

Best Case Presentation

Disseminated BCG Sepsis with Bone Marrow, Liver, and Lung Involvement Following Intravesical Bacillus Calmette-Guerin (BCG) Therapy

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Keywords

intravesical BCG, disseminated BCG, mycobacterium bovis, sepsis, pancytopenia

Abstract

A 54-year-old man presented to the emergency department with sepsis one week after receiving an intravesical administration of Bacillus Calmette-Guerin (BCG) for the treatment of urothelial carcinoma. He was admitted to hospital for potential urosepsis and was started on broad-spectrum antibiotics. Despite this therapy he had persistent fevers, tachycardia, and diaphoresis. He also developed pancytopenia, hepatitis, and pneumonitis while in hospital. A presumptive diagnosis of BCG dissemination is made and he was started on rifampin, isoniazid, and ethambutol in addition to high-dose prednisone. A bone marrow biopsy shows granulomas suggestive of mycobacterium infiltration. The stains for acid-fast bacilli in the bone marrow are negative. BCG is a live, attenuated strain of mycobacterium bovis. High-grade non-muscular invasive bladder cancer is commonly treated with intravesical administration of BCG. This treatment often lasts over three years.¹ The potential adverse events associated with BCG are broad and may occur months to years after administration. Local mycobacterium may cause cystitis, while dissemination

may lead to multi-organ dysfunction including sepsis, hepatitis, nephritis, pneumonitis, pancytopenia, osteomyelitis, and arthritis.² Less than 0.4% of intravesical BCG treatments become disseminated. These adverse events have been attributed to both the primary mycobacterium infection and to hypersensitivity reactions. Patients with disseminated BCG often have a favourable response to treatment with anti-tuberculosis medications and corticosteroids.³ BCG is the standard of care for certain types of urothelial carcinoma in Canada. This case helps illustrate the spectrum of serious adverse events associated with this therapy. As indicated by cases in the literature, early diagnosis and treatment can lead to good outcomes. General internists should have a high index of suspicion for any patient presenting with organ dysfunction with an immediate or remote history of intravesical BCG administration.

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Best Research Abstract

Systematic Review: The Cost-Effectiveness of Exercise Programs Used as A Primary Prevention in Patients with Moderate to High Risk of Cardiovascular Disease

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Keywords

exercise, lifestyle, cost-effectiveness, cardiovascular disease, primary prevention

Purpose

Exercise intervention for the secondary prevention of cardiovascular disease is well supported by evidence, but reports on its cost-effectiveness in primary prevention are rare. We aim to review the current knowledge concerning the cost-effectiveness of exercise programs used in patients with moderate to high risk of cardiovascular disease.

Methods

A search was performed for economic evaluations of exercise interventions in patients with at least one risk factor for cardiovascular disease. A search containing terms including “exercise,” “costs and cost analysis,” and “cardiovascular disease” was performed and reviewed independently by two researchers. Cost-effectiveness was described based on a model for evaluating interventions intended to promote physical activity.

Results

Our search resulted in 306 articles, 12 of which met our inclusion criteria. Eight were randomized controlled trials and 4 were models with hypothetical cohorts. Six studies examined diabetic patients, 1 examined hypertensive patients, 2 examined obese patients, and 3 examined patients with combined risk factors for cardiovascular disease. Exercise interventions were broad, ranging from 6 hours to 10 years. Ten studies concluded their interventions as cost-effective, 1 as not cost-effective, and 1 as inconclusive.

Conclusion

The literature on exercise interventions used in primary prevention for patients with moderate to high risk of cardiovascular disease strongly supports their cost-effectiveness. However, the studies reviewed were very heterogeneous in the duration and intensity of their interventions. Future research directions should examine the efficacy and cost-effectiveness of standardized lifestyle interventions, with the aim of garnering enough evidence to support or refute their utility in the primary health care setting.

