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By Students, For the World

RURAL MEDICINE

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Acute ‘Olympic Hepatitis’

2010 Rural Emergency Continuum of Care Conference

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The *UBC Medical Journal* uses an open access publishing policy in line with our mandate to publish in a socially responsible way. We endorse open access publishing as the preferred model for scholarly communication and encourage the adoption of open access principles by universities and research agencies.
On behalf of the Michael Smith Foundation for Health Research (MSFHR), I congratulate the UBC Faculty of Medicine students on the publication of the fourth issue of the *UBC Medical Journal*. The journal provides important insight into the research being done by medical students at UBC — our future leaders in medicine and health research in this province.

MSFHR is proud to have supported many talented students in the UBC Faculty of Medicine over the last 10 years with our master’s, PhD and post doctoral awards. These awardees and other faculty students make a valuable contribution towards putting BC on the Canadian and international maps as one of the places to conduct outstanding health research.

UBC students are pursuing a great number of exciting research projects, all of which have significant potential to improve health and health care in the future. Their commitment to health research helps build a strong health research sector in BC, which in turn benefits our health system, our advanced education system, our economy and all British Columbians.

Again, our congratulations on compiling a publication that showcases the research contributions of students in the UBC Faculty of Medicine — we look forward to seeing many more issues in the years to come.

Dr. John R G Challis, PhD, DSc, FRCOG, FCAHS, FRSC
President & CEO, Michael Smith Foundation for Health Research
Canadian Health Care: A Focus on Rural Medicine

Nicolas Bilbey, BSc (Hons), MSc, Shifana Lalani, BSc (Hons), MSc

Rural medicine has played a significant role within the overarching field of Canadian health care. As an expansive country, Canada encompasses 10 million square kilometres, the majority of which is considered rural and is home to 32% of the population. In 2005, 21% of Canadians lived in communities with populations of less than 10,000, and 9.4% of physicians lived and worked in those same communities. The majority of physicians are focused in dense urban epicentres where technology and resources are more widely available. Since this technology is not always available in rural centers, rural physicians tend to rely more on small groups and a wide range of skills. Interestingly, as one transitions from urban centres to more rural settings, there is a significant change in health outcomes. For example, rural regions are reported to have an increased prevalence of smoking, obesity, circulatory diseases, and injuries.

Although the Canada Health Act states that all Canadians should have reasonable access to health care services, the observed differences of health outcomes in rural regions could be attributed to limited access to services and higher expenses for the individual if specialized care is required. Of equal importance is the difficulty in recruiting and retaining physicians in rural regions. Strategies such as providing financial incentives or creating a Rural and Remote Access Fund have not managed to successfully curtail the continuing loss of physicians to urban settings.

In addition to these strategies, medical education programs in Canada have recognized the need for rural physicians and as a result, have initiated a variety of programs to promote rural areas to medical undergraduates. For example, the distributed sites of the University of British Columbia Medical Program have been designed to expose medical students to rural British Columbia. To this extent, this program has expanded to include a distributed site in the interior of British Columbia for 32 medical students in addition to the northern and island British Columbia sites, which each house 32 medical students. This totals almost 100 medical students training at campuses across the province. The education provided at these distributed sites allows students to adapt to the lifestyle of a rural environment. Studies have shown that several factors, such as family background, time spent in a rural area, and specific personal values and attributes, all contribute to medical students studying, and eventually practicing, in a rural setting.

Numerous additional programs have been proposed and implemented in British Columbia to facilitate the student rural experience. This includes the integrated clerkship program and the rural family practice clerkship implemented in the medical school curriculum. These programs provide a well-rounded medical education as rural physicians have a greater amount of independence, autonomy and responsibility compared to their urban counterparts due to their relative geographical isolation. It has been shown that family physicians in less populated regions are involved in a wide variety of procedures, such as deliveries, anesthesia, geriatric, and surgical care, while urban general practitioners tend to be limited in the type of procedures they offer.

Volume 2, Issue 2 of the UBCMJ features contributions from Dr. Stefan Grzybowski and Dr. John Wootton. Dr. Stefan Grzybowski is a family physician researcher and Professor in the University of British Columbia’s Department of Family Practice. He is Co-Director of the Centre for Rural Health Research and also the Co-Leader of the Michael Smith Foundation for Health Research’s BC Rural and Remote Health Research Network. In the featured article titled “Sustaining the Health Care Services of Rural Communities: The Role of the University,” Dr. Grzybowski discusses the impact of reduced access to adequate health care in rural communities and the repercussions this has on populations inhabiting these regions. Dr. John Wootton, current president of
the Society of Rural Physicians of Canada (SRPC), describes the role of the SRPC in the support and development of rural physicians in Canada. He also describes his career transition from Toronto urban medicine to northern Ontario (Sioux Lookout) and rural Quebec.

These articles provide the backdrop for a discussion of rural practice in Canada. However, rural medicine exists beyond our borders, warranting a global discussion of rural health care. Therefore, in this current issue, the UBCMJ facilitates a global discussion on rural health care, including community health care in Botswana and health care in Cuba (Bana, Page 19; Fulton, Page 22). Also, an academic article outlining the prevalence of anemia in a select population of children in the Indian Himalayas relays an important discussion of rural access and preventive medicine in a global setting (El-Zammer, Page 12).

Delivering high-quality, comprehensive health care to Canadians is a challenge that needs to be addressed. As many Canadians live in rural communities, medical students and physicians should consider a rural practice. Rural physicians achieve strong patient-doctor relationships and maintain a high level of continuity of care along with providing many services often deferred to hospital specialists in an urban setting. The UBCMJ provides a forum for academic dialogue with respect to rural practice. Hopefully this will allow medical students, faculty, and practicing physicians to better appreciate the complexity and increasing dilemma of this topic. On behalf of the UBCMJ, we anticipate that this issue will expose strategies and possible solutions to overcome rural health care discrepancies across Canada. In addition, these strategies may lead to positive change in the education and training of medical students nationally and globally.

REFERENCES

Sustaining the Health Care Services of Rural Communities: The Role of the University

Stefan Grzybowski, MD, CCFP, MCIsC, FCFP\textsuperscript{a}

\textsuperscript{a}Professor, Department of Family Practice, UBC Faculty of Medicine, Vancouver, BC

The gap between the town and the gown is nowhere greater than in small, rural communities. This has only been exacerbated in the last 10 years as people in rural towns have experienced acceleration in the erosion of their local health services. This erosion has been marked by closures of small rural maternity services, surgical services, decreasing numbers of hospital beds, and, in some cases, closures of entire small hospitals. Reasons cited for closures include difficulties with recruitment and retention of care providers (particularly physicians and nurses), concerns about the safety of small rural services, and all-too-often regional health planning priorities focused on centralizing services in referral centres. While from a regional perspective centralizing services may seem to be fiscally prudent and a compelling solution to problems of health service sustainability in small communities, it often generates significant hardship for those affected.

At the Centre for Rural Health Research we have studied the centralization of health services and its attendant effect on rural communities from multiple perspectives over the past six years. Our ‘case study’ has been a systematic program of research into rural maternity services, starting with immersing ourselves in the birthing experiences of parturient women from small communities. Methodological research has noted the importance of understanding patient experience as the starting point for further research into intervention or system change.\textsuperscript{1,2} To this end, in our first round of research we spoke with women from across the province and heard some powerful stories. One woman described giving birth to her first child in the hospital in her community but then having it close its doors on her unexpectedly a few weeks before her due date for her second pregnancy. She then scrambled to organize accessing delivery services elsewhere. Other women described frantic trips to the hospital from their home communities while in labour and expressed the poignancy of leaving small children at home as they left to give birth at a facility removed from the community.

Ironically, the challenge of accessing services in a referral community when labour commences? This situation can be even more challenging when the family is socially vulnerable and socioeconomically challenged. Little, if any, support is provided to these families to mitigate the costs of moving to live in a referral community for what can be weeks (excluding minimal travel subsidies available to status First Nations women). This can lead to significant stress for the expectant mother and, as our emerging research suggests, potential complications.\textsuperscript{3,4} The situation in British Columbia is mirrored across rural Canada, and the effects of 10 years of regionalized, rural health service management are well entrenched.

The program of research that I co-direct with my colleague Dr. Jude Kornelsen, a health services researcher, was born in response to this context and environment. The goal of our program of research has been to answer the important questions that will lead to better evidence for planning maternity care for residents of rural British Columbia. After completing a series of discrete project grants in the area, the Canadian Institutes of Health Research (CIHR) awarded us a New Emerging Team Grant in 2004 with the participation of several prominent UBC and Simon Fraser University (SFU) researchers. This multi-year infrastructure grant has underpinned our work for the past six years and has provided the foundation for numerous projects and secondary grant applications. The first three years of our work was mostly qualitative in nature. We visited 26 communities in rural British Columbia of under 15,000 catchment population and captured the experiences of women who had to travel to access maternity care, the experience of maternity care providers in limited service environments with no local access to caesarean section, and the experience of policy makers and planners in trying to provide best services for small rural communities.\textsuperscript{5,6,7}

We were successful in achieving a number of secondary grants, including a CIHR Operating Grant using a program logic-model approach, to try to understand the sustainability of a small rural maternity service. The outputs of this study coalesced into a health services planning model called the Rural Birth Index\textsuperscript{4} (RBI) which Dr. Kornelsen and I developed with the support of Dr. Nadine Schurman, a health geographer from SFU. This model is predicated on establishing a catchment area around each rural maternity care service, which is one hour surface travel time, identifying the postal codes that exist within this catchment zone, and using these postal codes to link, by residence, the mothers who delivered in the study’s duration. We used a modified average number of births for a five year period for each catchment zone and adjusted this result to calculate a score for each small rural

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Stefan Grzybowski, sgrzybow@interchange.ubc.ca
community with a local maternity service in British Columbia. We then aligned the existing level of maternity service with the scores for each community and categorized a series of service levels. Further information on this method is available through our website: www.ruralmatresearch.net.

Our research interests also led us to explore another key issue underpinning rural maternity services in small communities: rural surgical services. Many, if not most, small hospital operative services are sustained by GP Surgeons and GP Anaesthetists (general practitioners with enhanced skills). With the support of GP Surgeons like Dr. Stuart Iglesias and Dr. Nancy Humber, we have begun to try and answer the core questions about the training, scope of practice, and safety of these services. Hopefully this knowledge will lead to better policies and greater sustainability for these important rural services and, ultimately, better care from rural residents.

Our most recent work has involved examining population-based outcomes by level of service for both mothers and newborns and a comprehensive examination of the cost effectiveness of various levels of service for small populations. This program of research has been undertaken with the support of the Vancouver Coastal Health Research Institute (VCHRI), which has provided us with research office space. Also, the Provincial Health Services Association (PHSA) and the Children’s and Families Research Institute have provided us with support funding for programmatic grant applications. We have also had support from the Michael Smith Foundation for Health Research (MSFHR), which has provided both Dr. Kornelsen and I with scholar awards. The MSFHR has also supported the BC Rural and Remote Health Research Network, which has had its UBC base in our offices and has provided a broad range of support for rural health researchers.

As rural health services researchers, both Dr. Kornelsen and I believe strongly in the need for better evidence to support effective planning of small hospital services in rural British Columbia and across Canada. Evidence to date has largely consisted of consensus task force recommendations extolling the virtues of providing services “closer to home” without adequate evidence for issues of safety and sustainability. A systematic review of the literature relevant to the planning and sustaining of rural health services is strikingly thin with multiple lacunae related to answers to important questions such as safety and cost. Consequently, our research program has had tremendous support from the policy and planning community, including Perinatal Services of British Columbia and its antecedent organizations as well as the Health Authority Perinatal planning groups. These collaborations have ensured an integrated knowledge translation process which at times has felt like we were being pulled to deliver the answers rather than having to struggle to find someone to listen to our findings. We believe that the rural health services work that we have accomplished in the area of maternity care is directly relevant to planning other services in rural hospitals and are moving forward with plans to extend our work to studying emergency services and primary care. We believe that the University has an obligation to give back to the rural communities of British Columbia in the form of new knowledge and partnerships. We look forward to continuing our contributions in the next ten years.

REFERENCES

The Society of Rural Physicians of Canada: An Appreciation
An Interview by Dr. John Wootton

John Wootton, MD

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The Society of Rural Physicians of Canada (SRPC), online at www.srpc.ca, is a child of the Internet. In the same way that email allows families to stay in touch with their children as
they disperse, so too the internet allows physicians in small towns across the country to communicate, almost in real time, about real issues with colleagues in adjacent and distant places. The Internet has created a family of rural physicians.

