1-alpha hydroxylation. Hypocalcemia (7% Grade 1–2, 4% Grade 3-4) has been reported in a phase II trial of brentuximab vedotin, another ADC using MMAE. Baseline 25-hydroxy vitamin D testing should be performed prior to initiating MMAE-containing ADCs, and calcium and phosphate levels should be monitored on therapy.

A Rare Case of Ectopic Parathyroid Adenoma in the Mediastinum

FREDERICK WONG*, GEETHA MUKERJI, JESSE PASTERNAK

University of Toronto

Background: Primary hyperparathyroidism is commonly treated with parathyroidectomy resulting in an over 95% cure rate. However, in the rare occasions when parathyroid levels and hypercalcemia do not normalize after surgery, clinicians need to consider inadequate surgical excision, secretion from the remaining parathyroid gland, and less commonly an ectopic parathyroid source.

Case: A 31-year-old healthy man with primary hyperparathyroidism underwent localizing studies including ultrasound and sestamibi scan which were negative. The patient then underwent a 4-gland parathyroid exploration with 4 glands found at the time of surgery. Three were resected (right upper, left upper and left lower) and a 4th normal gland was left in-situ (right lower). Intraoperative PTH did not normalize and postoperative calcium remained elevated. The most abnormal gland was the right upper which was found to be hypercellular parathyroid tissue on pathology. Repeat sestamibi scan was negative but a CT scan showed a 9 mm soft tissue nodule in the mediastinum. Subsequent 18F-fluorocholine positron emission tomography-computed tomography (18F-FCH PET/CT) showed uptake in this area. Due to persistent hypercalcemia (Ca^{2+} 2.83 mmol/L) and muscle weakness, polyuria, and nephrolithiasis, cinacalcet was started with calcium normalizing (Ca^{2+} 2.59 mmol/L). Thoracic surgery has been consulted for minimally invasive resection of the mediastinal tumor.

Discussion: Ectopic parathyroid lesions in the mediastinum are rare. Cinacalcet can be considered to lower persistent hypercalcemia while definitive surgical management is pursued. Genetics testing should be considered in young patients that present with ectopic parathyroid tumors.

VIEW POSTER

When Imaging Fails: A Case of Unexplained Hypopituitarism

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Introduction: A 36-year-old man with pre-diabetes was referred to Endocrinology clinic with an 18 month history of erectile dysfunction and fatigue; initial labs showed low testosterone and elevated prolactin.

Case Presentation: The patient had no history of head trauma, surgery, radiation, nor headaches. He had no systemic symptoms aside from fatigue, although review of systems revealed joint pain in his hands and feet. Laboratory records showed a prior history of elevated ferritin and negative rheumatological panel.

A baseline pituitary panel demonstrated partial anterior hypopituitarism with AM cortisol 130 nmol/l, ACTH 5.6 pmol/l (1–13), free T4 6 pmol/l (11–23), TSH 2.45 mIU/L, AM bioavailable testosterone 1.2 nmol/l (4.1–12.7), LH 1.2 IU/L, FSH 2.0 IU/L, and prolactin 85 ug/L (< 18). Macroprolactin was negative and IGF-1 and serum electrolytes were normal. Ferritin was elevated at 602 ug/L. Pituitary MRI without contrast did not show a discrete lesion.

Management and Outcome: The most common cause of hypopituitarism in adults is pituitary adenoma[1]; however, this was not found here and necessitated a search for other causes. Our patient's elevated ferritin, joint involvement, pre-diabetes and lack of pituitary lesion on imaging is suggestive of hereditary hemochromatosis; HFE gene testing was requested. Pituitary imaging with contrast as well as testing for sarcoidosis and IgG4 disease were ordered. Our patient was initiated on hydrocortisone, levothyroxine, and testosterone and at time of writing is clinically well.

References 1. Higham, CE, Johannsson, G, & Shalet, SM. Hypopituitarism. 2016. The Lancet 388(10058):2403–2415.

VIEW POSTER

TB or Not TB: Hypopituitarism in a Patient with Pleural and Lymph Node Tuberculosis

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Background: Our case demonstrates clinical features suggestive of pituitary TB, and highlights the practical challenges of establishing this rare diagnosis.

Case: A 37-year-old woman from Ethiopia presented with progressive shortness of breath and a 2-year history of weight loss and night sweats. Investigation revealed an exudative pleural effusion. Axillary lymphadenopathy was biopsied and confirmed to be extrapulmonary TB. In hospital, she was noted to have hyponatremia. Cortisol testing showed an AM cortisol of 61 nmol/L, and 250 mcg ACTH stimulation values of 59, 128, and 155 nmol/L at 0, 30, and 60 minutes. CT abdomen showed structurally normal adrenal glands, and ACTH level was 8.8 pmol/L. Pituitary panel revealed central hypothyroidism (TSH 0.58 mIU/L, FT4 1.1 pmol/L, FT3 undetectable), and central hypogonadism (LH < 1 IU/L, estradiol 24 pmol/L) in the context of amenorrhea for the past 2 years. Pituitary MRI showed a partial empty sella with hemosiderin deposition, suggestive of remote pituitary hemorrhage. The patient was started on hydrocortisone and levothyroxine, and standard TB therapy.

Discussion: Pituitary TB can be considered in patients with hypopituitarism and evidence of extrapulmonary TB. A histologic finding of caseating granulomas within pituitary tissue supports this diagnosis, however, the need for tissue confirmation of pituitary TB should be evaluated in the broader clinical context. Sellar masses with hemorrhage have been reported in 4 cases of pituitary TB that presented with apoplexy, suggesting that TB infiltration may be a risk factor for pituitary apoplexy. TB-related apoplexy resulting in an empty sella has never been reported.

ACTH Dependent Cushing's Syndrome in Metastatic Acinic Cell Carcinoma

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Western University

Background: Acinic cell carcinoma (ACC) with high-grade transformation is an aggressive subtype of salivary gland neoplasm with a poor prognosis. There are only a few documented cases of Adrenocorticotropic Hormone (ACTH) production and Cushing's syndrome in metastatic ACC. This case highlights the significance of ACTH production in aggressive disease progression.

Case: A 52-year-old woman presented with recent onset Cushing's syndrome following completion of first line chemotherapy for metastatic ACC. Immunohistochemical staining for ACTH of her initial pathology sample taken 18 months prior was ACTH positive despite the absence of clinical signs and symptoms of cortisol overproduction at the time of resection. Development of her Cushing's syndrome coincided with aggressive spread of her ACC. Treatment was focused on managing complications of hypercortisolism and aggressively treating the underlying malignancy, as previous use of adrenal enzyme inhibitors in the literature has been of little benefit. Despite second- and third-line chemotherapy regimens, the ACC continued to spread and the patient ultimately decided to focus on comfort care. She passed away 7 months after her Cushingoid presentation.

Discussion: In patients with ACC, the development of Cushing's syndrome correlates with the onset of aggressive progression. Circulating ACTH and its activity may serve as a useful marker of prognosis in ACC with high-grade transformation. In patients with ACC, vigilance for signs and symptoms of cortisol overproduction is warranted as this may signal dedifferentiation, disease progression and a poorer prognosis.

VIEW POSTER

Vitamin D Toxicity from an Unusual Source: A Case Report

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University of British Columbia

Introduction: Hypervitaminosis D is an uncommon etiology of hypercalcemia. Toxicity is usually caused by very high doses of oral supplements due to erroneous prescription or administration of Vitamin D formulations.