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Abstracts Selected for Poster Presentation, Resident Category

Campylobacter jejuni reactive arthritis and brainstem encephalitis

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Keywords

Campylobacter jejuni, reactive arthritis, Bickerstaff's brainstem encephalitis, anti-GQ1b antibody syndrome

Bickerstaff's brainstem encephalitis is a rare and potentially fatal complication of *Campylobacter jejuni* enteritis. Numerous adult case reports are described in the English literature (1-5); however, we present a case of both reactive arthritis and brainstem encephalitis complicating *Campylobacter jejuni* infection in a single patient. We also review the literature describing these complications. A 55-year old male immigrant from Columbia presented to the emergency room with severe osteoarticular pain and gastroenteritis within one week of eating undercooked chicken. Stool cultures grew *Campylobacter jejuni*. While receiving treatment for reactive arthritis he developed progressive neurologic deficits, including encephalopathy, ophthalmoplegia, ataxia, and hyperreflexia. Magnetic resonance imaging showed brainstem encephalitis. Cerebrospinal fluid analysis demonstrated cytoalbuminologic dissociation, but neurologic serology was negative. He recovered after treatment with corticosteroids, intravenous immunoglobulin, and extensive rehabilitation. Recognizing brainstem encephalitis

following enteric infection with *Campylobacter jejuni* is imperative. When associated with neurologic deficits, reactive arthritis can be difficult to distinguish from systemic inflammatory diseases, and can complicate rehabilitation. Multiple treatment modalities and a multi-disciplinary approach may be needed to treat the complications of *Campylobacter jejuni* enteritis.

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Peritonitis as the First Presentation of Disseminated Listeriosis in a Patient on Peritoneal Dialysis—A Case Report

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Keywords

Peritoneal dialysis; peritonitis; listeria monocytogenes

Infections with *Listeria monocytogenes* are uncommon but serious, with mortality rate approaching 30 percent in cases of systemic involvement despite first-line therapy. They are usually caused by ingestion of contaminated foods, however sporadic infections have been described. *Listeria monocytogenes* is a rare cause of peritonitis, and most of the published cases are in patients with cirrhosis and ascites. There are a few reported cases of *Listeria* peritonitis associated with peritoneal dialysis, primarily isolated peritonitis. If detected early, listeria peritonitis can be successfully

treated with ampicillin, alone or in combination with gentamicin. Vancomycin has been listed as a second line agent, however, it has been associated with treatment failure. In this case report, we present a patient who developed disseminated listeriosis, with peritonitis as the first manifestation of disseminated infection. This case illustrates the importance of having a high index of suspicion for *L. monocytogenes* if patients deteriorate despite empiric therapy for peritoneal dialysis (PD) associated peritonitis, and serves as another example demonstrating the inadequate coverage of vancomycin for *L. monocytogenes*.

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Asymptomatic Coarctation of the Aorta in a Middle-Aged Man: The Significance of Physical Examination

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Coarctation of the aorta is narrowing of the aorta that impedes normal blood flow. This condition is associated with a high mortality rate if untreated. It rarely presents in adulthood, especially in Canada, due to early childhood screening. We report a case of a middle-aged newly immigrated gentleman with a history of hypertension who was incidentally found to have some physical examination findings concerning for coarctation

of the aorta. Subsequent imaging studies not only confirmed this diagnosis, but also found other cardiac complications commonly associated with it. Recently, he underwent surgical intervention significantly impacting his mortality and morbidity. Our aim through this case report is to emphasize the importance of physical examination findings to detect such cases in unscreened immigrant populations.

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Xanthogranulomatous Pyelonephritis Presenting as Pleuritic Chest Pain

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Keywords

Xanthogranulomatous pyelonephritis, pyelonephritis, pleural effusion, pleuritic chest pain

A 43-year old female with a history of renal colic and constitutional symptoms was admitted to hospital after presenting with a one-day history of subxiphoid pleuritic chest pain radiating to the left shoulder tip and flank. A CT chest for suspected pulmonary embolism incidentally showed a loculated effusion in the subcapsular region surrounding the spleen. Further evaluation with a CT of the abdomen and pelvis revealed a staghorn calculus in the left kidney with surrounding inflammatory soft tissue changes and communication across the left hemidiaphragm. A presumptive diagnosis of xanthogranulomatous pyelonephritis (XPN) was made and the patient was started on IV antibiotics and ultimately underwent a successful laparoscopic radical left nephrectomy. Surgical pathology confirmed the diagnosis of XPN. XPN is a rare and severe manifestation of chronic destructive granulomatous inflammation of renal parenchyma often resulting in complete loss of renal function in the affected kidney¹. This inflammation may invade and spread to adjacent structures, most commonly the gastrointestinal tract, urinary tract, and skin². Patients typically present with flank pain, lower urinary tract symptoms, as well as constitutional symptoms. Almost all cases of XPN occur