From the beginning of civilization, obtaining the recognition of one’s peers has been acknowledged as the most important type of recognition that one can obtain. The stereotype of the “country doc” who simply does the best he can with whatever he has at hand is receding into history and being replaced by well-trained, well-equipped and multi-skilled physicians who act at the “coal face” of rural care and bring these skills to bear in the training of successive cohorts of modern rural physicians. Rural physicians now recognize the need to train and be trained by their peers because within this family of physicians are the critical attitudes and aptitudes which form the backbone of rural medicine. The conferences that the SRPC organizes, and the peer reviewed journal that it distributes, are based on this understanding: rural physicians learn best from their peers.

The history of the SRPC is linked to a job action in the emergency department of a rural hospital in the small town of Mount Forest, Ontario where rural physicians sought recognition for the unique challenges they were facing, challenges shared to a greater or lesser degree amongst all rural physicians across Canada.1 The recognition of these unique challenges has evolved into the more general statement that “geography is a determinant of health.” By this, it is meant that rural Canadians face greater risks to their health on the basis of their demographics (older, poorer, sicker), the nature of rural employment (farming, fishing, logging), and limited access to care.2-3 And without the backdrop of the Canadian commitment to equity and accessibility in health care, the SRPC could not exist or enjoy the influence that it does. Every discussion about access to care begins with the reaffirmation of the principle that every Canadian, wherever he/she may live, deserves equitable access to care. This has never meant “equal” access, but it does require that policy makers examine what is possible and apply a “rural lens” to their decision-making.

Thus, the SRPC lobbies for change at the federal, provincial, regional, and local level.4 Without it, the trend toward centralization, specialization, and concentration of resources could not be seen for the dangerous and insidious process that it is. The SRPC embraces issues that concern infrastructure, human resources, training, working conditions, access to services, and relationships with other organizations. More important, perhaps, is an understanding of why the SRPC exists.

Every rural physician has a story. Mine goes way back to the days of rotating internships. Those were the days before collective agreements limited work hours and before I knew any better. Falling asleep over a chart at three in the morning at the end of 48 hours on-call on a medical service was a common experience as was meeting the other denizens of the night at the 24-hour vegetable stands along the Danforth in Toronto. These denizens were policemen, ambulance drivers, nurses arriving or leaving, and other assorted insomniacs. I grew comfortable with hospitals as places that were always open and always ready to help. Medical training at the time delivered a degree of procedural competence and confidence, and a variety of useful skills in a short period of time, such that by the end of one year I was champing at the bit to cut my teeth in practice. After an ill-fated locum stint in downtown Toronto that had left me crawling the walls after just one week, I went to the other extreme and signed on to be the only physician in the isolated community of Ocean Falls, located 300 miles north of Vancouver, accessible only by float plane only in good weather and only in daylight. Here, I delivered my first baby on my own, sat through a nail biting night with a suspected ectopic pregnancy, and generally grew to understand my role, both its limits and its importance, in this isolated setting. A short plane ride or a longer boat trip away, full-service general practitioners were practicing in Bella Coola but in a larger hospital. From Ocean Falls I moved to Sioux Lookout in Northern Ontario, which was already a well-established rural teaching site, and benefitted from the flipped demographics of the Cree communities. I learned a lot of obstetrics, pediatrics, and the basics of collaborative care with the nurse practitioners in the north. I still meet many colleagues who are in rural practice and were lucky enough to spend some time in Sioux Lookout, or other similar places, where the experience of working shoulder-to-shoulder with like-minded colleagues has served them well wherever the ended up.

Personally, I ended up in rural Quebec, where I still take my turn on the obstetrics roster, do my share of emergency room call, in-patient care, and teaching. This is alongside the ongoing surprises of my general practice with patients I have now known for more than 25 years. I am aware, as the experience of delivering a baby whose mother I delivered becomes increasingly frequent, that a generation has passed in my rural practice. My efforts are now turning to doing my part to ensure that this new generation will also have physicians who will care for them, get to know them, become part of their communities, and benefit from the multiple ways in which these commitments are repaid.

As current president of the SRPC, my role is to do what I can to make sure the communities of rural Canada continue to have access to care which is equitable in scope, provided as close to home as possible, and delivered by a properly equipped healthcare team trained to rise to the challenges of rural practice.

That is my message. My hope is that there is a receptive audience to hear it.

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Assessment and Management of Anemia in a Population of Children Living in the Indian Himalayas: A Student-Led Initiative


UBC Global Health Initiative, Faculty of Medicine, University of British Columbia

ABSTRACT

OBJECTIVE: To determine the prevalence and etiology of anemia among school-aged children in Spiti Valley, India, and implement an appropriate management plan.

METHODS: Hemoglobin (Hb) levels were measured in 382 children (3 to 18 years old) living in the Indian Himalayas for three consecutive years. Blood smears from the 200 most severe cases of anemia were analyzed. Iron treatments were provided for three months, and hemoglobin levels were measured after six weeks.

RESULTS: Pre-treatment, 88.4% were anemic in 2007, 78.3% in 2008, and 71.3% in 2009. Analysis of the hemoglobin concentration curve over the three years demonstrated an overall shift to the right. Blood smear results showed that 57% of the samples displayed normocytic, normochromic red blood cells; 30% were hypochromic only; and 11% hypochromic, anisocytic. Post-iron treatment prevalence of anemia was found to be 82.9% in 2007, and 84.9% in 2008.

CONCLUSION: There is a significant prevalence of anemia in the Spiti Valley children, which is multifactorial in etiology. A three-year evaluation of Hb levels combined with interventions addressing linked causes of anemia, such as iron supplementation, deworming, and enhanced nutrition through greenhouses, have demonstrated a significant year-to-year improvement in anemia. The hypochromic anisocytic anemia suggests iron deficiency or thalassemia. The normocytic normochromic anemia may be due to 1) mixed iron, B12, and folate deficiencies from a low animal protein and fresh vegetable diet in winter months; 2) early iron deficiency; or 3) genetic adaptation in oxygen transport at high-altitude. Due to the multifactorial nature of the anemia, an integrated prevention and treatment approach is warranted. Future goals include administration of iron, multivitamins, and zinc supplements, improvements in water and sanitation, and evaluation of the impact of greenhouses on anemia status.

KEYWORDS: anemia, hemoglobin, children, iron treatment, Spiti Valley

INTRODUCTION

Anemia is a global health issue that has significant consequences for individual health and socioeconomic development. Anemia is defined by serum hemoglobin (Hb) concentrations below a recommended threshold value (Table 1). This results in insufficient oxygen delivery to tissues and organs. According to the World Health Organization (WHO), children are especially vulnerable and exhibit high rates of anemia. Childhood anemia is associated with poor health and impaired cognitive development, leading to reduced academic achievement and work productivity in adulthood. Several studies have demonstrated that determining iron status and providing adequate supplementation is an effective means of prevention and management of childhood anemia. The purpose of this study is to determine the prevalence and etiology of anemia in the students attending the Munseling boarding school in Spiti Valley, India and to implement a suitable management plan.

The most common cause of anemia in developing nations is iron deficiency.
was conducted by the University of British Columbia (UBC) Global Health Initiative (GHI). This was in collaboration with the Rinchen Zangpo Society for Spiti Development, a local community non-governmental organization (NGO) that, in 2006, invited the GHI to develop health improvement programs for the Munsel-ling school. The school is located in the town of Rangrik in the Spiti Valley. This desert-mountain valley in the Indian Himalayas lies at an altitude of 3700-4500 meters and has a population of approximately 10,000, who are predominantly of Tibetan ancestry.\(^{10}\) Residents of the remote Spiti Valley are exposed to environmental stressors in the winter months when the temperature ranges from -5 to -35°C, and severe snowfalls occur.\(^{10}\) These environmental factors, in addition to the mountainous terrain, create barriers for growing fruits and vegetables, herding animals, importing food, accessing essential supplies, and severely limit sustainable access to health care. Accordingly, Spitian children likely have deficiencies of iron, folate, zinc, and vitamin B12 in their diet.\(^{1}\) Another stressor is chronic exposure to high altitude, which may lead to lower Hb saturation and reduced oxygen delivery to body tissues as suggested by a study of exposure to high altitude.\(^{11}\) Two recent analyses of genome-wide sequence variations in high-altitude Tibetans compared to non-Tibetan lowlanders found that Tibetans carried higher frequencies of two hypoxia-related gene variants, EPAS1 and EGLN1.\(^{12,13}\)

Due to all these aforementioned factors, it is important to test Hb concentration and oxygen saturation in this population. It is also essential to determine the etiology of anemia in the students before implementing a treatment plan. The most common cause of anemia in developing nations is iron deficiency.\(^{3}\) Other causes of anemia may include other micronutrient deficiencies, infections, such as malaria, hookworms, or schistosomiasis, inherited conditions, such as thalassemia, and other chronic diseases.\(^{1,2}\)

We hypothesized that there would be a high prevalence of iron deficiency anemia in the Munsel-ling school children and that dietary folate and vitamin B12 deficiency might contribute to the burden of illness. If our hypothesis is valid, then our approach to anemia management must be multifaceted and include consideration of factors such as crop diversity, education, water, and sanitation, as well as nutrient supplementation.

**MATERIALS AND METHODS**

This study protocol received ethics approval from the UBC Clinical Research Ethics Board. All students at the school (boarders or non-boarders) were eligible for enrolment into the study, and this convenience sample formed a population-based inception cohort. The cohort size varies insignificantly across the three years mostly due to new student enrolment, the majority of which are preschool children ages three to five years. Including student turnover from year-to-year allows for a more realistic assessment of anemia prevalence in this population. This also results in more conservative statistical estimates of effect size.

A cursory qualitative needs assessment at Munsel-ling school was completed in 2006, identifying three domains (health, water, and sanitation) as requiring urgent intervention. Three subsequent visits by the GHI team (2007-2009) allowed for enrolment and follow-up in this study. In 2007, health screens and baseline Hb measurements were completed between June and August. A three month iron supplementation program was initiated with assistance provided by the local school healthcare worker. A second health screen was conducted in 2008 (June-August). Hemoglobin levels were measured, and peripheral blood smears were completed on the 200 most severely anemic. Iron supplementation was re-initiated for an additional the months. To improve efficiency for this treatment cycle, the school healthcare worker and senior students (grade 10) were trained to distribute iron tablets daily. In June 2009, a third health screen and Hb measurements were conducted for all students. Additionally, a Canadian registered dietician assessed dietary intake for a typical child’s diet.

**Health Screens**

The health screen consisted of 1) Hb measurements, 2) qualitative assessment of parasitic infestations, 3) vision and hearing examination, and 4) a dental screen. All medical students were trained to complete the health screens through pre-departure educational sessions with the supervising physician.

**Hemoglobin Measurement**

Hemoglobin levels were measured for all students attending Munsel-Ling School. In 2007 and 2008, Hb levels were measured at two time points (pre-treatment/June and post-treatment/ August). In 2009, Hb levels were only measured at one time point (pre-treatment/June only) due to unanticipated school closure. Finger-prick blood samples were obtained for each child using lancets and loaded into the HemoCue β-Hemoglobin Photometer to determine Hb levels. The HemoCue was calibrated on-site using a control sample. Upon returning to Vancouver, the HemoCue was validated for accuracy against a laboratory-grade analytical analyzer at the British Columbia Children’s Hospital (BCCH) for 10 specimens with Hb concentrations of 77-178 g/L. Descriptive statistics showed good correlation between the two instruments with a random error of 2.5% (data not published). A diagnosis of anemia was determined using the WHO definitions for anemia (age, gender, and altitude specific) (Table 1). Due to limited resources, we were unable to perform any medical laboratory analysis such as red blood cell distribution width (RDW) and mean corpuscular volume (MCV).

**Blood Smears**

Two hundred peripheral blood smears were performed in June 2008 (pre-treatment) on the most severe cases of anemia. Fingertip pinprick blood samples were obtained for 120 females and 80 males. The gender specific sample size was determined based on discussions with a hematologist and clinical researcher at St. Paul’s Hospital in Vancouver who suggested a greater sample size for females than males as there is an established higher prevalence of anemia in menstruating females.\(^{14}\) Samples were smeared onto glass slides, preserved in methanol, and morphologically analyzed by a hematopathologist in New Delhi.