Case description: A 16-year-old boy, previously healthy, presented with a 2-week history of fatigue and anorexia. Investigations showed acute kidney injury (creatinine 201 μmol/L), hypercalcemia (total calcium 3.81 mmol/L; ionized calcium 1.73 mmol/L) and nephrocalcinosis. Further diagnostic workup revealed undetectable PTH levels, elevated 25-hydroxy-vitamin D (> 400 nmol/L by immunoassay; 1910 nmol/L measured by LC-MS/MS). He denied taking vitamin D supplements, however, he did report consumption of creatine and protein supplements. Mass spectrometry analysis of the creatine powder estimated a Vitamin D3 content of 425,000 IU/serving (5g). This product was manufactured in Canada and did not disclose Vitamin D as a component. It was recalled by Health Canada soon after reporting this event. The patient was managed with IV hydration, calcitonin and pamidronate, with resolution of hypercalcemia and AKI in 1 and 2 weeks, respectively. After 6 months, 25-hydroxy-vitamin D levels normalized.

Discussion: We present a case of hypervitaminosis D causing severe hypercalcemia. Interestingly, excessive amounts of vitamin D were found in a natural health product that did not report Vitamin D content. Physician-laboratory collaboration was key to identifying this source. The use of dietary supplements is highly prevalent among youth; this should be routinely inquired and considered as a possible source of toxicity, regardless of the product label.

VIEW POSTER

Hypophosphatasia: A Rare Cause for Bone Loss

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Hypophosphatasia (HPP) is an inherited disorder of bone and mineral metabolism due to mutations in the alkaline phosphatase (ALPL) gene, leading to a reduction in activity of the tissue non-specific enzyme of alkaline phosphatase (ALP). We report a case of HPP in a patient who was initially referred for bone loss. A 57-year-old woman presented with osteopenia and a significant decline in her bone mineral density (BMD) in the left total hip. Her past medical history was significant for a wrist fracture at age 8, slipped capital femoral epiphysis, osteoarthritis, and bone spurs in bilateral big toe requiring debridement. She had a strong family history of osteoporosis and fractures. Investigations for secondary causes revealed a low ALP, suspicious for HPP. Her parathyroid hormone (PTH), serum calcium, phosphate, 25-OH vitamin D, thyroid stimulating hormone (TSH) and kidney function were within normal limits. Further testing showed an elevated vitamin B6 level, compatible with HPP. This was confirmed with genetic testing which identified a heterozygous mutation in the ALPL gene. She was treated with asfotase alfa, which is an ALP replacement therapy. Two weeks after starting therapy, her energy level and arthralgia improved. Her repeat BMD one month after starting therapy showed a significant improvement in the lumbar spine. It is important to consider HPP as a diagnosis in patients with low bone mass and low ALP, such that the appropriate therapy can be initiated, and anti-resorptive agents (e.g., bisphosphonates and denosumab) are avoided as they can further impair bone mineralization.

VIEW POSTER

Use of Androgen Deprivation Treatment in Deviant Sexual Behaviours – An Atypical Indication Creating a Dilemma for the Endocrinologist

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Case: A 31-year-old man was referred by his psychiatrist for sexually inappropriate behaviours, public mischief, and violent outbursts resulting in repeated law enforcement actions, with the specific consideration of initiating androgen deprivation treatment. Initial investigations showed that he was eugonadal with a total testosterone level of 11.8 nmol/L (8.4–28.8). After an informed discussion, he was started on Leuprolide 22.5mg injections every three months. Baseline Bone Mineral Density (BMD) showed spine Z-score −2.3, and femoral neck Z-score −0.7. Treatment with GnRH receptor agonist achieved sustained suppression of testosterone to levels less than 0.5 nmol/L. Hormonal treatment, along with regular psychotherapy, resulted in reduced recidivism and notable reduction in inappropriate behaviours within several months as noted by the patient and his case workers.

Discussion: There are both ethical and medical considerations for the endocrinologist when requested to advise on androgen deprivation treatment. This is an atypical situation where the indication is not an endocrine disease and involves disrupting a normal functioning hormonal axis. Adverse effects including elevated fracture risk, change in body distribution, anemia, and altered glucose and lipid metabolism. Our patient has been on androgen deprivation treatment for five years, and while this has been successful from a sexual behaviour perspective, it has resulted in a significant decrease in BMDs spine Z-score, which necessitates ongoing monitoring. There is currently minimal guidance on how to approach this topic, but this case highlights the necessity for regular reviews with a multidisciplinary team to optimally balance benefits of treatment versus potential harm.

Central Diabetes Insipidus and Partial Anterior Pituitary Dysfunction in Acute Myeloid Leukemia

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University of Toronto

Background: Central diabetes insipidus (CDI) associated with acute myeloid leukemia (AML) is rare, and when present, typically occurs with chromosome 3 and 7 abnormalities. The etiology of CDI in patients with AML is unclear, with the majority of patients found to have no abnormalities on brain imaging. Here, we present a case in which leukemic infiltration is the suspected mechanism of CDI.

Case Presentation: An 81-year-old woman newly diagnosed with AML t(12;14)(p12; q13) was found to have an elevated serum sodium in hospital (Na 151 mmol/L, urine osmolality 154 mmol/kg). On review of her clinical history, she reported nocturia, polyuria and polydipsia for five months preceding hospitalization. Based on her clinical history and biochemical parameters, she was diagnosed with DI and treated using intravenous desmopressin with good effect (Na 144 mmol/L, urine osmolality 501 mmol/kg). Endocrinology was consulted for etiological assessment of her DI. An MRI brain for assessment of neurologic involvement revealed symmetric high-T2 signal within the hypothalamus extending into the mamillary bodies bilaterally without obvious enhancement, a partially empty sella, and loss of the pituitary bright spot. Based on her imaging findings, a pituitary panel was completed which suggested partial anterior pituitary dysfunction.

Discussion: The patient's robust improvement with desmopressin therapy along with her imaging findings suggested a central rather than nephrogenic etiology for her DI. Given the time course of her presentation with respect to her AML diagnosis, MRI findings, and investigations excluding other causes, her CDI and partial anterior pituitary dysfunction were suspected to be secondary to hypothalamic leukemic infiltration.

A Case of Long-term Remission of Acromegaly After Somatostatin Analog Withdrawal

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Background: Somatostatin analog (SSA) is a mainstay medical therapy for patients with acromegaly who are ineligible for surgery. Long-term treatment with SSA can result in a normalization of GH and IGF-1 levels and tumour shrinkage. However, sustained disease remission after treatment discontinuation is uncommon, with over 80% relapse within 12 months.

Case Presentation: We report the case of a 74-year-old woman with an 11.4 × 10 mm pituitary incidentaloma who presented with carpal tunnels, enlarged hands and feet, and sleep apnea. The initial pituitary function tests showed an isolated elevation of the IGF-1 level of 719 ug/L (N:35–173). A positive glucose tolerance test with a nadir GH level of 2.04 ug/L confirmed the diagnosis of acromegaly. Since the patient refused surgery, medical treatment of Octreotide LAR 20 mg every four weeks was initiated. Three years into treatment, her IGF-1 and GH levels decreased to 79 ug/L and 0.08 ug/L (N:0–7), respectively, with an 88% shrinkage of the adenoma volume. Considering this excellent biochemical and radiological response, Octreotide LAR was withdrawn progressively. After five years of active surveillance, the patient remains in long-term remission with persistent normal IGF-1 (15.2 ug/L) and GH (0.1 ug/L) levels and no increase in pituitary adenoma size.