in the setting of obstructive uropathy, nephrolithiasis, and/or recurrent urinary tract infections³. Once a diagnosis of XPN is established, treatment often involves nephrectomy with pre-and-post-operative antibiotics^{4,5}. To our knowledge, this is the first case of a patient with XPN presenting with pleuritic chest pain. Her chest pain was explained by local spread to and involvement of the left hemidiaphragm, indeed an unusual presentation of a rare illness. In any patient with a history of lower urinary tract pathology presenting with abdominal, flank or even chest pain amidst constitutional symptoms, a diagnosis of XPN should be considered and clinicians should adopt a low threshold to order appropriate imaging studies of the abdomen and pelvis.

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A case of Hemothorax Due to Ruptured Mycotic Aneurysm of Intercostal Arteries Associated with Infective Endocarditis

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Keywords

infective endocarditis, mycotic aneurysm, intercostal artery, hemothorax

Infective endocarditis (IE) is an infection of the endocardium caused by a wide variety of microorganisms and may readily extend to involve the valves and adjoining structures of the heart. In addition to local extension, vegetation can also embolize and infect the arterial wall in peripheral vessels, causing peripheral mycotic aneurysms. Symptomatic peripheral mycotic aneurysms have been reported in 2% of IE cases, and the majority of those are found in the intracranial vessels supplying the brain. Less common sites of mycotic aneurysms include the popliteal, ulnar, humeral, hepatic and coronary arteries. Here we present a rare type of peripheral mycotic aneurysm as a complication of IE that has not been previously reported in the English literature. The patient was a 40-year-old male admitted to our hospital for methicillin-resistant *Staphylococcus aureus* IE and active intravenous drug use. He was treated with Vancomycin and Rifampin. Seven days

into hospital admission, he developed acute shortness of breath and anemia due to a large right-sided hemothorax. CT angiogram revealed active extravasations of contrast from three intercostal arteries. Urgent microcoil embolization successfully controlled the active bleed, and thoracotomy was performed for exploration and evacuation of the massive hemothorax. The patient tolerated these procedures well, and he was discharged home after finishing his course of antibiotics in hospital. Intercostal artery mycotic aneurysms are commonly associated with coarctation of aorta, and in fact have not previously been reported as a complication of infective endocarditis. Other rare causes of intercostal artery mycotic aneurysm include trauma, interventional procedures and local infections. Our case report highlights the possibility of devastating rupture of mycotic aneurysms within intercostal arteries in patients with infective endocarditis and alerts physicians to have a high index of suspicion for this rare but potentially fatal complication.

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Postpartum Hypertensive Disorders—What are We Doing About Them?

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Keywords

postpartum hypertension, gestational hypertension, preeclampsia, eclampsia

Background

Hypertensive disorders of pregnancy (HDP) are a leading cause of preventable maternal morbidity and mortality in Canada, particularly amongst women with postpartum presentation of HDP. Women with postpartum HDP often present to the Emergency Department (ED), where they may experience delayed recognition and treatment of hypertension leading to serious adverse clinical outcomes. To address this care gap, a novel clinical management protocol for the treatment of postpartum HDP in the ED was created in Calgary by a multidisciplinary team of clinicians (OBIM, GIM, ED, Neurology/Stroke) and implemented into practice in May 2016. The objective of this study is to describe the **current** management and clinical outcomes of women with postpartum HDP presenting to Calgary EDs, prior to implementation of our protocol.

Methods

A retrospective chart review of 119 postpartum women attending three Calgary EDs from 2010-2012, within 42 days of delivery,

was performed. The National Ambulatory Care Reporting System (NACRS) was used to randomly select 119 women; 44 cases (ICD-10 codes for any HDP), and 75 controls (ICD-10 codes for related diagnoses, e.g., abdominal pain, headache). Hospital charts reviewed for: maternal demographics; obstetrical history; and ED clinical findings, investigations and management. Results were summarized with descriptive statistics. Predictors of clinical outcomes and management are assessed through logistic regression.