**Nutritional Assessment**

Using WHO standard weights, heights, clinical signs, and
symptoms, children were assessed for stunting, micronutrient deficiency, and anemia. A nutrition analysis of the school meals was conducted using a weekly menu, food stock records, and Daily Recommended Intake (DRI) values.

**Treatment**

In 2007 and 2008, ferrous sulfate was provided to the school children six days per week for three months. Dosages were adherent to WHO recommendations: 30 mg/day of elemental iron for children under 13 years and 50 mg/day for those over 13 years. The intake of the iron was supervised by the teachers of each classroom to ensure compliance. In 2009, iron supplementation was intended but could not be implemented due to disruption in school attendance by a unique religious event that resulted in an unprecedented extended school holiday. Due to limited resources, folate and vitamin B12 supplements were not administered. However, other sustainability projects to reduce micronutrient deficiencies, such as greenhouses, were implemented.

For a yearly school-wide anti-helminthic program (2007-2009), a single 400 mg dose of albendazole (Albenza®) was provided to every student. Children that demonstrated infestation by the observation of worms in stool were provided a second 400 mg dose, two weeks after the first dose.

**Statistical Analysis**

All statistical analyses were comparisons of means between two groups, and hence two-sample t-tests were employed throughout. In the determination of Hb levels over the three years, a Bonferroni correction for multiple comparisons was applied where the threshold of significance is alpha/n=0.05/3. Therefore we employed a threshold p-value of 0.0167 for all t-tests. We treated missing raw data to be missing at random.

**RESULTS**

**Health Screens**

The study population of Munsel-ling school students (ages 3–18 years) from 2007–2009 demonstrated a significant increase in mean Hb levels from 130.3 g/L (σ = 18.6) in 2007 to 141.1 g/L (σ = 15.4) in 2009 (p = 6.713x10^{-10}). Comparing year-to-year differences, an increase was noted between years 2007 and 2008 (p = 0.001) as well as years 2008 and 2009 (p = 0.003). The mean Hb levels for female and male subjects are represented in Table 2. The distribution curve for Hb levels is slightly skewed to the right (Figure 1). While both males and females show increases in Hb levels 2007–2009, the increase is more significant in males (p = 4.338x10^{-8} versus p = 0.001). However, the year-to-year increase in Hb for females from 2007–2008 and from 2008–2009 are not statistically significant (p = 0.043 and 0.351, respectively). For males, the year-to-year increase in Hb is statistically significant both from 2007–2008 (p = 0.0095) and 2008–2009 (p = 0.0022). Anemia prevalence was found to be 88.4% in 2007 (n=379),
78.9% in 2008 (n=384), and 71.3% in 2009 (n=416). In 2008, the prevalence of anemia in males (76.4%, Hb = 136.8 g/L) was observed to be lower than in females (81.5%, Hb = 134.1 g/L) (Table 2), although the difference is not statistically significant (p = 0.26). Looking across all years, the prevalence of anemia decreases in males with age, while in females, it increases up to the age of 10 and then tends to decrease.

Due to small sample sizes within each subgroup, we also performed a visual inspection. Boys of all age levels had consistently improved throughout the three study years as had girls aged 3-10 years. Girls aged 11-18 years have not demonstrated a consistent improvement in their Hb concentrations (Figure 2). The prevalence of anemia in the age groups of three to seven years was comparable between males and females at 86.1% and 85.2%, respectively (Figures 2 and 3). Between the ages of eight and 10, a difference was noted in the prevalence of anemia between genders (76.4% in males and 85% in females). This became more pronounced between the ages of 11 and 16 (69.2% in males and 75.9% in females).

Based on WHO guidelines, if a population of children demonstrates a prevalence of anemia exceeding 40%, mass iron supplementation should be provided to all children. Accordingly, all the Munsel-ling school students were treated with iron supplementation. The post-treatment Hb levels measured in August 2007 indicated a prevalence of anemia of 82.9% and in August 2008 of 84.9%. No treatment was implemented in 2009.

Other components of the health screen included documenting cases of intestinal worm infestation and recording growth parameters. 16 students (5.6%) reported seeing worms in their stools in 2008, while only 2.6% reported worms in 2009. The helminth infection reporting rates were likely under-reported due to the subjective nature of the responses. Given the visible presence of worms in the drinking water, most students are likely infected with helminths. The percent of students under the 3rd percentile in weight decreased from 10.3% in 2007 to 2.6% in 2009. A similar reduction was observed for the percent of students under the 3rd percentile in height (30.9% in 2007 to 17.3% in 2009).

**Blood Smears**

Peripheral blood smear results (Table 3) consist of morphological descriptions of RBCs based on microscopic visualization. Fifty-seven percent (57%, n=200) of the blood smears showed a normochromic normocytic morphology. Isolated hypochromia was found in 30% of the samples. Another 11% were both hypochromic and anisocytic, while 2% of the smears were described as having multiple morphologies, including hypochromia, microcytosis, and/or macrocytosis.

**Nutritional Assessment**

The combined nutrition and health screen found that 20% of the population showed signs of micronutrient deficiency, and 20% are stunted based on WHO growth guidelines. The dietary assessment conducted through observations at mealtime and
Table 3. Microscopic description of red blood cell morphology as seen on peripheral blood smears in the 200 most severely anemic Munsel-ling school children.

<table>
<thead>
<tr>
<th>Description of RBC morphology on Peripheral Blood Smear</th>
<th>No. of smears (n = 197)</th>
<th>% of smears</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normocytic normochromic</td>
<td>112</td>
<td>57</td>
</tr>
<tr>
<td>Hypochromic only</td>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td>Hypochromic anisocytic</td>
<td>22</td>
<td>11</td>
</tr>
<tr>
<td>Other (includes samples with combined hypochromia, microcytosis and/or macrocytosis)</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

monthly purchasing log assessments showed student meals were adequate in calories and carbohydrates but inadequate in dietary fat, high biological value (HBV) protein, iron, folate, zinc and B12 in comparison to dietary reference intake (DRI) values. A report of this analysis will be used by the Indian NGO that runs Munsel-ling School to lobby the state government for more school food funding.

**DISCUSSION**

The findings of this study confirm that there is a high prevalence of anemia in the Munsel-ling students. The three month course of iron supplementation for all school children in 2007 and 2008 proved beneficial, reducing anemia prevalence by 9.5% from 2007 to 2008 and then by 7.6% from 2008 to 2009. This supports iron deficiency as a contributing cause to the anemia. However, a reduction in the occurrence of anemia was lower than anticipated since iron deficiency anemia should be more rapidly reversed with iron therapy. A similar study in Pune, India documented a prevalence of anemia of 66%, which dropped to 30% following wide-scale treatment with iron for eight weeks. This suggests that the anemia in the students at Munsel-ling may be compounded by other factors such as micronutrient deficiencies, infections, and inherited conditions. Some studies have suggested that with continued daily administration, iron absorption could decrease due to fatigability of the intestinal mucosa. One study reports that absorption from a single dose of iron reduces from 30–40% on the first day to as low as 3–6% after a few days of continuous daily administration. This recent evidence implies that biweekly or weekly iron supplementation may have superior effectiveness in the management of anemia and is worth considering as a future directive of this project.

Although the iron supplementation was provided annually over the course of three months, the students continued to consume a low iron diet for the remainder of the year. Education on nutrition and iron deficiency was not provided to the families as they did not have the resources to adjust their diet. Consequently, greenhouses were funded by GHI to improve nutrition at the boarding school. The Center for Disease Control states that one of the reasons the worldwide prevalence of anemia has not been reduced is because typical interventional programs assumed that there is a single cause of anemia. They recommend improving the assessment of the status of the anemia to enable appropriate treatment programs that address linked causes.

To plan effective anemia intervention in the Munsel-ling students, peripheral blood smear analysis was performed to determine the true etiology of the disease. The majority of smears (57%) demonstrated a normochromic normocytic morphology. One explanation for these findings is that the anemic children suffer from mixed nutritional deficiencies. With iron only deficiency, a hypochromic microcytic appearance is characteristic whereas with folate or vitamin B12 deficiency, macrocytosis is observed. If all three deficiencies coexist, normochromic normocytic cytology is a possible outcome. A second explanation for normochromic normochromic anemia is early iron deficiency whereby there is still a sufficient concentration of normal RBCs in the circulation, outnumbering any microcytes in the blood sample. A third explanation involves genetic adaptation documented in inhabitants of high altitude. Since the 1970s, several reports described relatively low Hb concentration among Tibetan high-altitude natives compared to newcomers and have raised the question of a genetic influence on the physiology of oxygen transport. A study in Tibetan children living at high altitude found the mean Hb concentration to be lower than the expected altitude adjusted mean concentration, and the population distribution was Gaussian. The normality of the population curve, together with a mixed distribution analysis, led the authors to conclude that either the whole population should be considered anemic because they submit to the same living conditions or that Tibetans react differently to high altitude and adapt without increasing their hemoglobin; our study exhibited similar findings. Figure 1 shows a Gaussian distribution of the Hb concentrations that is skewed to the right. Most students have borderline Hb concentrations with a mean between 130 and 140 in the three study years. The normality of the hemoglobin distribution suggests that a genetic adaptation may exist in these Tibetan descendants; however, the slight rightward skewing of the Hb levels over the subsequent three years suggests that factors other than genetics, such as nutritional deficiencies, may be contributing to the anemia. It is worth noting that the majority of school children look healthy overall with no complaints of fatigue, weakness, pallor, or shortness of breath and thus are not symptomatic from their low Hb concentrations. Provided that the Hb levels are due to genetic adaptations, then the anemia prevalence measured in this study may be an overestimate, and the Centre for Disease Control guidelines for altitude-adjusted hemoglobin ranges used to define anemia may not be applicable to this population. It was beyond the scope of this study to confirm genetic adaptations for decreased Hb. Given that the study population showed improvement in Hb levels, iron supplementation should be continued according to the guidelines for the altitude-adjusted hemoglobin ranges used to diagnose anemia.

As for the remaining smears, 30% were found to have hypochromic cells only, which suggests either iron deficiency anemia or thalassemia. To confirm the presence of thalassemia, further investigations would be required, such as Hb electrophoresis with genetic testing, which were beyond the scope of this project. A literature review to determine the prevalence of thalassemia in the Indian Himalayas and Tibetans proved inconclusive. One study reports that thalassemia is rare in the neighboring Nepalese Himalayas. Since Tibetans and Nepalese
in the Himalayas may have common ancestry, it is permissible to hypothesize that a similar low prevalence of thalassemia exists in the Spitian population. However, the prevalence of thalassemia is significantly high among South Asians, including certain tribes from northern India. Inter-racial genetic mixing may have taken place in the Spiti Valley, and hence, thalassemia cannot be ruled out. Another 11% of blood smears showed both hypochromia and anisocytosis, consistent with iron deficiency anemia. Finally, 2% of smears were found to have multiple morphologies, including hypochromia, microcytosis, and/or macrocytosis. This supports the hypothesis that there are multiple contributors to the anemia.

Concurrent etiologies for the anemia may explain the decrease of 5.5% and the increase of 6% in post-treatment prevalence of anemia in August 2007 and 2008, respectively. Although folate, zinc, vitamin A, and B12 deficiencies may have contributed to the anemia, only iron and anti-helminthic treatments were provided, which may account for the suboptimal improvement observed. Another consideration is that post-treatment Hb measurements were taken earlier than planned. Measurements were taken at six weeks of treatment due to travel logistics while a three month course of treatment was provided complying with the WHO standard of care. Six weeks may be insufficient to elicit changes in Hb levels. It should also be noted that the anti-helminth treatment should have been effective as it was prescribed according to current Canadian practice guidelines, and hookworm infestation as a cause of anemia six weeks after albendazole (Albenza®) treatment is less likely.

An important difference in the outcomes between female and male subpopulations was a major finding. The older females (ages 15–18) did not demonstrate as great an improvement in Hb levels compared to males of the same age. This is likely due to menstrual losses and possibly due to variations in quantity of food intake between genders. Further investigation of food intake between genders and more rigorous interventions for females should be considered, including education and regular supplementation.

With low Hb concentrations and low inspired oxygen partial pressures at high altitude, it raises the question of whether oxygen saturation is sufficient to meet the body’s metabolic needs. Medical Checks for Children (MCC), a Dutch NGO also involved in health care promotion at the Munsel-ling school, measured oxygen saturation in all school children in 2006 and found results to be within normal limits (data not available). Adequate oxygen saturation in the blood indicates that sufficient oxygen is being delivered to body tissues.