Conclusion: Data on sustained remission of acromegaly after therapy discontinuation is scarce. This report suggests that SSA can be a curative treatment and that withdrawal should be considered for well-selected acromegalic patients.

VIEW POSTER

A Rare Case of Ectopic Cushing's During Pregnancy

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McMaster University

Case Presentation: 37-year-old female G9P7A2 with pre-existing hypertension presented at 32 weeks gestational with rapidly worsening anasarca, profound muscle weakness and weight gain of 65 kg during pregnancy. She underwent an urgent c-section at 32+5 weeks for severe pre-eclampsia. A week after discharge, she was readmitted with acute hypoxic respiratory failure from bilateral pulmonary embolism requiring intubation with new difficult to control hypertension and hyperglycemia. Examination revealed BMI of 65 with multiple violaceous striae on her abdomen and 2/5 strength in proximal muscle groups.

Investigations: The potassium was 2.1 mmol/L, CO_2 38 mmol/L, ALT 57 IU/L, HbA1C 6.9%, androstenedione > 35 nmol/L, ACTH elevated at 42.2 pmol/L, 24hr UFC 24,102 nmol/d. Her renin, aldosterone, DHEA-S, 24-hr urine metanephrines, chromogranin A and calcitonin were all normal. After 8 mg DST, her ACTH was 78.6 pmol/L and 8 AM cortisol was 2787 mmol/L. Lumbar x-ray revealed compression fractures at L1-2. CT imaging showed normal adrenal glands with no other tumors identified. MRI sella was unremarkable.

Treatment and Discussion: She was started on Ketoconazole 600 mg BID along with aggressive management of her multiple comorbidities related to her hypercortisolism. After discussion with surgery, the decision was made to proceed with bilateral adrenalectomy prior to pursuing functional imaging given worsening of her comorbidities and failure to respond to medical treatment. Ectopic ACTH secretion (EAS) is an extremely rare cause of Cushing's in pregnancy and can be life-threatening. In uncontrolled occult EAS Cushing's, bilateral adrenalectomy can be the life-saving treatment of choice and should be considered early on.

VIEW POSTER

Paroxysmal Headache and High Blood Pressure Triggered by Micturition in a patient with Urinary Bladder Paraganglioma — Case Report

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Western University

VIEW POSTER

Introduction: Paraganglioma of urinary bladder is a very rare neuroendocrine tumor accounting for less than 1% of all pheochromocytomas and less than 0.05% of bladder tumors. These paragangliomas may be functioning or non-functioning and present with variable manifestations.

Case description: A 49-year-old female patient presented with a 5 year history of episodes of headache and hypertension triggered by urination. The episodes lasted about 30 minutes, and blood pressure increased to 250/120 mmHg, with systolic blood pressure being 95–115 mmHg outside of the episodes. Normetanephrine was elevated in 24-hour urine at 4.1 (Normal $<$ 3.4) umol/day and in plasma at 2.84 (Normal $<$ 0.89) nmol/L. MIBG scan showed increased focal activity on the right side of urinary bladder, consistent with a complex mass of 3.5 cm seen on MRI of the pelvis. She underwent a robot-assisted laparoscopic partial cystectomy. No significant intraoperative instability was noted. The patient did not require ICU admission or vasopressors. Pathology showed a completely resected paraganglioma. Upon follow up, she reported significant improvement of her symptoms. Repeat 24-hour urine collection, 3 months after surgery, was within normal range for catecholamines and metanephrines. Genetic testing for paraganglioma panel was negative.

Discussion: This patient presented with adrenergic symptoms with micturition, which may be the initial manifestations of bladder paraganglioma. Patients can also be asymptomatic or present with microscopic hematuria. Surgical resection of paraganglioma is the initial treatment modality, and can be curative. This case report highlights the important role of careful history in diagnosing bladder paraganglioma.

Nephrogenic Diabetes Insipidus as the First Manifestation of Ectopic Adrenocorticotropic Hormone (ACTH) Syndrome

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Background: Ectopic adrenocorticotropic hormone (ACTH) production is a rare complication of medullary thyroid cancer (MTC) associated with significant morbidity and mortality. Here we discuss a patient with metastatic MTC presenting with nephrogenic diabetes insipidus and ultimately diagnosed with ectopic ACTH production in the context of MTC.

Case: A 36-year-old woman, with a history of known metastatic MTC, presented with polydipsia and polyuria (urine output 8 L in 24 hours). The patient had metabolic alkalosis and profound hypokalemia (K < 1.5 mmol/L) refractory to high dose supplementation. DDAVP trial confirmed nephrogenic diabetes insipidus. Work-up for the metabolic abnormalities revealed borderline low renin (3.1 ng/L) and aldosterone (53 pmol/L) levels. This was associated with markedly high morning serum cortisol (2,862 nmol/L), 24-hour urine cortisol (23,324 nmol/L) and ACTH (62 pmol/L) levels.

Results: The patient was diagnosed with ectopic ACTH production from MTC causing profound hypokalemia, which in turn caused nephrogenic diabetes insipidus. Medical therapy with ketoconazole was not effective. Due to ongoing clinical deterioration secondary to hypercortisolemia, the patient underwent bilateral adrenalectomy. She tolerated the surgery well despite ongoing difficulty to normalize potassium; however, her post-operative course was complicated by aspiration pneumonia. Goals of care were switched to palliation.

Discussion: This is a rare case of ectopic ACTH production in the context of MTC initially presenting as nephrogenic diabetes insipidus secondary to severe hypokalemia. Recognition of a mineralocorticoid-driven presentation of ectopic ACTH production is essential in timely diagnosis and management of this cancer complication.

VIEW POSTER

Hyperglycemia-induced Chorea: A Short Case Series

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Background: Hyperglycemia-induced chorea is an uncommon disorder associated with nonketotic hyperglycemia and striatal abnormalities on neuroimaging, typically affecting females older than 70 years with HbA1C above target. We present 2 patients with mild hyperglycemic hyperosmolar state (HHS); one of whom had concurrent choreiform movements, while the second patient developed chorea shortly after management of hyperglycemia.

Cases: Patient 1 was an 89-year-old female with type 2 diabetes mellitus (T2DM) with HbA1C of 14% at presentation (6.9% one year prior, managed with diet) and 3-month history of involuntary movements in her face, and bilateral arms and legs. Her glycemic control improved rapidly with basal-bolus insulin by post-admission day 1, but her chorea symptoms worsened and she developed rhabdomyolysis and dysphagia. She was treated with quetiapine for symptoms but died 9 days later from aspiration pneumonia. Patient 2 was an 87-year-old female with T2DM diagnosed in 2019 with HbA1C of 7.3% managed with diet control, presenting with mild HHS and HbA1C of 13.7%. She developed left-sided hemichorea on post-admission day 2 after correction of hyperglycemia with basal-bolus insulin, metformin, gliclazide, and linagliptin. CT head showed bilateral basal ganglia hyperintensities. Her neurological symptoms improved within 7 days with euglycemia and she did not require antipsychotic agents.

Conclusion: Both patients developed worsening or new chorea symptoms when glucose control initially improved, which is less commonly reported in the literature for hyperglycemia-induced chorea. Awareness of this phenomenon is essential in avoiding misdiagnosis, while achieving optimal glycemic control may help with symptom management.