Results

We identified important gaps in the recognition, investigation, and clinical management of women with postpartum HDP. This chart review will be repeated six months after protocol implementation to assess changes in management and associated clinical outcomes. Through a pre-post intervention comparison, we will evaluate the uptake and effectiveness of the novel ED management protocol.

Conclusions

This is part one of a multi-step study to describe the current burden, presentation, and ED management of postpartum HDP prior to implementation of the protocol.

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Medication use by middle-aged and older participants of an exercise study: results from the *Brain in Motion* study

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Keywords

natural health products, prescription drugs, geriatrics, polypharmacy

Background

Over the past 50 years, there has been an increase in the utilization of prescribed, over-the-counter (OTC) medications, and natural health products. In this study, we study the pattern of medication use in a sedentary but otherwise healthy older persons and determined if there was an association between medication use and aerobic fitness level.

Methods

All participants enrolled in the *Brain in Motion* study provided the name, formulation, dosage and frequency of any medications they were consuming at the time of their baseline assessment. Maximal aerobic capacity (VO₂max) was determined on each participant.

Results

271 participants (mean age 65.9 ± 6.5 years; range 55-92; 54.6% females) were enrolled. Most were taking one or more (1+) prescribed medication (n = 204, 75.3%), 1+ natural health product (n = 221, 81.5%) and/or 1+ over-the-counter (OTC) drug (n = 174, 64.2%). The most commonly used prescribed

medications were HMG-CoA reductase inhibitors (statins) (n = 52, 19.2%). The most common natural health product was vitamin D (n = 201, 74.2%, average intake 1896.3 IU/participant). For OTC drugs, non-steroidal anti-inflammatories (n = 82, 30.3%) were the most common. Females were more likely than males to take 1+ OTC medications, as well as supplements. Those over 65 years of age were more likely to consume prescription drugs than their counterparts (p ≤ 0.05). Subjects taking more than two prescribed or OTC medications were less physically fit as determined by their VO₂max.

Conclusions

Medication use was common in otherwise healthy older individuals. Consumption was higher among females and those older than 65 years. Vitamin D intake was over two-fold higher than the recommended 800 IU/day for older persons, but within the tolerable upper intake of 4,000 IU/day. The appropriateness of the high rate of medication use in this generally healthy population deserves further investigation.

Funding

This study was funded by CIHR and the Brenda Strafford Foundation Chair in Alzheimer Research

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The Canada-Guyana Medical Education Project: A Win-Win Partnership Among Post-Graduate Medical Residents

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Keywords

medical education, international residency education

Background

Guyana is a South American nation with a population of 735,000 and a single accredited medical school. Previously there was no post-graduate training in Guyana; students had to pursue specialist training in the United States or Cuba. The majority of trainees who left Guyana did not return, exacerbating the paucity of trained physicians in Guyana. A Guyana-based, internal medicine (IM) post-graduate program was established in 2013 with the goal of retaining IM specialists. However, lack of instructors and formalized teaching sessions are barriers to the program's success. The objective of this project is to foster a partnership between The University of Calgary and University of Georgetown's IM programs for the development of sustainable, mutually beneficial, resident-led videoconference teaching sessions.

Methods

Calgary residents volunteered to create and present weekly teaching sessions to Guyanese residents based on Canadian Royal College of Physician and Surgeons learning objectives via videoconference. Guyanese trainees provided feedback to Calgary

residents using Likert-scale based questionnaires on teaching style, content, and organization. A similar survey was completed by Calgary residents to assess the value of participation in this project. Proportions of residents who gave a positive response or agreed to each survey question were reported.

Results

Twenty-four videoconference-teaching sessions were conducted over 7 months with a total of 191 and 16 surveys completed by Guyana and Calgary residents, respectively. An average of 8/14 Guyanese residents attended each session. Over 92% of Guyana and Calgary residents agreed that the sessions enhanced their learning, 93% reported increased interest in international collaboration, and 95% would recommend the sessions to co-residents. Furthermore, 88% of Calgary residents felt the sessions improved their teaching skills and 100% wished to present again.

Conclusions

The formation of a resident-led, videoconference teaching series is a mutually beneficial partnership for Canadian and Guyanese medical residents and fosters international collaboration in medical education.