Considering the remoteness of the Spiti Valley and the limited expertise of the GHI members, we acknowledge some shortcomings of this study. Namely, a lack of adequate laboratory facilities and expertise prevented certain investigations from being carried out, such as ferritin levels, RDW, MCV, and stool ova and parasite testing, that would have allowed accurate diagnosis of anemia and determination of its etiology.

Despite limited resources and geographical constraints, the GHI studied the prevalence and etiology of anemia in a population of children in the Indian Himalayas and implemented an integrative management program in a collaborative, sustainable manner. In conclusion, blood smear analysis and the minimal improvement with iron treatment suggest that anemia in the Munsel-ling children is multifactorial in nature and warrants an integrative treatment approach. Deficiencies in iron, folic acid, and vitamin B12 could all be possible causes of the anemia. The GHI’s solution to the anemia problem in the Spiti Valley was comprehensive and consisted of therapeutic, nutritional, and preventative components that were adapted annually based on an expanded understanding of the study population. Aside from the therapeutic initiatives previously discussed, preventative intervention included construction of greenhouses to improve folic acid and iron levels by increasing fresh fruit and vegetable intake during the cold winter months. Treatment with albendazole (Albenza®) would not prevent recurrent parasitic infections; thus, preventative measures such as hygiene education, construction of toilet blocks, water purification, and sanitation projects were implemented.

Future goals include follow-up of the productivity and effectiveness of constructed greenhouses in addition to continuing with multivitamin, zinc, and iron supplementation as necessary. A school nurse was trained to perform annual health screens, and a local resident was employed to manage the greenhouses to ensure year-round access to fresh vegetables. The GHI’s approach is to focus on sustainable interventions to reduce the linked causes of anemia and thus effectively meet the long-term needs of this remote, underserved community.

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The Importance of Cultural Awareness in Global Health – Experiences from Botswana

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Botswana has been heavily impacted by the HIV/AIDS epidemic. Thus, HIV prevention and treatment have been built into national development policies. I travelled to Botswana to complete my practicum as a Master of Public Health student by working on HIV prevention and sexual/reproductive health education programs with Holy Cross Hospice (HCH), a local non-governmental organization. I quickly learned the importance of cross-cultural training in global health work. This training, and subsequent experiences on the job, led to an enhanced understanding of the challenges faced by health service organizations in developing countries and the various cultural factors that influence health outcomes of individuals and communities.

Botswana has one of the highest HIV prevalences in the world, with 17.6% of the population aged 18 months and above testing positive.\(^1\) The prevalence has declined slowly in urban areas since 2000 but has remained stable in rural areas. The number of new adult infections has remained stable for several years at approximately 20,000 annually.\(^2\) In the capital city of Gaborone, there are an estimated 33,588 persons living with HIV/AIDS and approximately 2113 orphans and vulnerable children.\(^3\) The healthcare system in Botswana is stretched thin in physical and human resources due to HIV/AIDS. Between 1999 and 2005, country healthcare staff decreased by 17% due to the working-age population being infected and dying from HIV/AIDS. This problem has been exacerbated by the amount of hospital beds occupied by AIDS patients who are estimated to stay in hospital four times longer than other patients.\(^1\)

In order to advance the development of the nation, the Government of Botswana has created the Vision 2016 policy which includes seven key strategic goals, one of which is the development of “a compassionate and just, caring nation.”\(^4\) By 2016 the government aims to stop the spread of HIV and ensure that AIDS patients have access to quality health facilities, communities and workplaces.\(^5\) By 2016 the government aims to stop the spread of HIV and ensure that AIDS patients have access to quality health facilities, communities and workplaces. In other countries) students on the topics of multi-drug resistant tuberculosis, H1N1 influenza, and the relationship between these infections and HIV/AIDS. Secondly, I assisted in the development of a Sexual and Reproductive Health manual for facilitators and peer educators to conduct workshops and activities. These workshops continue to encourage positive behavior change with regard to high-risk sexual activities as well as promote living positively with HIV. Finally, I conducted home visits to assess clients’ physical, emotional, and mental health status. These assessments were then used to make appropriate referrals to health and social services.

Cultural sensitivity training played an important role in enabling me to carry out these tasks successfully. This training drew interesting parallels between Canadian and Botswanian culture. During the training, a sociology professor from the University of Botswana, Professor Log, explored the rapid development of Botswana, especially in the capital city of Gaborone. He discussed the resulting tensions between traditional African and modern Western cultures. A key difference that emerged was that of societal organization: communalistic in Botswana vs. individualistic in the West. According to Professor Log, the communalistic culture in Botswana has translated into communal parenting of children where community members participate together in the discipline and care for all children in the community. Additionally, traditional Botswana custom has included boys being raised by men and girls being raised by women. Now, with the increasing number of female-headed households, mothers are experiencing challenges raising boys because historically this has not been a major part of their role.

Professor Log also mentioned that Botswana is currently undergoing a “masculinity crisis.” As women become aware of, and fight for, their rights, many men are feeling threatened. This has contributed to an increase in violence against women as men feel disempowered with the changing status of women in society. In addition, there has been a breakdown of the family structure as well as child neglect and abuse. This is a problem that is compounded by the lack of services for children. Professor Log noted that men...
...the family firmly believed that their loved one had died due to low blood pressure, even though she had been clinically diagnosed with AIDS.

are not being educated about the women’s rights movements and thus are getting left behind as gender relations moves forward in Botswana. With rapid economic development made possible by the diamond mining industry, as well as the influence of Western culture, Botswana has accepted many Western values without fully understanding them. This has contributed to the challenges discussed above.

Working in this cultural context was both unique and challenging. Some experiences were more difficult than others. For example, I attended the funeral of a hospice client who had died of AIDS. Here I saw firsthand the stigma associated with the disease. In this case the family firmly believed that their loved one had died due to low blood pressure even though she had been clinically diagnosed with AIDS.

During the HIV prevention education sessions, I witnessed many male participants who were not open to the idea of using condoms. They would claim, “You can’t taste the sweet with its wrapper on.” Understanding these underlying ideologies was useful in enabling me to be culturally sensitive in my work. I focused on engaging participants in discussion about condoms to dispel myths and provide accurate information.

Another major challenge was the lack of resources, particularly the lack of adequate transportation. I conducted home visits on foot and was restricted to one catchment area. Unfortunately, this meant that few visits were conducted in the other areas of operation. It also created tension between individual program staff as they often competed for resources. It is hoped that a new integrated service model, which will recruit clients as family units rather than individual children or adults, will increase collaboration among staff and allow for more efficient use of resources.

As a whole, my time at HCH was a positive learning experience. I witnessed the struggles that people living with HIV face on a daily basis. At the same time, I worked with a wonderfully compassionate staff that genuinely cared about their clients despite resource challenges. Despite the occasional frustrations, I am grateful for all of this.

ACKNOWLEDGEMENTS
World University Service of Canada, Students Without Borders Program, and Holy Cross Hospice staff and volunteers.

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the number of refugees and asylum seekers neared 14 million, with Canada resettling between 10 to 12 thousand annually. Refugees constitute a significant group in Canadian society, and in order to promote health equity within our country, we must have a thorough understanding of the specific health needs of this population and how to address them in a comprehensive manner.

One of the most important issues that health care practitioners will face when working with refugee populations is that of mental health because of the nature of the experiences refugees have endured. This article will explore the mental health challenges faced by this group, including the various stressors influencing their mental health and the most common manifestations of mental illness among refugees. The article will also explore different approaches to successfully addressing their mental health needs.

**FACTORS INFLUENCING THE MENTAL HEALTH OF REFUGEES**

Refugees face a variety of pre-migratory, migratory, and post-migratory stressors that can have lasting impacts on their mental health. While most practitioners recognize the significance of stressors endured in their home countries, many do not fully understand the challenges they encounter after arrival, which are often equally powerful in influencing mental health.

Pre-migratory stressors are events experienced in the home country that forced people to flee. These include civil conflict, persecution for being in a particular group, exposure to physical or emotional torture, the loss of family members, and exposure to famine and disease. Migratory stressors are events endured during escape. Refugees are exposed to a variety of stressors during their journey because of dangerous modes of transport, the crossing of insecure borders, and the potential for being detained.

Post-migratory stressors, including the process of cultural transition (learning to function in a new language and culture), are often endured long after migration. It is during this phase of adjustment where the greatest risk of mental health challenges lies. Post-migratory factors include the realization of the loss of possessions, family, and culture that have ensued. Stressors include the fear of being sent home, discrimination by the host culture, and coping with abrupt changes in socioeconomic status, including poverty, unemployment, underemployment, and unsafe housing conditions.

**MANIFESTATIONS OF MENTAL HEALTH ISSUES IN REFUGEES**

The type and prevalence of mental health disorders among refugees are highly contested topics. Several meta-analyses have been conducted with refugees in Western cultures which show that the most common disorders faced by refugees are posttraumatic stress disorder, depression, anxiety, and dissociation.

However, critics of this research have pointed to the overemphasis on the biomedical model of care when diagnosing and treating refugees. The focus tends to be on ascribing pathological diagnoses based on defined criteria. This approach carries with it the danger of characterizing all refugees as a homogenous group that experiences trauma in set ways. It ignores the resilience of refugees and fails to consider what the meaning of the trauma and settlement is to the individual refugee being cared for.

More recently, the concept of cultural bereavement has been developed which suggests that mental health symptoms in refugees, while they may complement diagnostic categories, may represent a “normal and constructive process of rehabilitation from traumatic experiences”. It encourages professionals to explore symptoms in terms of the subjective experience of the individual person.

A range of mental health symptoms may manifest in refugee populations depending on cultural factors, and not all may be pathological. The focus should be shifted away from a purely biomedical model when trying to establish the meaning of mental health symptoms in this group.

**TREATMENT APPROACHES TO THE MENTAL HEALTH NEEDS OF REFUGEES**

Similarly, the treatment of refugees warrants a broadening of our current biomedical approach. The WHO Commission on Social Determinants of Health (SDH) describes a hierarchy of factors shaping health and well-being, the majority of which extend beyond the health sector. The model encourages us to consider factors such as income, education, social support, and access to safe housing and water in influencing health.

Nowhere is the importance of considering a SDH approach to treatment more pertinent than in this population. Studies have shown that when asked what will help their situation, refugees cite social and economic factors far more commonly than psychiatric or medical assistance. Thus, when clinically assessing a new refugee patient, it is important not only to ask about their migration history, losses, feelings of guilt, grief, and nightmares, but also ability to find work and the presence of social networks. In evaluating a new refugee for treatment, one must keep in mind the variation in cultural norms and seek the assistance of local community translators or cultural consultants when required. This can be helpful in distinguishing normal cultural expressions from pathological symptoms. In many communities, psychological distress often manifests as somatic complaints, and this should be considered when deciding upon further work up of these symptoms.

Upon their arrival, refugees often suffer from cognitive disorganization. Thus, as the first point of contact, physicians should refer patients to local governmental and community-based organizations. These organizations can provide structure to their
day, help organize their time, orient them to the language and culture, as well as assist them in finding housing and employment.\textsuperscript{4} Citizenship and Immigration Canada (CIC) funds settlement and community centres across the country where new immigrants and refugees can gain access to counselors, social workers, and community volunteers trained to assist newcomers in this way. As well, CIC provides free French and English language classes across the country through a program called Language Instruction for Newcomers to Canada (LINC).\textsuperscript{4} Finally, physicians may want to refer appropriate individuals to the Canadian Centre for Victims of Torture, based in Toronto, where refugee victims can gain access to peer support groups, social workers, psychiatrists, and counselors to assist them in navigating through the legal system as well as finding housing, finances, employment, and educational opportunities.\textsuperscript{5}

Once these basic needs are secured, physicians can begin to revisit traumatic events and assess the patient’s reaction and coping mechanisms. Treatment approaches must consider the notion of cultural bereavement and allow for refugees to make sense of their symptoms in their own terms. In addition to offering counseling and potentially pharmacotherapy, practitioners should acknowledge and build on traditional community-based methods of healing that undoubtedly contribute to resilience and encourage participation in community groups.\textsuperscript{4,5}

**CONCLUSION**

Refugees face a host of different stressors as a result of the forced migration process that may influence their mental health. As health care practitioners engaging with this growing population, we must move beyond a biomedical approach in diagnosing and treating refugees. A consideration of cultural differences, subjective experiences, and individual resilience will help both health care provider and refugee make sense of their mental health symptoms. In treating refugees, we must build on community methods of healing, focus on factors the refugee identifies as crucial to their well being, and improve their social and economic conditions.\textsuperscript{5}

**REFERENCES**

The relevance of these numbers is lost until you meet the people who make up that balance sheet and begin to perceive the tremendous individual and collective effort supporting the health of each Cuban.