Post-Transplant Diabetes in Kidney Transplantation — A Single Center Study

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Introduction: Post-transplant diabetes (PTDM) is a known complication of kidney transplantation and is associated with adverse outcomes including cardiovascular disease, decreased graft and patient survival, and graft rejection. Given changes in transplant protocols over time and updated consensus diagnostic criteria for PTDM, the aim of our study was to evaluate the incidence and associated risk factors of PTDM at a single Canadian center.

Methods: We identified kidney transplant recipients who received their first transplant at our center between January 2014 and December 2016 (n = 143). PTDM was identified according to HbA1c $>$ 6.5%, random BG $\geq$ 11.1 mmol/L and/or a fasting BG $\geq$ 7 mmol/L. Student's t-test was used to compare mean values. The incidence of PTDM over time post-transplant is analyzed by both univariate and multivariate Cox regression.

Results: 36 out of 143 kidney transplant patients developed PTDM (25.2%). The mean time to developing PTDM was 13.6 months. The average age of developing PTDM was 53.4 $\pm$ 11.2 years. The mean tacrolimus trough level in PTDM was not significantly different from those who did not develop PTDM. Patients with PTDM had higher BMI post-transplant (27.9 $\pm$ 5, p = 0.004). The clinical factors associated with PTDM included pre-transplant dialysis, polycystic kidney disease, and living donor.

Conclusion: Compared to previously published report from our center, the incidence of PTDM has increased over time. This may be related to the use of expanded diagnostic criteria for PTDM in our current study. Consistent with the literature, we identified PCKD as a risk factor for PTDM.

Severe Hypertriglyceridemia in a Child with New-Onset Type 1 Diabetes Presenting in Diabetic Ketoacidosis

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Background: Mild hypertriglyceridemia is a known complication of diabetic ketoacidosis (DKA); however, severe hypertriglyceridemia is rare, especially in pediatric patients. We present a case of a young girl with new-onset type 1 diabetes and DKA whose management was complicated by severe hypertriglyceridemia.

Case: A 4-year-old previously healthy girl presented with severe DKA (pH 6.9, bicarbonate 5 mmol/L). Blood was lipemic and initial triglycerides (TG) were 150.94 mmol/L. With insulin infusion, acidosis resolved by 36 hours; however, TG remained elevated (53.40 mmol/L). Given risk of pancreatitis, patient remained fasting on intravenous insulin (0.05–0.1 u/kg/h) and dextrose. On day 4 (TG 21.37 mmol/L), continuous nasogastric feeds with a free amino acid formula were started, allowing both fat and protein restriction until organic aciduria was ruled out. With further decreasing TG on day 7 (TG 9.17 mmol/L), she was transitioned to subcutaneous insulin and a low-fat diet, with MCT oil to supplement fat intake with no increase in TG. At discharge, TG were 6.93 mmol/L.

Blueprint Genetics Hyperlipidemia Panel was negative. Low-fat diet was subsequently discontinued, and 3 months post discharge, TG were 0.99 mmol/L (A1C 8.6 %). Additional genetic testing for pathogenic variants in genes causing lipodystrophy or lipoatrophy, and polygenic hypertriglyceridemia will be pursued.

Conclusion: Severe hypertriglyceridemia is a rare complication of DKA in children that makes management more challenging. Prolonging insulin infusion after correction of acidosis promotes lipoprotein lipase activation and ongoing TG degradation. Clinicians should consider investigating for underlying disorders of lipid metabolism and organic aciduria.

VIEW POSTER

A Rare Case of an Adult Metastatic Sellar Region Atypical Teratoid/Rhabdoid Tumour Presenting with Vision Loss and Hypopituitarism

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University of British Columbia

VIEW POSTER

Case: A 56-year-old woman with a history of basal cell carcinoma presented with acute visual deterioration after six weeks of blurred vision, exertional dyspnea, polyuria and polydipsia.

Biochemical testing revealed a mildly elevated prolactin with central adrenal insufficiency, hypothyroidism, and diabetes insipidus. MRI revealed an unusual 2.9 × 2.3 × 3.9 cm dural-based sellar mass with infiltration of the hypothalamus that was indistinguishable from the normal pituitary gland. Her visual fields rapidly worsened in hospital, and serial imaging showed enlargement of the mass. Malignancy workup demonstrated a T7-S3 spinal lesion and a biopsy-confirmed bronchial carcinoid tumour.

Endoscopic biopsy of the lesion showed an atypical teratoid/rhabdoid tumour (ATRT), a rare aggressive malignant tumour that primarily occurs in young children. There are fewer than 25 reported adult cases of sellar ATRT with the majority occurring in women presenting with visual disturbance, headaches and ocular palsies. Initial presentation with associated hypopituitarism is less common. On MRI, ATRTs usually exhibit an irregular shape with heterogenous enhancement and extension into surrounding tissue.

Given the paucity of data on adults with ATRT, there are no clear guidelines and management is often extrapolated from the pediatric population which consists of radiation and multiagent chemotherapy. ATRTs typically grow rapidly and carry a poor prognosis. After replacement of her hormonal deficiencies, our patient was started on emergent radiotherapy followed by chemotherapy. Her visual fields improved rapidly.

Conclusion: New onset of headache and visual changes associated with a large sellar mass are diagnostic clues for sellar ATRT or other rapidly expanding sellar masses.

An Atypical Cause of a Pituitary Mass

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A 68-year-old man with a history of metastatic renal cell carcinoma, cardiac arrythmia, amiodarone-induced thyrotoxicosis, chronic kidney disease and type two diabetes was referred for a 16 mm pituitary macroadenoma.

He reported sudden onset light-headedness, nausea, emesis, and a forty-pound weight loss over 6 weeks. He appeared frail and was hypotensive. Bloodwork revealed a free T4 27 pmol/L (12–22 pmol/L), testosterone < 0.1 (6.7–25.7 nmol/L), follicle stimulating hormone 2.2 IU/L (2.0–12.4 IU/L), prolactin 52.5 ug/L (3–15.2 ug/L), and morning cortisol 22 nmol/L. He was diagnosed with adrenal insufficiency, hypogonadotropic hypogonadism, and hyperprolactinemia likely from stalk effect. He was started on glucocorticoid supplementation and methimazole.

CT head demonstrated compression of his optic chiasm prompting urgent decompressive surgery.

During the surgery, the pituitary lesion appeared to be grossly abnormal, and a subtotal pituitary gland resection was performed. His pathology confirmed metastatic clear cell renal cell carcinoma. Two months later, he underwent a second debulking surgery for recurrence. He developed panhypopituitarism postop.

We present a rare case of metastatic renal carcinoma presenting as a pituitary macroadenoma with rapid onset hypopituitarism. Metastatic renal cell carcinoma to the pituitary gland is exceedingly rare and has been documented only in a few case reports. Unlike other metastatic disease to the pituitary gland, renal cell carcinoma presents more commonly with hypopituitarism and visual field defects. Our case highlights that metastatic disease to the pituitary gland should be considered in the differential diagnosis for patients with a history of cancer.