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Carnitine Administration in Valproate-Induced Pancreatitis: Adverse Event or Side Effect Mitigation?

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A 33-year old female with a history of Lennox-Gastaut syndrome presented to the emergency department with three days of abdominal pain and distension. Her lipase was 834 U/L (normal 0-80 U/L). Computed tomography of the abdomen demonstrated acute necrotizing pancreatitis and multiple hepatic abscesses. Abdominal ultrasound did not reveal cholelithiasis. Serum calcium, triglycerides, and IgG4 levels were normal. She was non-verbal and fed via gastrostomy-tube. She had no access to ethanol. She took phenytoin and valproic acid for seizure management. Her valproic acid level 261 umol/L (350-700 umol/L) and her ammonia was 112 umol/L (12-47 umol/L). Valproic acid was discontinued. She received 15 mg/kg of L-carnitine every 8 hours for three days until her ammonia level was less than 40. She was discharged ten days later. Valproate-induced pancreatitis is an uncommon idiosyncratic drug reaction that has been reported since 1979 and led to a FDA Black Box warning

in 2000. The mechanism of valproate-induced pancreatitis is uncertain; proposed mechanisms include accumulation of a toxic metabolite or depletion of anti-oxidants in the pancreas. L-carnitine is an amino acid that is required for β -oxidation of fatty acids in the liver. It is also heavily used in hepatic valproate metabolism; L-carnitine is sometimes administered during valproate toxicity to decrease hepatotoxicity. Deficiencies in enzymes that metabolize carnitine are associated with recurrent pancreatitis. For these reasons, we administered L-carnitine to this patient with presumed valproate-induced pancreatitis. Idiosyncratic drug reactions are uncommon and there is a lack of evidence for drug antidotes for affected patients. Toxic metabolite accumulation is sometimes implicated in idiosyncratic drug reactions and is thought to cause valproate-induced hepatotoxicity. For this reason, L-carnitine was administered as a potential treatment for toxic metabolites secondary to valproic acid.

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Abstracts Selected for Poster Presentation, Faculty Category

An Unusual Presentation of Adrenal Cushing's syndrome in an Elderly Woman.

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Keywords

Cushing's syndrome, metyrapone, adrenal crisis

Cushing's syndrome may lead to significant morbidity and mortality. The clinical features may be subtle and the aetiology varied. We did a case study of a 66-year-old woman with a 2-year history of gradual debilitation, declining mobility, leg ulcers and poor wound healing. Her medical history included diabetes mellitus, hypertension and osteoporosis. Clinical findings revealed mild truncal obesity, bruising and thinning of the skin, plethora, proximal myopathy and muscle wasting. Laboratory results confirmed cortisol excess and ACTH independence. Computerized tomography showed a left adrenal mass. In conclusion, this patient had ACTH independent Cushing's syndrome due to a benign, functioning, left adrenal adenoma confirmed on histology. She was treated successfully by a laparoscopic left adrenalectomy. The most important initial step, in the management of patients with Cushing's syndrome, is to establish a diagnosis. Cushing's syndrome may be mimicked by other pathophysiologic states such as alcoholism and depression. Exogenous steroid therapy is the most common

cause of Cushing's syndrome. In the initial diagnostic work up, different screening tests were used to show a loss of the normal circadian rhythm of cortisol secretion. The 24 hour urinary free cortisol excretion, 1 mg overnight dexamethasone suppression test, 2 mg low dose dexamethasone suppression test, midnight salivary and serum cortisol measurements are simple and readily available screening tests. Plasma ACTH levels will distinguish ACTH dependent from independent causes. Surgery is usually curative, however, medical treatment is more appropriate for patients of high surgical risk or with advanced malignancy. Prior to surgery, patients will require optimization of their nutritional status, mental status, blood pressure, potassium and glucose parameters. Ketoconazole was given to reduce cortisol production. Metyrapone is a suitable alternative. Adequate steroid cover, starting in the peri-operative period, is essential to prevent an adrenal crisis post tumor resection. Atrophy of the contralateral adrenal gland, from chronic exposure to steroid excess, may take months to years to resolve. Dual steroid therapy is required until normal endogenous steroid production is restored. Our patient is recovering well and steroid therapy is being slowly weaned.