The medical school is being reclaimed by jungle. Leafy vines clamber over fences, grasses sway on rooftops, the roots of mango trees split worn concrete steps, wooden beams bare the trails of termites, and swallows nest in the hollows where once were light bulbs. Songs from a gospel choir of South African medical students swell from a stairwell out across the courtyard, and Pakistani medical students practice their cricket arm by using stones to knock ripe mangoes from the trees. The daily barefoot soccer match is underway, pitting the Central American, Cuban, and South African students against one another with the vuvuzelas of the world cup blasting from a nearby television. The afternoon rain has not yet arrived, but the air is growing heavy. Such is the scene as I reflect on our morning at the policlínico (polyclinic, a small primary care hospital).

The heat is stifling, my white lab coat sticking to my back, each blast of cool air from a small electric fan triggering a fleeting euphoria. We have been ushered into the gynecology clinic, part of our observation-based curriculum, to get a perception of how public health is practiced in Cuba. I watch a middle-aged woman grit her teeth and twist the bed sheets in her fists as her gynecologist takes a punch biopsy of her grossly swollen cervix, while a roll of sterile gauze covered with antibiotic is used to stem the ensuing flow of blood. I remind myself that this awful procedure may very well save this woman’s life by detecting operable cancer and that this doctor is imparting her extensive training for a monthly salary of around $40. A lab slip is filled out and placed in a box labeled “sodium bicarbonate” (more evidence that nearly everything in Cuba is reused at least a few times), which is placed beside a tray of freshly autoclaved instruments, each wrapped in thick brown paper to maintain its sterility.

In the afternoon our group disbands to several consultorios (family practice clinics, each consisting of a nurse and a family doctor). The high density of Cuba’s urban population means that each family doctor is responsible for the few square blocks near their clinic, making it possible for most patients to visit their doctor on foot, and for their doctor and nurse to provide house visits as needed. Inside the consultorio are only the basics: a desk, three wooden chairs, a phone, a decrepit filing cabinet, and the most basic of medical equipment and pharmaceuticals. As a screaming baby is weighed, measured, and patted with a stethoscope, I peek through the open window blinds where rain pelts off the banana fronds. Across the street, fumigators go systematically from house to house spewing white fog in an endless battle to beat back the Aedes mosquitoes which transmit break bone fever (dengue). Chickens peck at an overripe mango fallen in the dust of the roadside.

We head out to visit the homes of the neighbourhood’s new mothers. We go on foot, and our doctor carries a parasol to blunt the ferocity of the Caribbean sun. The homes we visit are clean and well kept and the families (parents and grandparents) attentive and appreciative as their family doctor examines their newborn. The doctor instructs them on the importance of crib and household safety and how to maintain the cleanliness of the scabbed umbilical stump. A five-year-old boy eyes me from behind the wrought iron partition of a shaded courtyard, his eyebrow cocked in curiosity as I place my stethoscope on the chest of his new baby sister.

In the evening I walk the few kilometers from the university to the center of town. People sit in their doorways, chatting with friends and neighbours, enjoying the cool night air and some time outside their adequate (though somewhat cramped) lodgings. Flies swarm over chewed sugarcane and the occasional horse dropping, but besides a few cigar butts, there is no litter. A small brass hand practices in the street, to which children as young as four dance the basic steps of salsa and merengue. A dachshund chases the public bus as it flies across town. The flaking concrete walls of home exteriors reveal the many layers of paint beneath, layers being peeled back by the tropical sun and turned into dry dust. As I lie in the grass of the parque central (city square) and reflect on the day, I wonder what I have learned of public health in Cuba. Before arriving in Cuba we (our group of six) had poured over dozens of papers filled with dry statistics on mortality rates: infant, maternal, cancer, cardiovascular, infectious disease…but I recognize now that none of this had ever really computed in my mind. The relevance of these numbers is lost until you meet the people who make up that balance sheet and begin to perceive the tremendous individual and collective effort supporting the health of each Cuban. The sun sets tangerine behind the arched facades of the few well-kept buildings which face onto the park, and I migrate towards the sound of salsa and mojitos.

REFERENCES
The University of British Columbia Medical Journal (UBCMJ) is a student-run academic journal with a goal to engage students in dialogue in medicine. Our scope ranges from original research and review articles in medicine to medical trends, clinical reports, elective reports, and commentaries on the principles and practice of medicine. We strive to maintain a high level of integrity and accuracy in our work, to encourage collaborative production and cross-disciplinary communication, and to stimulate critical and independent thinking.

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2. Reflections are subjective, anecdotal pieces of personal insight upon a global health related issue.
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Abstracts are not required for News and Letters submissions. There are two main types of submissions:

1. UBCMJ looks for breaking news within the medical community.
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For submitting a news lead or for writing assignments, please contact news@ubcmj.com for more information.

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The aim of this section is to provide a platform for intellectual dialogue on topics relevant to the study and practice of medicine. Articles submitted to this section should correspond to one of the following descriptions. An abstract is required.

1. Subjective pieces relevant to medical studies, life as a future physician, or the current social context of medicine.
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Case and Elective Reports
Case Reports describe notable clinical encounters with patients in a public health setting. The case should provide a relevant teaching point for medical students.

Patient consent
Submissions must include consent from the patient in order to be considered for publication. A copy of the written consent obtained from the patient must accompany the submission.

SOAP note
In addition to the standard submission criteria, case reports are strongly encouraged to include a brief inset summarizing the findings in the form of a standard medical history SOAP note (Subjective, Objective, Assessment, Plan).

Elective Reports aim to increase student exposure to a variety of medical specialties and training opportunities both locally and internationally. Reports give a specific description of the scope of a practice in a medical specialty and/or training program and recall a student’s impressions and reflections during and upon completion of the elective. They should highlight the student’s clinical experiences and the unique features offered by the program. Examples of Elective Reports can be found at the Lancet Student (http://www.thelancetstudent.com/category/electives/).

Please contact reports@ubcmj.com for more information.
Assumptions are a funny thing. In medical school, we learn to observe our patients carefully. We mentally note patients’ clothing, gait, ethnicity, and affect, clues that may guide us toward a particular diagnosis. If we assume too much, however, not only might we travel down the wrong diagnostic path, but we also lose the opportunity to relate to a patient and truly understand his or her experience.

Dr. Janet Ip, a Vancouver-based family physician, is all too aware of assumptions. During her residency, Ip noticed that the media often portrayed Inuit youth as struggling with solvent abuse and suicide. Interested in adolescent health, Ip wondered whether these media portrayals were accurate.

In 2004 Ip travelled to Inuvik, Northwest Territories to complete a two-month rural family medicine elective. Located two degrees above the Arctic Circle, this town of 3,500 people is also known as the “Land of the Midnight Sun” because of its 24-hours of sunlight during the summer. Along with her stethoscope, Ip packed 35 disposable cameras: Ip hoped to use a qualitative research technique known as photo novella to ascertain “what really mattered” to Inuvik youth. In photo novella, marginalized populations are asked to take photographs of “life as they see it,” explains Ip. She adds, “The community illustrates its concerns and is asked to provide relevant solutions” to its perceived problems.

Thus, Ip handed her cameras out to 35 Inuvik youth, 14 of whom agreed to be interviewed about their photographs. Several themes emerged from these encounters. Youth were concerned about the loss of their culture, the use of their land, the role of mothers in their society, and the boredom that they witnessed in their community. Ip was most surprised, however, to discover that the youths’ main health concerns paralleled those voiced by urban youth. Smoking, drug and alcohol abuse, and teenage pregnancy dominated the conversations. Youth linked these issues to isolation, depression, boredom, and poor parenting. They proposed bringing a shopping mall or movie theatre to their community and upgrading their skateboard park to address these concerns.

No stranger to the arts—Ip had been an actress and a film writer, and as a medical student she had created a documentary about the challenges of rural medicine—Ip produced the film We Don’t Live in Igloos: Inuvik Youth Speak Out to illustrate these youths’ experiences.

To Ip, photography is not only a powerful way to engage a marginalized community, but it also gives healthcare practitioners the chance to truly understand their patients’ perspectives, enhancing their ability to heal. Assumptions are important in medical practice. Yet Ip and these Inuvik youth demonstrate that so, too, is asking patients what they think, see, and experience.

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In 2004, UBC Medical School opened its Northern and Island regional campuses in Prince George and Victoria, respectively. At the time, only 24 students were accepted into each distributed site to test the system. Success in sustaining the satellite campuses allowed UBC to continue with their planned expansion of distributed site enrolment to 32 students each in 2007. Now, in 2011, UBC Medical School will add a further 32 students at the new Southern Medical Program based in Kelowna to its growing distributed program.

One of the aims of UBC’s distributed medical program is to tackle the ongoing deficit of medical practitioners serving rural areas of BC. Return-of-service contracts that force physicians to practice in rural settings are not sustainable.1 Ideally, rural physicians should want to live and work in these rural communities rather than feel that they are obligated. The nature of UBC Medical School’s distributed site approach to teaching is conducive towards finding and moulding a healthy proportion of medical students to become passionate physicians who will live and work in those regions.

UBC’s rural distributed medical program encourages the development of rural practitioners through the admissions process. It has been widely documented that medical students born and raised in rural communities often return to their roots to practice.2 Similarly, students who are involved with extracurricular activities in rural communities despite an urban background are also good candidates. For example, UBC and UNBC conjointly developed a Rural and Remote Suitability Score (RRSS) criteria guide that gauges rural experience.3 The RRSS allows UBC to find medical students with a high affinity for rural life that are well suited to thrive at UBC’s Northern regional campus. The hope is that they will stay on to become physicians in those rural communities.

UBC’s rural distributed medical program also socially integrates students into the communities in which they learn. Most individuals from outside a community need time to adjust to the norms of the community and find their own social place in that community. Only by discovering their own identities in relation to the community can individuals begin to consider a community as their own. For most students, the process of socialization cannot occur within the span of a four-week rural community elective. It takes time, and the UBC rural distributed program gives those students that time by immersing them in these rural communities over the four years of their undergraduate medical curriculum. Students craft their own identities in the communities through their social interactions with others in the area, through their meaningful contributions to the communities, and through the hobbies that they develop that only the community can offer. Inevitably, students will be more likely to feel that these communities are where they belong and where they would like to practice in the future.

At the distributed medical sites, students are also exposed to an exciting and challenging type of medical practice that is unique to rural medicine. Physicians in rural communities are often full-service generalists. Their practices cover everything from traditional primary care, obstetrics, and psychiatry to emergency medicine, oncology, and surgery. Resources are often lacking in terms of high-tech instrumentation and imaging modalities. It is a medical practice that calls for adaptability and variety, and many students at the distributed sites find themselves gravitating towards it. Rural physician preceptors are often excellent teachers and do amazing jobs of inspiring their students. Exposure to the unique full-service nature of rural practice through excellent tutelage of inspiring preceptors is important to help students realize that rural medicine is for them.

In these ways, UBC Medical School’s admissions process and distributed approach to teaching motivate medical students at the satellite campuses to want to become rural physicians. UBC Medical School not only screens for students with a high affinity for rural life but also exposes them to the rural community both socially and professionally. The effectiveness of this approach at increasing the number of medical students that ultimately end up in rural practice is still too early to gauge. However, the approach that UBC’s distributed medical program takes to increase rural medicine interest in its medical students makes sense.

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Canada Hosts First ACP Internal Medicine Meeting

Abhijat Kitchlu, BASc, Aleksandra Leligdowicz, MD

Imagine thousands of physicians under one roof on a three day mission to strengthen their clinical knowledge with the latest guidelines. Each year, the American College of Physicians (ACP) organizes a meeting to update internal medicine physicians, fellows, residents, and medical students on the most current data available on the pathogenesis, diagnosis, and treatment of everything from congestive heart failure to eosinophilic esophagitis. Perhaps even more impressive, this conference offers free registration to all student members. This was the first year the event took place outside of the United States, being held at the Metro Toronto Convention Centre from April 22–24, 2010.