Management of Diabetic Ketoacidosis in a Patient with Allergic Reactions to Multiple Insulin Analogues

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University of Toronto

Allergic reactions to insulin are rare since the availability of human insulins and insulin analogues, with an estimated prevalence of 0.1–3%. The allergens for these reactions are often additives in the formulation and most allergies documented are type 1 hypersensitivity reactions. Given the need for insulin in emergencies, desensitization protocols have been trialed to facilitate insulin therapy in allergic patients with a reported 85% efficacy, however the evidence is largely limited to case reports and specific insulin analogues. We describe a case of a 52-year-old female with ketosis-prone type 2 diabetes mellitus presenting with diabetic ketoacidosis (DKA). She presented with recurrent DKA, and her management complicated by various hypersensitivity reactions (type I–IV) to different insulin analogues including glargine, detemir, NPH, mixed insulin, lispro, glulisine, and regular insulin. This case was unique in the vast number of analogues she reacted to and the variability of the reactions. In collaboration with Clinical Pharmacology, she underwent a desensitization protocol to aspart which was not trialed previously to facilitate continuous subcutaneous insulin infusion (CSII) therapy. She started on a dose of 0.01 units with exponential uptitration daily. Unfortunately, she had a hypersensitivity reaction of angioedema and urticaria to a dose of 2 units, leading to discontinuation of the protocol. Her case is also unique as she typically presents to hospital with DKA biochemically which resolves with oral anti-diabetic agents and fluids. She was discharged from hospital on metformin and gliclazide. We review the evidence on insulin desensitization and its use in this challenging case.

VIEW POSTER

Screening of Diabetes Between 1 and 7 Years after Gestational Diabetes – A Single Center Retrospective Cohort Study from 2009 to 2019

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Université de Sherbrooke

Introduction: Gestational diabetes (GDM) represents a major risk factor for the development of type 2 diabetes. The years after a GDM are an opportunity for prevention and screening of diabetes. Our objective was to evaluate rates and predictors of diabetes screening and Diabetes Canada recommendation adherence over a prolonged period after GDM.

Methodology: A retrospective cohort study was conducted in women who experienced GDM and last delivered in our center between 01-01-2009 and 31-12-2011. Demographic, clinical and laboratory data were collected using an electronic medical record and archive services. Random serum glucose, HbA1c and all types of OGTT were accounted for. Women diagnosed with diabetes within a year after pregnancy were excluded from further analysis.

Results: Among 386 patients, 87% had ≥ 1 screening test for diabetes between 1 and 7 years after GDM (overall screening[1]), while only 32.6% had an initial postpartum screening followed by 2 tests adequately spaced over 6 years (adherence to recommendation[2]). Advanced age at delivery (OR 1,11[1], p = 0,001 and OR 1,04[2], p = 0,043), maternal comorbidities (OR 4,39[1], p = 0,045 and OR 2,93[2], p = 0,001) and involvement of OBGYN in hospital (OR 6,56[1], p = 0,000 and OR 2,09[2], p = 0,001) are positive predictors of overall screening and adherence to recommendations, but non-Caucasian ethnicity negatively affects overall screening (OR 0.46 (0.22–0.95), p = 0.035).

Conclusion: Although overall screening is widely practiced, 67.4% of women did not benefit from a recommended minimal screening. This represents a lost opportunity for early detection of T2DM. Increased efforts should be directed towards screening younger women without comorbidities and non-Caucasian populations.

VIEW POSTER

Exploring Healthcare Providers' Ability to Facilitate Diabetes Screening Amongst Individuals with Experiences of Diabetes and Homelessness

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Background: Completing regular screening to detect microvascular complications of diabetes allows for proactive management and referral to specialty care. In particular, diabetes foot screening and foot care, dilated retinal exams, and blood and urine testing for nephropathy are indicated for all patients with diabetes. Individuals experiencing homelessness face many barriers to completing screening, which can result in later detection of microvascular complications and diabetes-related morbidity.

Methods: We conducted a qualitative descriptive study using open-ended interviews of 96 health and social care providers across five Canadian cities (Calgary, Edmonton, Ottawa, Vancouver, Toronto). We used NVivo data analysis software to perform a thematic analysis of the data, focusing on themes relating to accessing microvascular screening maneuvers.

Results: Barriers to assisting patients in completing screening include lack of transportation, distrust of unfamiliar providers, difficulty contacting patients about appointments, lack of education regarding the importance of screening, not having supplemental medical coverage, and language barriers. Providers minimized barriers by providing multiple tests in one location, having flexible schedules, offering transportation vouchers, providing a support person to attend appointments with patients, and referrals to providers who speak the patient's language.

Conclusion: Typical care settings are ill-adapted to assist patients experiencing homelessness in completing diabetes screening. Diabetes care programs across Canada are finding ways to minimize barriers to completing these tests. Further studies are required to explore novel ways to facilitate patients' access to this important facet of diabetes management.

Osteoporosis Treatment among Hip Fracture Patients at Time of Discharge: A Retrospective Quality Improvement Study

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Introduction: A hip fracture sustained from a standing height or less is a fragility fracture, a serious manifestation of osteoporosis (OP)1. Fragility hip fracture increases the risk of further fracture and mortality. Therefore, fragility hip fracture is an indication for OP pharmacotherapy in patients aged 50 or older.

Objective: To evaluate the administration of OP pharmacotherapy for fragility hip fracture patients upon hospital discharge.

Methods: We conducted a retrospective chart review on patients admitted to Regina General Hospital from January 1 to December 31, 2019 with the diagnosis of fragility hip fracture. Primary outcome included the proportion of patients with appropriate administration of OP pharmacotherapy. Factors associated with OP pharmacotherapy use were identified using logistic regression.

Results: 148 patients were admitted for fragility hip fractures during the study period. Median age was 82.5 years (IQR 73.3–88.0), with 73.6% females, 95.3% were admitted under the Orthopedics service. Only 24 (16.2%) of patients were provided with OP pharmacotherapy at discharge, with 91.7% consisted of bisphosphonates. Being admitted under an Internal Medicine or Hospitalist service was associated with a 50% and 40% respective increase in the rates of OP pharmacotherapy use compared to an Orthopedics service ($p = 0.04$).

Conclusion: Only a small proportion of patients admitted to hospital with fragility hip fractures were discharged with appropriate OP pharmacotherapy. As the majority of patients were admitted under a surgical service, improving the delivery of OP treatment will require education, multidisciplinary collaboration, and implementation of standardized discharge order sets for this specific population.

VIEW POSTER

Thyroid Hormone Replacement Therapy and Renal Outcomes in Mild Subclinical Hypothyroidism

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Objective: To determine whether levothyroxine treatment decreases the risk of adverse renal events among patients with mild subclinical hypothyroidism (mild-SCH) using a population-based cohort study.

Overview: Mild-SCH is defined as an elevated thyroid stimulating hormone (TSH) level less than 10 mU/L with a normal thyroxine level, which affects 5 to 10% of the population. Cross-sectional studies have shown that SCH is associated with renal insufficiency. Few studies have evaluated renal outcomes associated with levothyroxine treatment among patients with mild-SCH. Management of mild-SCH remains controversial. Thus, further studies are necessary to assess the role of levothyroxine treatment in reducing renal insufficiency.

Methods: Using the United Kingdom Clinical Practice Research Database (CPRD) Aurum, we will conduct a population-based cohort study assessing patients with incident mild-SCH, based on two consecutive TSH measurements obtained within 12 months between 1998 and 2018, with follow-up until the end of 2019. Patients will be followed until the occurrence of a major adverse renal outcome or administrative censoring, whichever comes first. Cox proportional hazards models with matching on time-conditional propensity scores will be used to estimate hazard ratios (HRs) and 95% confidence intervals (CIs) for the risk of primary outcomes among levothyroxine treated versus untreated patients with mild-SCH. Several sensitivity analyses will be conducted to confirm our findings.