The ACP is the largest international organization of internists today, with a membership of 129,000 internists, internal medicine subspecialists, fellows, residents, and medical students. One of the College’s missions is education, and the annual Internal Medicine conferences are an example of this commitment. The meeting is structured to appeal to all participants, with seminars focusing on each subspecialty of internal medicine. As such, it is a great opportunity for early trainees and medical students to obtain concise, high-quality information about the latest trends in healthcare. In addition to the seminar sessions, hands-on clinical skills demonstrations, and opportunities to present research, the meeting is a way to network with colleagues and leading physicians throughout the United States and Canada.

This year’s conference opened with a keynote address by Dr. James Orbinski, former president of Médecins Sans Frontières and recipient of the 1999 Nobel Peace Prize on their behalf. Dr. Orbinski is one of the world’s leading scholars dedicated to global health policy, improvement of healthcare access, and medical humanitarianism. His inspiring talk set an enthusiastic tone, which was evident during the remainder of the conference: individuals with a vision improve the lives of others—one patient, one hospital, one country at a time.

Over three days, Internal Medicine 2010 offered over 250 scientific sessions taught by internationally recognized faculty on subjects ranging from clinical updates to ethical issues to options for models of practice. This lecture diversity allowed attendees to fully tailor their experiences to their own areas of interest. In addition, the conference featured student and resident abstract, poster, and clinical vignette competitions. Students could also attend sessions on thriving during clerkship, mastering the match, and student-physician mentorship forums.

Perhaps most appealing to students early in their training was the impressively equipped Herbert S. Waxman Clinical Skills Center. This area featured small group sessions (with fewer than 15 learners) on numerous procedures, including ultrasound-guided central line placement, intra-articular injections, airway management, incision-and-drainage, and many other techniques. The center also featured physical exam skills development through an audio tour of cardiac murmurs, a fundoscopy training area, and a mock objective structured clinical examination (OSCE) track in which participants were mailed written feedback by experienced standardized patient-evaluators.

Lastly, the meeting featured Doctor’s Dilemma™, a Jeopardy-style competition billed as the World Series of medicine. This exciting game pitted teams of top residents from across the world against one another in a test of clinical knowledge from all areas of medicine.

Students interested in attending next year’s conference are encouraged to visit the ACP website and enroll as student members. In addition to free registration to Internal Medicine 2011, which is being held April 7–9, 2011 in San Diego, California, student members are offered numerous benefits, including clerkship preparation materials, physician mentors, and free access to ACP publications. Students interested in becoming ACP student representatives are encouraged to request additional information via e-mail to the corresponding author.

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The first annual medical student conference jointly hosted by the BC College of Family Physicians and the UBC Family Medicine Interest Group took place in September 2010 at the Life Sciences Centre at UBC. According to Mr. Ian Tang from the BC College of Family Physicians, its aim was to “foster relationships with medical students to promote Family Medicine as a satisfying, fulfilling, and rewarding career.”

The Conference on Family Practice highlighted important challenges in rural medicine, demonstrating how the two are tightly intertwined. As Dr. James Rourke writes, “Rural family practice requires doctors with the knowledge and skills of Family Medicine to [implement] them in settings where high-technology facilities and specialist resources are distant and limited.”

The series of talks and presentations were coordinated to reveal to medical students that family medicine is a very diverse specialty with a large range of flexibility.

Talks on marginalized populations and women’s health were relevant to rural medicine because rural residents also have reduced access to health care.

The key message from talks on geriatrics was to focus on knowing the priorities of one’s patients and of the importance of home visits.

Providing emergency care in rural areas is also a unique challenge in rural medicine. Talks on this topic outlined emergency family physicians’ responsibilities for patient care in acute care settings, and further elaborated on the benefits of the emergency medicine training program offered through the Canadian College of Family Physicians (CCFP-EM program) for practice in small communities.

The role of information technology in supporting rural physicians was also discussed as well as family physicians’ roles in a diverse range of research and international health activities.

The conference closed by looking to the future, at what family medicine will look like in 2015. Ideally, all families in BC will have a family physician who is familiar with their medical history and who is a part of a coordinated team that communicates with specialists regularly as an advocate for the patient. The family physicians of this not-so-distant future will be leaders in healthcare, helping to reduce costs to the healthcare system while improving patient health.

“We had a fantastic turnout from students, and a lot of the feedback I received both during and after the conference was positive,” says Goldis Chami of the UBC Family Medicine Interest Group. Both Ms. Chami and Mr. Tang would not only love to see this conference continue but also to expand to include more presenters and attendees.

REFERENCES

The annual Rural Emergency Continuum of Care Conference was hosted in the Delta Grand Okanagan Conference Centre in Kelowna, BC on June 18–20, 2010. The conference is a collaborative effort of the Rural Coordination Centre of BC, the Division of Continuing Professional Development of the UBC Faculty of Medicine, the BC Medical Association, the BC Ministry of Health Services, and the Society of Rural Physicians of Canada. I was one of the 12 lucky UBC medical students to attend. The conference is an accredited professional and educational conference for physicians, medical students and residents, nurses, paramedics, and other health professionals and authorities. The goal was to address the unique needs of rural physicians and healthcare providers. There were ample opportunities to tour Kelowna, network with colleagues, and share ideas and field experiences.

The opening address was delivered by the BC Minister of Health Services, the Honourable Kevin Falcon. The conference program consisted of lectures, interactive sessions, and hands-on workshops followed by social events and mixers in the evenings. Interactive sessions and lectures were vibrant and involved sharing techniques and stories on varying topics, including sepsis, poison, and emergency obstetrics. Some examples of workshops with limited capacity included “The Joys & Challenges of Rural Practice Session,” led by Dr. David Goranson, Dr. Alec Ritchie and Mr. Chris Sims, and the “Shock Course” on emergency room tools and procedures, led by Dr. Tandi Wilkinson and Dr. Jeff Plant.

Each hands-on workshop had beginner, intermediate, and advanced levels, which allowed participants to fully tailor their experiences to their own level of expertise. I attended the ultrasound hands-on workshops, which featured exemplary teaching, several practical stations with volunteers of differing body types, and different ultrasound equipment best suited for each body habitus. Participants were welcome to practice the demonstrated techniques on volunteers under instructor supervision, which provided immediate feedback. What is wonderful about being in a conference with experienced physicians is the numerous opportunities to learn and gain feedback. The instructors, volunteers, and participants were all very kind, enthusiastic, knowledgeable, and approachable.

The workshop on obstetrical emergencies was equally practical, hands-on, and stimulating. It began with a short lecture which flowed naturally into an interactive session during which physician instructors and other experts shared their experiences and techniques. Demonstration with models was followed with hands-on practice at a variety of stations with varying fetal positions, some of which were in shoulder dystocia!

On the final night, the conference ended with a gala where approximately 300 participants enjoyed a lovely meal and dancing. This reminded me of the importance of balance that is often emphasized and encouraged in rural medicine. From a student perspective, the conference was particularly useful. I encourage medical students and healthcare professionals interested in rural medicine to attend the 2011 conference on June 1–18. For details, please visit www.rccbc.ca/education/2011_RECC_Conference.

The Society of General Practitioners of B.C.

- The SGP represents the Section of General Practice in the BCMA and advocates strongly for the pivotal role of the General and Family Physician in the delivery of primary care in B.C.
- The SGP advocates for improved funding through the GP Subsidiary Negotiations Committee.
- Membership in the SGP provides access to our website where members can find billing and practice management tools.
- MEMBERSHIP IS FREE FOR ALL MEDICAL STUDENTS AND FAMILY PRACTICE RESIDENTS.

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(604) 638-2943     Fax (604) 736-6160
Dr. Peter Newbery – A Leading Pioneer of Rural Medicine

Jennifer Y. Quan

UBCMJ Staff Writer

Dr. Peter James Newbery’s enthusiasm to serve is evident in his achievements. He began as a social worker, and after obtaining his Masters and Doctorate of Divinity degrees from the Vancouver School of Theology, became a Minister in the United Church of Canada in 1966. In 1976, he graduated from McMaster University in Medicine and completed a fellowship with the College of Family Physicians of Canada (CFPC). In 1978, he began his practice as a family physician in Hazelton, British Columbia (BC).

In 1987, Dr. Newbery became the United Church Health Services director, a position he held for over 20 years. He served the church continuously aside from three years during which he served as the Postgraduate Programs Director for the University of British Columbia’s Department of Family Practice. He took this appointment in 2001. As the United Church Health Services director, he served as the administrator for medical, nursing, and other support services for the six hospitals and eight medical clinics operated by the United Church of Canada, which include hospitals in Hazelton, Bella Coola, and Bella Bella, BC.

For over two decades, Dr. Newbery has been focused on training personnel for rural communities on both a provincial and national scale. He was a founding member of an international group of rural physicians that develop training programs in rural family medicine worldwide. The group’s recommendations for rural training have helped form the training program of both Canadian and international medical schools. Under Dr. Newbery’s leadership, this group created a support system for practicing and returning rural physicians and for training new rural doctors.

As UBC’s Postgraduate Program Director of Family Practice from 2001 to 2005, Dr. Newbery focused on meeting the medical needs of communities from the inner city to the remote communities of the coastal and northern BC. As the RIII Enhanced Skills Program Director, he also developed an enhanced rural skills residency program in Emergency Medicine, Anaesthesia, Elder Care, Palliative Care, Inner City Medicine, Mental Health, Aboriginal Health, Research, Medical Education, Women’s Health, Advanced Obstetrics, and International Health. He also played a significant role in developing the Northern Medical Program at the University of Northern British Columbia and the first Family Practice Residency Program in Aboriginal Health. He continues to be a Clinical Professor of Medicine at UBC, teaching medical students and family physicians alike.

Dr. Newbery remains active in the CFPC and the College of Physicians and Surgeons of BC (CPSBC). He served on the board of the BC College of Family Physicians from 1988 to 1993, and was elected President in 1992. From 1995 to 2001, he was part of the executive of the CFPC and served as the national president in 1999 and 2000. He is also the chair of the research and education foundation of the CFPC. Dr. Newbery has been a member of numerous provincial and national rural health task forces, including the Northwest Health Services Review, the Federal Minister of Health’s Advisory Council on Rural Health, and the Northern health task force, from which came the provincial locum service and Health Match BC. He recently helped author a book on the history of the United Church Health Services in Canada. He has given presentations on medical ethics, rural recruitment, multiculturalism, medicine and ministry and continues to preach frequently in churches throughout Canada. He has also spoken at numerous national and international conferences about rural medicine and life-long learning for family practice physicians.

Dr. Newbery’s work and passion for rural medicine has taken him to many remote places in BC. His private and commercial pilot’s license has proven useful as he has flown over 1200 hours, often flying newly recruited medical personnel to rural hospitals.

Dr. Newbery has received numerous honours and awards, including honorary member of the CPSBC (1997), the UBC Faculty of Medicine Golden Jubilee Medal (2000), the Vancouver School of Theology Doctor of Divinity (2001), membership in the Order of Canada (2003), the Golden Jubilee Medal presented by Queen Elizabeth II (2003), membership in the Order of British Columbia (2004), and the BCMA Cam Coady Medal of Excellence (2008).

While exemplifying integrity, compassion, and leadership, Dr. Newbery’s career has been about service to others. He is active in many facets of medicine from rural practice, administration, rural recruitment, teaching, leadership in the UBC Department of Family Practice, and in the CFPC. His passion and work in rural health has inspired health care workers in BC, as well as across Canada, and has brought increased notoriety and status to rural medicine.

Dr. Newbery emphasizes that his accomplishments would not be possible without his colleagues and the love and support of his family. Dr. Newbery is married to Lynn, who is a retired teacher, administrator, and former Vice Principal of Hazelton High School. Together they have two children: Sarah Lynn, a physician in Ontario, and Mark, a teacher in Hazelton. They also have four grandchildren.
Acute “Olympic” Hepatitis: A Medical Experience from the Vancouver 2010 Games

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\(^{b}\)Division of Gastroenterology, University of British Columbia, Vancouver, BC  
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ABSTRACT

A 50-year-old Chinese man, visiting for the Vancouver 2010 Winter Olympic Games Opening Ceremonies, was referred with acute-onset hepatitis. On presentation, he was found deeply jaundiced but without any clinical encephalopathy or stigmata of chronic liver disease. Initial laboratory investigations revealed acute liver failure that was complicated by renal impairment. His immediate prognosis was considered significant enough to result in referral to the liver transplant service. With increasing global travel, it is apparent that acute hepatitis E should be considered in the differential diagnosis of any patient with acute liver failure. Appropriate screening tests in this patient included hepatitis A, B and C viral serology and metabolic and autoimmune markers. The initial history suggested hepatotoxicity from traditional Chinese medicines; however, after a careful review via an interpreter, it was clear that the herbal medications were consumed after the patient became ill. Liver biopsy revealed features consistent with acute hepatitis E, which was confirmed by subsequent positive viral serology for the hepatitis E virus (HEV), particularly anti-HEV IgM. The patient’s liver function improved with conservative treatment, and he was able to return home.

KEYWORDS: acute hepatitis, hepatitis E virus, hepatic failure, conservative treatment, olympic

INTRODUCTION

As the influx of both international visitors and immigrants increases, the need for medical clinicians and trainees to be competent in considering and diagnosing “foreign” diseases is increasingly important. We provide here a case of hepatitis E virus (HEV) infection, which is typically considered only in endemic regions—particularly amongst pregnant women—and thus not considered in the differential diagnosis of acute hepatitis. Important, recent literature suggests that hepatitis E is becoming increasingly prevalent in the developed world, independent of immigration and travel history.\(^1\)

HEV is a single-stranded ribonucleic acid (RNA) virus that is transmitted primarily through the fecal-oral route. Another more recently identified transmission route is that of zoonotic foodbourne transmission through swine, attributed as the source of autochthonous HEV infections reported in the developed world.\(^2\) HEV classically is endemic in tropical and sub-tropical regions, including Asia and Africa, but there are increasing reports of its presentation among the general population in developed countries as well.\(^2\) HEV can present in both epidemic and sporadic cases within hyper-endemic regions. In both epidemic and sporadic cases, young adults are primarily affected, with no difference between sexes. Regions that report domestic cases of HEV are now considered “endemic” and include the United Kingdom, New Zealand, Taiwan, France, and Germany.\(^3\)

The prevalence of HEV has traditionally been considered in two separate domains according to endemic and non-endemic. Endemic region outbreaks typically affect 1–15% of the population with the majority of victims being young adults (up to 30%) and the highest mortality rates among pregnant women (up to 19%).\(^4\) Non-endemic reports tend to be of isolated cases.

The diagnosis of HEV is made through the presence of Immunoglobulin M (IgM) antibodies against HEV or direct detection of the HEV viral particles in the serum or feces.

“Hepatitis E is becoming increasingly prevalent in the developed world, independent of immigration and travel history."
Importantly, there is currently a great deal of variance in the sensitivity and specificity of these assays, making results less reliable than what is available for other strains of hepatitis viruses.  

CASE REPORT

A Chinese visitor in his mid-50s was referred for acute liver failure. He was unwell for six weeks prior to this presentation. His initial symptoms began within a few weeks of a recent inter-province travel in China. He became acutely unwell, suffering from lethargy, loss of appetite, nausea, abdominal bloating, discomfort, and occasional episodes of fever. His family members found him jaundiced one week after his initial symptoms. He had no previous diagnosis with any viral hepatitis. His reported alcohol history was very minimal. He consulted a Chinese medicine practitioner and started on herbal medications which he discontinued within two days due to lack of improvement. His symptoms persisted upon subsequent arrival in Vancouver, provoking him to visit a local primary care physician who then referred him for admission to hospital for liver transplant assessment.

His past medical history was significant for diabetes mellitus, hypertension, hypercholesterolemia, and obstructive sleep apnea. His regular medications included glyburide, pioglitazone, amlodipine, and atorvastatin. Apart from being from an endemic area, he had no other risk factors for horizontal transmission of viral hepatitis, such as intravenous drug use, tattoos, or a history of blood transfusion. His family history was insignificant for liver disease.

On presentation he was found febrile and deeply jaundiced but without stigmata of chronic liver disease, including portal hypertension and ascites. He did not develop encephalopathy at any stage. The remainder of his abdominal and physical exam was unremarkable. Ultrasonogram of his abdomen did not show any evidence of vascular or bile duct pathology. His initial calculated Child-Turcotte-Pugh (CTP) score was 10 (Table 1), and his Model for End stage Liver Disease (MELD) score was 36 (Table 2) with a very abnormal cholestatic pattern of liver function test.

![Table 1. Child-Turcotte-Pugh (CTP) Classification of the Severity of Liver Cirrhosis (Adapted from 7).](image)

<table>
<thead>
<tr>
<th>Clinical and Biochemical Measurements</th>
<th>CTP points assigned for increasing abnormality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encephalopathy (grade)</td>
<td>CTP points assignment: 1</td>
</tr>
<tr>
<td>Ascites</td>
<td>None</td>
</tr>
<tr>
<td>Bilirubin (µmol/L)</td>
<td>&lt;34.2</td>
</tr>
<tr>
<td>Albumin (g/L)</td>
<td>&gt;35</td>
</tr>
<tr>
<td>INR</td>
<td>&lt;1.7</td>
</tr>
</tbody>
</table>

CTP grade: A = 5–6 points( well-compensated disease) ; B = 7–9 points B (significant functional compromise); and C = 10–15 points (decompensated disease). One- and two-year patient survival: grade A = 100 and 85 percent; grade B = 80 and 60 percent; and grade C = 45 and 35 percent.

He was reported to have an initial alanine transaminase (ALT) level of 1700 U/L (normal 25–80 U/L), which had decreased to 84 U/L upon transfer to our care. At this time his aspartate aminotransferase (AST) was 60 U/L (normal 10–30 U/L). However, his bilirubinemia remained alarmingly high: both total bilirubin (reported 514 µmol/L, normal 0–18 µmol/L) and direct bilirubin (reported 412 µmol/L, normal 0–5 µmol/L). Hepatitis B virus surface antigen (HBs Ag) was negative with a hepatitis B surface antibodies (Anti-HBs) level of 1000 mIU/ml. However, his total Anti-Hepatitis B core (Anti-HBc) was positive. His Anti-HBc IgM was non-reactive, indicating a past infection. He tested negative for antibodies to the hepatitis C virus (Anti-HCV). All of his viral serologies for recent infections were negative, including those for cytomegalovirus, Epstein-Barr virus, herpes simplex virus, human immunodeficiency virus, and hepatitis A virus. His immunoglobulin levels were 18.1 g/L (normal 6.7–15.2 g/L), 6.52 g/L (normal 0.70–4.00 g/L), and 1.15 g/L (normal 0.40–2.30 g/L) for Immunoglobulin G (IgG), Immunoglobulin A (IgA), and IgM, respectively. He was negative for anti-parietal cell antibody, antimitochondrial antibody, antinuclear antibody, antineutrophil cytoplasmic antibody (ANCA), anti-tissue transglutaminase, α1-antitrypsin, anti-smooth muscle antibody (1:40), and ceruloplasmin. Although he had episodes of fever, repeated blood cultures remained negative, and no obvious source of infection was ever isolated. His creatinine, elevated at 312 µmol/L (normal 60–115 µmol/L), was investigated for renal impairment and was thought to be due to pre-renal type etiology or possibly an early hepato-renal syndrome. However, this resolved promptly with intravenous fluid administration and resolution of the liver failure.

Routine investigations failed to provide a clear etiology for this patient’s hepatitis, so a needle core biopsy of his liver was performed. Pathology showed an acute hepatitis with importancy.

![Table 2. MELD (Model for End-stage Liver Disease)’.](image)

(3.8[Ln serum bilirubin (µmol/L)] + 11.2[Ln INR] + 9.6[Ln serum creatinine (µmol/L)] + 6.4; where Ln is the natural logarithm).

Most commonly-used prognostic model for estimating disease severity and survival in end stage liver disease. Originally developed to estimate procedure-related mortality in patients undergoing TIPS (transjugular intrahepatic portosystemic shunts). The MELD score is based on patients’ laboratory values for serum bilirubin, serum creatinine, and international normalized ratio (INR) in a log transformed equation. High MELD scores are associated with a poor short-term prognosis. Three-month survival drops to less than 20 percent in patients with a MELD score of 40. An online MELD calculator that accepts SI units is accessible at http://www.mdcalc.com/meld.

![Table 3. Patient’s laboratory values on presentation.](image)

<table>
<thead>
<tr>
<th>Investigation</th>
<th>Patient’s Value</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALT</td>
<td>84 U/L</td>
<td>25–80 U/L</td>
</tr>
<tr>
<td>AST</td>
<td>60 U/L</td>
<td>10–38 U/L</td>
</tr>
<tr>
<td>ALP(alkaline phosphatase)</td>
<td>166 U/L</td>
<td>90–210 U/L</td>
</tr>
<tr>
<td>GGT</td>
<td>407 U/L</td>
<td>15–80 U/L</td>
</tr>
<tr>
<td>Bilirubin Total</td>
<td>514 µmol/L</td>
<td>0–18 µmol/L</td>
</tr>
<tr>
<td>Bilirubin Direct</td>
<td>412 µmol/L</td>
<td>0–3 µmol/L</td>
</tr>
<tr>
<td>LDH(lactate dehydrogenase)</td>
<td>212 U/L</td>
<td>50–160 U/L</td>
</tr>
<tr>
<td>Sodium</td>
<td>134 mmol/L</td>
<td>135–145 mmol/L</td>
</tr>
<tr>
<td>Albumin</td>
<td>20 g/L</td>
<td>34–50 g/L</td>
</tr>
<tr>
<td>Creatinine</td>
<td>312 µmol/L</td>
<td>60–115 µmol/L</td>
</tr>
<tr>
<td>INR</td>
<td>1.3</td>
<td>1</td>
</tr>
<tr>
<td>PTT</td>
<td>34 secs</td>
<td>24–40 secs</td>
</tr>
<tr>
<td>Platelets</td>
<td>199 giga/L</td>
<td>150–400 giga/L</td>
</tr>
</tbody>
</table>
unusual histopathologic features (Figure 1). Portal inflammation was present with a pattern of acute inflammation preferentially concentrated at interface, and chronic inflammation comprising lymphocytes and occasional plasma cells concentrated more centrally within the portal tracts. Damaged bile ducts were present, accompanied by considerable ductular proliferation. The lobular parenchyma showed occasional foci of acute inflammation, hepatocytolysis, and cholestasis. Mild steatosis and fibrosis were also present; these latter features are not characteristic of HEV infection and were attributed possibly to antecedent fatty liver disease secondary to the patient’s diabetes mellitus.

His serology for hepatitis E IgM and IgG came back positive at a later date. After clinical review of the incubation time of acute HEV and the timeline of the patient’s visit to Vancouver, it was apparent that the infection was acquired in Asia. Eventually, this patient’s condition recovered with supportive management only, and he was able to return to China. The final clinical conclusion was that this patient’s acute HEV was acquired in Asia, possibly from eating contaminated pork.

Figure 1. Liver core biopsy (hematoxylin and eosin stain: 200x magnification). Portal tract edge with predominantly neutrophilic infiltrate surrounding interface hepatocytes. Inflamed bile ductule is at extreme right (arrow).

DISCUSSION

We provide a poignant clinical case of acute-onset hepatitis caused by the hepatitis E strain. Although this is not a commonly seen causative factor, it is critical to consider in the differential diagnosis for any patient who presents with hepatitis. Consistent with previous reports, the HEV incubation period (2–9 weeks) is followed by the acute infection period at which point viral RNA is detected in blood and stool, and hepatocellular liver enzymes rise (peak approximately six weeks post exposure) with resolution at ten weeks exposure. The most common prodromal symptoms are jaundice, followed by anorexia, lethargy, and abdominal pain.

The diagnosis of hepatitis E, compared to other etiologies, is critical as the treatment of acute hepatitis E is supportive since no specific anti-viral therapy exists. Provided the unclear etiology of this patient’s hepatitis from routine labwork results, pathology was a critical component of the diagnosis. Two previous studies characterised the histopathology of acute autochthonous HEV infections and reported a number of characteristic features also seen in the current case: intralobular neutrophilic inflammation and necrosis, neutrophilic interface inflammation with lymphocytic inflammation in the centre of portal tracts, and acute cholangitis and cholangiolitis. An important advancement in the prevention of hepatitis E is the development of vaccinations. There are currently two in clinical trials: 1) a recombinant truncated capsid protein vaccine (Phase II) and 2) a recombinant structural protein (p239) vaccine (Phase III).