Expected outcomes: Mild-SCH is anticipated to be associated with worse renal outcomes and levothyroxine treatment is expected to decrease these outcomes in this condition. The findings from this study will further guide the clinical community in the management of mild-SCH.

VIEW POSTER

Optimizing the Treatment of Inpatient Hypoglycemia at a Quaternary Care Hospital: A Quality Improvement Study

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University of Toronto

VIEW POSTER

Background: Prompt treatment of hypoglycemia is important to minimize length of stay and mortality of inpatients with diabetes. This quality improvement study aims to increase the proportion of inpatients with hypoglycemia achieving timely correction to 50% over 2 years.

Methods: The outcome measure was the proportion of inpatients with hypoglycemia, defined as capillary blood glucose (CBG) less than 4 mmol/L, achieving timely correction. Based on chart review and human models of hypoglycemia, timely correction was based on severity of hypoglycemia, such that it takes 15 minutes to increase CBG by 0.5 mmol/L. We conducted chart review of nursing documentation as well as surveyed nurses, pharmacists, and residents to identify root causes for delays in treating hypoglycemia. Our change idea was to implement a hypoglycemia management protocol order set. We created a Statistical Process Control (SPC) XmR to track the outcome measure over time.

Results: The order set was implemented in February 2019. The SPC demonstrates special cause variation following implementation with an 8.5% increase in timely correction of hypoglycemia (average percentage of patients with timely correction pre-intervention = 17.3% and post-intervention = 25.8%, see Figure 1). The process measure was the percentage of patients on insulin and/or sulfonylureas with the order set ordered; this increased from 9.4% to 26.8% from the 1st to 23rd month.

Conclusions: The order set resulted in modest improvement in timely treatment of hypoglycemia. There has been regression towards the mean in recent months and our aim is not yet achieved. Future Plan-Do-Study-Act cycles will focus on hypoglycemia protocol forcing-functions.

Higher Pre-surgical IGF-1 Predicts Hip and Knee Replacements, and Spinal Laminectomies in Patients with Acromegaly

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Background: Arthropathy is highly prevalent in patients with acromegaly and is associated with a poor quality of life. The objective of our study was to report on the factors associated with hip and knee replacements, and spinal laminectomy in patients with acromegaly.

Methods: We performed a retrospective chart review of patients with acromegaly referred to our tertiary pituitary service. We collected data on hip and knee replacements, spinal laminectomies, anthropometrics, and biochemistry (IGF-1 expressed as ratio of upper limit of normal [ULN]). SPSS was used for statistical analyses ($p < 0.05$).

Results: Out of 103 patients included in the study, 23 underwent at least one hip or knee replacement, or laminectomy. Multivariate analyses revealed hip/knee replacement was associated with an older current age (64.7 versus 56.5, $p = 0.024$), and a higher standardized pre-surgical IGF-1 level (2.89 times ULN versus 2.37 times ULN, $p = 0.039$) compared to patients without hip/knee replacement. 5 patients underwent laminectomy and while they had a higher standardized pre-surgical IGF-1, this was not statistically significant. 14 patients that underwent more than one surgery (hip replacement, knee replacement, or spinal laminectomy) had an older current age (68.4 years versus 56.8 years, $p = 0.000$), and a higher standardized pre-surgical IGF-1 (3.1 times ULN versus 2.4 times ULN, $p = 0.020$) versus those with one or fewer surgeries.

Conclusion: Our data suggests that joint replacements are prevalent in patients with acromegaly and correlate with older age and higher pre-surgical IGF-1 levels. Early recognition and interventions for acromegaly-associated arthropathy are important, as they may improve quality of life.

VIEW POSTER

A Case Report of the Progressive Decline in Gonadal Function Associated with Ring Y Chromosome

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Objectives: To present a case of a patient with a 45,X/46,X(r)Y karyotype demonstrating progressive gonadal dysfunction. To illustrate the importance of including fertility early in the discussion and clinical course. To discuss the ongoing challenges and clinical risks associated with this karyotype.

Methods: A retrospective chart review of a patient with 45,X/46,X(r)Y karyotype followed at a University Hospital Andrology Clinic.

Results: A 21-year old male with a 45,X/46,X(r)Y karyotype presented for ongoing care and monitoring of his underlying karyotype and risk of gonadoblastoma. Elevated gonadotropins with a normal testosterone level demonstrated progression of compensated hypogonadism over time. The follicular stimulating hormone level increased over time remaining consistently above the reference range, and bone mineral testing revealed progressive decline. Screening for testicular cancer did not demonstrate any concerning features to suggest underlying malignancy though his risk remains elevated compared to the general population.

Conclusion: This case illustrates the need to include discussion around fertility early in the clinical conversation with those with a 45,X/46X(r)Y karyotype. Screening for complications including impact on bone mineral density, fertility and the risk for testicular malignancies remains an ongoing necessity.

VIEW POSTER

Non-Alcoholic Fatty Liver Disease in Type 1 Diabetes: A Retrospective Case Series

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Background: Non-alcoholic fatty liver disease (NAFLD) ranges from steatosis without inflammation to non-alcoholic steatohepatitis (NASH) cirrhosis. NASH cirrhosis is the second leading cause of liver transplantation in the United States. There is a paucity of data on the link between NAFLD and type 1 diabetes (T1D) despite evidence of increasing prevalence of NAFLD in this population. We aim to describe the characteristics of adult patients with T1D and NAFLD.

Methods: Data was extracted from a database at a single centre between 2010 and 2021. Patients 18 years or older with T1D and NAFLD as diagnosed by an endocrinologist and gastroenterologist respectively were included, and descriptive statistics used to analyze data.

Results: Out of 181 charts, seven patients (n = 5 female, n = 2 male) were included. Their ages ranged from 22–50 (mean = 35), with a T1D duration of 0.3–40 years (mean = 18 years). Comorbidities included dyslipidemia (n = 5/7) and hypertension (n = 4/7). The majority did not have micro- or macrovascular complications. Data up to 6 months prior to NAFLD diagnosis included mean HbA1c 8.8%, Body Mass Index (BMI) 33.3, alanine aminotransferase (ALT) 41 (> 33) U/L, alkaline phosphatase (ALP) 128 (35–104) U/L, triglycerides 2.9 (< 1.7) mmol/L, LDL 2.48 (< 2.0) mmol/L, and HDL 1.26 (> 1.3) mmol/L.

Conclusion: Preliminary data show that patients with T1D and NAFLD have elevated BMI, HbA1c, ALT, ALP, triglyceride, and LDL levels. Dyslipidemia and hypertension were prevalent, though the majority did not have micro- or macrovascular complications of diabetes. We expect to analyze more patient data within the coming months.

VIEW POSTER

Long-Term Follow-up of Men with Macroprolactinomas, Managed With or Without Surgery

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Background: Current guideline directed first line treatment for prolactinomas is medical therapy with dopamine agonists (DAs). This is associated with a risk of long-term adverse events and elevated costs. Improved transsphenoidal surgery techniques result in reduced complication rates and comparable outcomes.

Objective: To compare the long-term reduction in serum prolactin and tumor size in male patients with macroprolactinomas managed with medications alone versus those requiring surgery.

Methods: Retrospective review of 95 adult male patients (mean age 46 years) with macroprolactinomas who underwent medical and/or surgical treatment at a tertiary care centre. An analysis of biochemical and radiological response to treatment approach was performed.

Results: 71 patients had treatment with DAs alone compared with 24 patients who required surgery. Median duration of follow-up was 105 months. At baseline, there was no significant difference in mean age, serum prolactin and maximal tumor diameter between groups. At final visit, significant decline in mean maximal tumor diameter occurred in both groups (3.05 to 1.77 cm). Additionally, median serum prolactin declined significantly (1027.4 to 7 mcg/L) and normalized in 87.3% of patients treated with DAs alone and 66.7% of those requiring surgery. At final follow-up, biochemical control, required DAs in 55 (96.5 %) patients treated with medications alone and 11 (68.8 %) patients requiring surgery.

Conclusions: Our data indicate that long-term control of hyperprolactinemia in men with macroprolactinomas is achievable with medical therapy, with or without surgery. In selected cases, a neurosurgical approach should be considered to reduce long-term dependence on DAs.

VIEW POSTER

Cardiac Metastases From a Follicular Variant of Papillary Thyroid Carcinoma Presenting as Acute Chest Pain in a 53-year old Male

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Cardiac metastases are a rare but serious and often fatal complication of epithelial thyroid cancer. Currently, the most common approach to management of metastatic thyroid cancer is a combination of radiation therapy, targeted therapies and surgical resection. Surgical resection of the cardiac mass is the treatment of choice where possible to prevent the significant morbidity and mortality associated with cardiac metastases. We describe the case of a 53-year-old male who presented with acute atypical chest pain and was found to have stage IV papillary thyroid carcinoma, follicular variant (FVPTC), with metastases to the heart, mediastinal lymph nodes, soft tissue and bone. The molecular analysis of his tumor was positive for NRAS and TERT C228T mutations, both associated with an increased risk of distant metastases. In this patient, a multidisciplinary team composed of experts in medical and surgical oncology, radiation oncology, endocrinology and pathology formulated a treatment plan that allowed for the successful resection of the primary thyroid tumor as well as soft tissue and cardiac metastases followed by radioactive iodine therapy. Based on our literature review, this is the first case report to attempt this aggressive surgical management of metastatic papillary thyroid cancer. Surgical resection of cardiac metastases should thus be considered in the management of aggressive metastatic thyroid cancer as it has the potential to increase survival if all metastases can be resected with appropriate adjuvant radiation or systemic therapy.

Alpelisib-Induced DKA and Successful Discontinuation of Insulin within Two Weeks of Resolution

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Background: Alpelisib is a PI3K (phosphatidylinositol-3-kinase) inhibitor approved for treatment of breast cancer. Hyperglycemia is a common side effect and diabetic ketoacidosis (DKA) can rarely occur. Our case highlights the reversibility of alpelisib-induced hyperglycemia and patient-centered approach to treatment.

Case Presentation: A 66-year-old woman with metastatic breast cancer, not previously known to have diabetes (recent A1C 5.9%), was admitted for DKA six weeks after initiation of alpelisib. She was on antibiotics for a perianal abscess but did not have systemic infection. On presentation, glucose was 26.5 mmol/L, A1C 11.3%, pH 7.21, anion gap 24 mEq/L, beta-hydroxybutyrate 7.32 mmol/L, and anti-GAD $<$ 5 units/ml. After 24 hours of IV insulin, she was transitioned to subcutaneous glargine and as needed aspart correctional scale. She decided against resuming alpelisib and expressed interest in eventual MAID. She developed C. difficile and pneumonia in hospital, extending admission to 18 days. Blood sugars were improving by day 4 of admission. We stopped glargine on day 7 and continued as needed correctional scale, with last dose given on day 14. At discharge, fasting glucose was 5.3–6.3 mmol/L off insulin. Anion gap remained closed.

Discussion: Alpelisib-induced DKA has been reported to occur 1 week to 3 months after initiation of therapy. Alpelisib can cause dose-dependent and reversible hyperglycemia through inhibition of insulin receptor signaling via P13K. If alpelisib is not resumed, insulin discontinuation should be considered to simplify treatment for patients, even after DKA. If glycemic control is needed off insulin, metformin is the first-line oral agent of choice.

An Evaluation of Virtual Care for Gestational Diabetes using the Quadruple Aim Framework: Assessment of Patient and Provider Experience, Cost and Clinical Outcomes

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Objective: To evaluate the impact of virtual care for gestational diabetes (GDM) in the context of the COVID-19 pandemic.

Methods: This mixed methods program evaluation used the quadruple aim framework. The impact on patient and provider satisfaction and costs was assessed with surveys and interviews. Chi-square tests of independence compared clinical outcomes before (April 2019–February 2020) to after (May 2020–March 2021) the shift to virtual care.

Results: 82 women who received their GDM care virtually completed a patient experience questionnaire. The majority rated their virtual care experience as good or excellent (93%) with a preference to continue visits in the future (84%). Most respondents felt virtual care saved them money (90%) and time (98%). Six providers were interviewed and all felt the switch to virtual care was positive but there was concern about the loss of non-verbal cues and personal connections. Physicians noted increased efficiency however more difficulty with assessing glucose trends. Nurses noted an increased work load, concerns about adequacy of patient education and delays in insulin initiation. When comparing outcomes for women who received in-person and virtual care there were no significant difference in rates of insulin initiation, C-sections, macrosomia or NICU admissions. There was a decreased rate of missed appointments after the switch to virtual care (6.1% vs 1.1%, p-value $< .01$).

Conclusion: There has been high patient and provider satisfaction for virtual GDM care with no difference in clinical outcomes and less missed appointments. Virtual GDM care should remain an option in the future.

First Report of Type II Diabetes Mellitus in an Adult with HMG-CoA Lyase Deficiency Associated with Hyperammonemia

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Background: 3-hydroxy-3-methylglutaryl-coenzyme A (HMG-CoA) lyase deficiency is an autosomal recessive disorder, resulting in a lack of ketogenesis and leucine catabolism. Hallmarks of decompensation include hypoglycemia without ketosis (or hypoketosis), metabolic acidosis, and hyperammonemia. Management includes avoiding fasting and restricting dietary protein and fat, often translating to a high carbohydrate diet. Conversely, type II diabetes mellitus (T2DM) requires carbohydrate restriction and/or anti-hyperglycemic agents; thus, managing these co-existing disorders is challenging.

Case: A 36-year-old male with HMG-CoA lyase deficiency, metabolic syndrome, and a recent diagnosis of T2DM (HbA1c 7.9%) presented with confusion. His BMI was 34.3 and acanthosis nigricans was present on exam. Family history was negative for T2DM. Blood work revealed pH 6.97, glucose 32 mmol/L, ammonia 235 umol/L, bicarbonate 4 mmol/L, and beta-hydroxybutyrate 0.4 mmol/L. He was diagnosed with hyperosmolar non-ketotic hyperglycemia and hyperammonemia secondary to HMG-CoA lyase metabolic decompensation requiring ICU admission. Hyperammonemia management was challenging because alternative calories with IV dextrose (due to hyperosomolar non-ketotic hyperglycemia) and IV lipids (due to HMG-COA lyase deficiency) couldn't be provided. Thus, he was started on hemodialysis and IV insulin with marked improvement.

Conclusion: We hypothesize that HMG-CoA lyase deficient patients are at increased risk for T2DM due to avoidance of fasting and carbohydrate supplementation. His T2DM diagnosis may have been a key factor in his presentation, impairing cellular glucose uptake and producing a state similar to hypoglycemia, despite being profoundly hyperglycemic. Managing T2DM and HMG-CoA lyase deficiency warrants special considerations because of the potential for hypoglycemia leading to metabolic decompensation.

Specific Medical Therapies of Excess Steroidogenesis in a Patient with Primary Bilateral Mecronodular Adrenal Hyperplasia

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Background: Primary bilateral macronodular adrenal hyperplasia (PBMAH) is a rare etiology of adrenal Cushing's syndrome, usually treated surgically. The literature regarding long-term medical therapy of PBMAH is limited.

Case: We evaluated a 37-yr-old man with bilateral macronodular adrenal hyperplasia co-secreting excess aldosterone and cortisol. The screening for aberrant adrenal G-protein coupled receptor identified regulation of steroidogenesis by β-adrenergic and V1-vassopressin receptors. Medical therapy with B-blockers decreased steroid levels by ~50%. The patient underwent left adrenalectomy which normalized his aldosterone and cortisol levels only transiently. He was then successfully treated with a combination of nadolol and eplerenone for 10 years. Genetic testing identified a germline ARMC5 mutation in the patient and one of his sons. During the past year, progressive escape from medical therapy occurred with elevated UFC (1,5× the upper normal limit), hypertension, weight gain and hyperglycemia. The patient was enrolled in the GRACE study (NCT03697109) adding the glucocorticoid receptor antagonist Relacorilant up to 400 mg orally once daily to his medication. Unfortunately, the patient's hyperglycemia and high blood pressure failed to normalize and he complained of generalized muscle pain and fatigue with increasing UFC levels. A completion right adrenalectomy will be performed shortly.

Discussion: patients with PBMAH with excess steroidogenesis can experience long-term benefit from specific medical therapy targeting some aberrant receptors but eventually escape when regulated by other receptors without specific antagonists. Aldosterone excess can be controlled by MR antagonists, but in this case, the glucocorticoid receptor antagonist Relacorilant was unable to block cortisol excess sufficiently.

Milk Alkali Syndrome as a Rare Cause of Severe Hypercalcemia in Twin Gestation

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Background: Hypercalcemia occurs in approximately 0.04% of women of child-bearing age, most commonly due to primary hyperparathyroidism, but cases of iatrogenic or malignancy-associated hypercalcemia have been noted.

Case: A 28-year-old woman, G1P0 at 14 weeks' gestation of dichorionic diamniotic twins, presented to the Emergency Department with hyperemesis and 3 days of muscle cramps, spasms, and weakness. Investigations identified severe hypercalcemia with a serum calcium of 5.03 mmol/L [2.24–2.58] (ionized calcium 2.45 mmol/L [1.14–1.28]), as well as hyperphosphatemia of 1.54 mmol/L [0.95–1.54], metabolic alkalosis with pH 7.52 [7.33–7.46], and severe renal injury with creatinine of 505 umol/L [49–84] but preserved urine output. She described taking 5× 300mg calcium carbonate tabs daily for her hyperemesis since 5 weeks gestational age.

Results: Patient was transferred to intensive care, fluid resuscitated, and given 400u subcutaneous calcitonin on Day 0, with Sustained Low Efficiency Dialysis (SLED) on Day 1. Investigations revealed PTH 1.2 [1.6–6.9], 25-hydroxy vitamin D 68 nmol/L [75–250], 24-hour urine calcium 3.5 mmol/d [2.5–7.5], and normal serum protein electrophoresis. Radiographic malignancy screen was negative. PTH-related peptide 1.6 pmol/L [< 4.2] and 1–25 hydroxy vitamin D < 12 pmol/L [48–190] resulted post-discharge. Obstetrical ultrasound found normal growth and anatomy of her twins. Calcium and renal function returned to normal limits on Day 2 and remained stable until discharged home Day 6 and thereafter in follow-up.

Discussion: Reports of milk-alkali syndrome causing severe hypercalcemia are scarce, with most cases occurring later in gestation. This case represents a dramatic presentation requiring renal replacement therapy early in twin gestation.

Insulin Reactions: What Do You Do When Your Treatment's the Trigger?

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A 17-year-old female patient with Type 1 Diabetes developed subcutaneous reactions to her insulin. She was diagnosed with diabetes at age 3 y and has a history of both lipohypertrophy and lipoatrophy. After 13 years on insulin therapy, she started to develop painful, erythematous nodules at the sites of her insulin injections. Reactions initially were only to rapid insulin but progressed to include long-acting insulin. Allergy and Dermatology teams were consulted. Work-up including patch testing did not reveal a specific trigger. A biopsy of a nodule revealed septal panniculitis consistent with an immune-mediated reaction to insulin or its components. Multiple different insulin types were trialed without improvement in her symptoms. Alternative delivery methods were trialed including the Medtronic i-Port injection port and pump therapy, both of which resulted in the same painful nodular lesions after a brief reprieve. Oral antihistamines did not alter the reaction severity. Topical immunosuppressants and analgesics applied to the skin prior to injection were ineffective. She was trialed on hydroxychloroquine, colchicine, methotrexate, and oral steroids without improvement. Due to the severity of her pain, she required admission to hospital for IV insulin therapy. After months in hospital, she underwent surgical insertion of a Roche DiaPort system which provides a continuous infusion of insulin via a pump into the intraperitoneal space. This operation was the first of it's kind in Canada. We present this case in order to help expand the literature around cutaneous insulin reactions and to highlight a possible solution when other treatments have failed.

Genetic Dissection of Primary Aldosteronism in a Patient with Multiple Endocrine Neoplasia Type 1 (MEN1) and Concomitant Ipsilateral Adrenocortical Carcinoma and Adenoma

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Background: Adrenal tumors are found in up to 40% of patients with multiple endocrine neoplasia type 1 (MEN1). However, adrenocortical carcinomas (ACC) and primary aldosteronism (PA) are rare in MEN1.

Case: A 48-year-old woman known for primary hyperparathyroidism and hypertension with hypokalemia was referred for a right complex 8 cm mass with a 38.1 SUVmax uptake on 18F-FDG PET/CT. PA was confirmed by saline suppression test (aldosterone 1948 pmol/L–1675 pmol/L, N:80–400) and suppressed renin levels (< 5 ng/L, N:5–20). Catecholamines, androgens, 24h urinary cortisol and pituitary panel were normal. A right adrenalectomy by laparotomy revealed a concomitant 4 cm ACC and a 2.3 cm adrenocortical adenoma. Immunohistochemistry showed high expression of aldosterone synthase protein in the adenoma but not in the ACC, supporting excess aldosterone production by the adenoma.

Genetic analysis: After genetic counselling, patient underwent genetic analysis of leucocyte and tumoral DNA. Sequencing of MEN1 revealed a pathogenic, heterozygous germline mutation in MEN1 (c.1556delC,p.Pro519Leufs*40). The wild-type MEN1 allele was lost in the tumoral DNA of both the resected adenoma and carcinoma. Sequencing analysis of driver genes in PA revealed a somatic mutation in exon 2 of the KCNJ5 gene (c.451G > A, p.Gly151Arg) only in the benign adenoma.

Conclusion: To our knowledge, we describe the first case of adrenal collision tumors in a patient carrying a germline mutation of the MEN1 gene associated to MEN1 loss of heterozygosity in both ACC and adenoma and a somatic KCNJ5 mutation leading to aldosterone-producing adenoma. This case gives new insights on adrenal tumorigenesis in MEN1.

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