In conclusion, this report highlights the importance of considering HEV infection, regardless of exposure history, in the case of acute hepatitis. However, there is a broader lesson as well: as the globalization of our population advances, so does the need for medical practitioners and trainees to think more globally in their diagnostic considerations. The 2010 Winter Olympic Games brought an unprecedented degree of international media attention to Vancouver. Post-Olympics, it can be anticipated that Vancouver will be a destination for international visitors for years to come, and the British Columbian medical community will need to prepare for this.

SOAP Note.

Subjective
A male, Chinese tourist, mid-50s, was referred for jaundice. He was unwell for six weeks prior to this presentation. He became acutely unwell, suffering from lethargy, loss of appetite, nausea, abdominal bloating, discomfort, and occasional episodes of fever. No previous diagnosis with any viral hepatitis or significant alcohol or drug use. However, he reported using Chinese herbal medications.

Objective
He was found deeply jaundiced but without stigmata of chronic liver disease (ascites, portal hypertension, and encephalopathy). He had a transaminitis ALT 1700 U/L (normal 25-80 U/L). He tested negative for hepatitis A, B, and C. Liver biopsy revealed acute portal inflammation preferentially concentrated at the interface. His serology for hepatitis E IgM and IgG came back positive at a later date.

Assessment
Acute hepatitis E viral infection causing hepatic failure, likely contracted from contaminated meat products in Asia.

Plan
Conservative management with close supervision resulted in full recovery.

REFERENCES
The Hidden Time Bomb Explodes: A Previously Asymptomatic and Undiagnosed Hepatocellular Carcinoma Presenting as a Tumour Rupture

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cAuthors contributed equally to this work

ABSTRACT

Hepatocellular carcinoma is the third leading cause of cancer-related death world-wide. Infection with hepatitis B virus is the strongest known risk factor for the development of hepatocellular carcinoma, especially in male patients. Regular surveillance is crucial for early detection of hepatocellular carcinoma as, in the absence of consistent follow-up, patients often present with advanced disease and sometimes with tumor rupture. We present here a case report of a patient from a high risk demographic—an African male infected with hepatitis B virus—whose initial presentation of hepatocellular carcinoma was that of a tumor rupture. We highlight the non-specific nature of his presentation and the importance of high clinical suspicion for hepatocellular carcinoma in patients from high-risk groups. We highlight that in the absence of timely recognition of this malignancy, especially at its advanced stage, a patient’s already scarce treatment options may become even more limited.

KEYWORDS: hepatocellular carcinoma, hepatitis B virus, tumour rupture, transarterial embolization

INTRODUCTION

Hepatocellular carcinoma (HCC) is the third leading cause of cancer-related mortality in the world,1 with a specific geographic distribution and strong association with hepatitis B or C virus (HBV and HCV) carrier status.2,3 It is especially prevalent in Sub-Saharan Africa, with Gambia specifically having the incidence of 33.1 per 100,000 males per year and 12.6 per 100,000 females per year.4,5 The increased susceptibility of males

We highlight that in the absence of timely recognition of this malignancy, especially at its advanced stage, a patient’s already scarce treatment options may become even more limited.
to HCC is observed world-wide and is thought to be due to multiple factors, including hepatitis carrier state, environmental exposures, and the effect of androgens.4,5

Infection with HBV was shown to be more likely to progress to HCC in patients positive for HBeAg, which is one of the viral polypeptides thought to modulate the host immune response, compared to those positive only for HBsAg, which in turn was higher than those of inactive carriers.6 Treatment of HBV was shown to reduce the risk of progression to HCC although it does not bring it back to baseline.7,9 Along the same lines, the risk of progression to HCC in HBV carriers was shown to be greater in patients with higher viral loads.7

Presentation of HCC is non-specific.10 Patients with HCC may have no symptoms other than those related to their chronic liver disease; in other words, some patients may present with decompensation of their previously compensated cirrhosis. More advanced lesions may present with mild-moderate upper abdominal pain, night sweats, fever, diarrhea, and symptoms related to the location of metastatic spread. A dramatic presentation is usually seen with tumour rupture, which can occur in up to 15% of patients.11 Clinical features include acute abdominal pain, distension, and hemodynamic instability; the thirty day mortality rate can be over 30%.12 Hemodynamic stabilization followed by transarterial embolization to control bleeding are essential to minimize mortality.11 Patients with ruptured HCC are at high risk for metastatic peritoneal seeding; however, this does not preclude an attempt at a potentially curative resection in suitable patients.11 At least one study on a small group of patients who underwent liver resection following rupture of their HCC suggested that there was a benefit to peritoneal lavage.13 The authors proposed that it may retard the growth of extrahepatic metastasis.

As with other malignancies, early detection is critical to maximize patient survival, and consequently, routine monitoring is recommended in patient populations at high risk. HBV carriers of African descent are of particularly high concern, with ultrasonographic surveillance advised every six to 12 months in patients over the age of 20.14 The treatment options depend on the extent of the disease spread. Potentially curative resection offers the best chance of survival to suitable candidates. Liver transplantation may be considered as well. In patients with unresectable lesions, various types of ablation and embolization can prolong survival. Radiation therapy, as well as systemic chemotherapy, can also be offered.

We present here a case of a HBV carrier from Gambia with HCC rupture as first presentation, with discussion of his diagnosis and treatment options.

CASE REPORT

A 52-year-old African male with a remote history of infectious hepatitis presented to the Vancouver General Hospital (VGH) complaining of severe epigastric pain lasting one week. The pain had been persistent and progressive, radiated throughout his abdomen, and was graded as 10/10 in severity at presentation. The patient was also suffering from constipation and had been experiencing night sweats. There were no other associated symptoms at presentation. Several days prior he had visited another emergency department with similar symptoms and was discharged with the diagnosis of constipation. The patient reported two prior episodes of severe abdominal pain: one occurred three years previously during a trip to Gambia and another four months before presentation after consumption of contaminated water.

This patient’s past medical history included insulin-dependent diabetes mellitus. His diagnosis of hepatitis infection was made 13 years ago and the patient’s family history was not significant for liver disease or other gastrointestinal concerns. He immigrated to Canada from Africa 24 years ago and denied history of alcohol abuse or illicit drug use.

On presentation, the patient was alert and not distressed with vital signs within the normal limits. The exam was remarkable for scleral icterus and mild ascites but no other stigmata of chronic liver disease. The abdomen was obese, soft, and non-tender with no evidence of hepatosplenomegaly or abdominal masses. The rest of the examination was unremarkable.

Laboratory investigations revealed a mild normocytic anemia with a slightly elevated creatinine. Liver enzymes were all mildly elevated, and lipase was within normal limits. Total and direct bilirubin as well as LDH were elevated while albumin was decreased.

Abdominal ultrasound revealed active ascites and two irregularly defined hyperechoic lesions in the left hepatic lobe measuring 3.7 cm and 8.6 cm. The gallbladder contained multiple calculi and sludge. Extrahepatic or intrahepatic biliary ductal dilatation was absent. Lastly, portal vein thrombosis was present.

To follow up on these findings a triphasic CT scan of the abdomen was done. It showed multifocal HCC with rupture of the dominant 6.6 cm exophytic tumor in the lateral segment of the left liver lobe surrounded by a highly localized high-attenuation fluid consistent with blood (Figure 1A). In segment 4a, a 3.3x3.4x2.6 cm well-defined lesion was seen as well as numerous other hypervascular lesions in segments 6, 7, and 8 of the right lobe consistent with multi-focal HCC. No active bleeding was...
demonstrated. Additionally, tumor thrombus was identified in the left and right portal vein branches as well as in the main portal vein (Figure 1B). Cholelithiasis and mild ascites were also noted.

The patient underwent a bland embolization of the dominant left hepatic lobe mass. He tolerated the procedure well with uneventful recovery.

HBV serologies demonstrated the presence of anti-HBe antibody, HBsAg, and an anti-HBsAg antibody titer of 22.3 mIU/L. Despite the anti-HBs antibody titer, the presence of HBsAg is consistent with a chronic HBV infection. Antibodies to HCV were not detected.

Upon discharge, the patient’s liver enzymes remained elevated above normal limits but were lower than on admission.

DISCUSSION
While, as mentioned previously, HCC presents with rupture in only a small percentage of patients, the potential consequences of not recognizing this event can be very severe. To avoid this potential disaster, a high index of suspicion for a previously unrecognized HCC should exist when encountering patients from high-risk demographics, such as the patient presented here.

Initially, hemodynamic control is of prime importance and can be achieved via embolization of the arteries supplying the ruptured tumor. Following stabilization of the acute presentation, appropriate follow-up care to maximize survival and quality of life becomes paramount. Unfortunately, our patient’s severe abdominal pain (which we felt signified the rupture of his HCC) started several days prior to his presentation to VGH. Therefore, by the time the stabilization of the ruptured tumor was achieved, he was already outside of the window of opportunity for peritoneal lavage to minimize peritoneal seeding. Although his high disease burden and the presence of portal vein thrombosis indicated a high chance of extrahepatic metastases prior to rupture, timely peritoneal lavage could have still minimized his disease burden and improved his prognosis. This once again highlights the importance of having a high suspicion for HCC in patients from high-risk demographics, allowing for timely diagnosis and management.

Prognosis for advanced HCC with extrahepatic spread is generally poor. However, sorafenib (Nexavar®), a small molecule that inhibits tumour angiogenesis and proliferation while increasing apoptosis, has been shown recently to be effective in prolonging survival of patients with metastatic HCC for up to three months. A number of other systemic therapeutic agents for HCC are currently in various stages of clinical trials. These options were discussed with our patient. Unfortunately, our patient was not a candidate for either liver resection or transplantation, due to his high and multifocal hepatic tumour burden and extrahepatic spread, respectively. However, the fact that his liver enzymes were elevated at presentation and there were no signs of decompensated cirrhosis (Child-Pugh Class A) demonstrated that he still had a reasonable hepatic reserve, which is a good prognostic indicator.

In conclusion, our case of multifocal HCC presenting with rupture highlights the importance of having a high clinical suspicion in appropriate patient populations as well as the essence of timely diagnosis and treatment initiation to improve the patient’s prognosis.

POST-SCRIPT
This patient returned to his native country and passed away from his HCC two months after presentation. He willingly consented to this case report in the belief that it would enhance awareness and medical education about his condition at this university. We dedicate this publication to him.

REFERENCES
The Clinical Presentation and Diagnosis of Primary Cardiac Amyloidosis

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\textsuperscript{c}James Hogg Research Centre-Heart & Lung Institute, Vancouver, BC

ABSTRACT

A 67-year-old woman presented to her family physician with a five month history of progressing shortness of breath and fatigue. The patient was referred to cardiology who saw her two weeks later. An echocardiogram revealed normal biventricular systolic function, pulmonary hypertension, and mild tricuspid regurgitation. Clinically, the patient had bilateral pedal edema, evidence of pleural effusion, and an elevated jugular venous pressure (JVP). Five weeks later she was admitted to hospital for further testing as there was a marked change in her condition. In hospital, a series of investigations were performed, including a pulmonary angiogram, thoracentesis, chest computed tomography (CT), venous Doppler of lower extremities, and an endomyocardial biopsy. The endomyocardial biopsy demonstrated interstitial and vascular positivity for amyloid. The patient was diagnosed with systemic primary (AL) amyloidosis with cardiac involvement. Primary amyloidosis results from an accumulation of immunoglobulin light chains due to a clonal B cell disorder such as multiple myeloma. Patients with primary amyloidosis, with heart involvement, progress rapidly and have a median survival of six months. The signs and symptoms of congestive heart failure (CHF) can be recognized with ease; however, establishing the underlying cause can be more difficult. Determination of the underlying cause of heart failure is essential as it will influence the management of the patient. Early intervention can have a significant impact on the patient’s response to treatment, especially when the underlying condition involves a malignancy or infiltrative disorder.

KEYWORDS: primary amyloidosis, cardiac involvement, shortness of breath, fatigue, congestive heart failure, comfort care

INTRODUCTION

Symptoms and signs of congestive heart failure (CHF) are present in 6–10% of patients over the age of 65 years.\textsuperscript{1} There are many causes of CHF, including coronary artery disease, myocardial infarction, hypertension, pulmonary heart disease (cor pulmonale), and chronic anemia. Other causes include infiltrative, storage, and metabolic disorders.\textsuperscript{1,2} The cause of CHF remains unknown in 20–30% of affected patients.\textsuperscript{1} While the signs and symptoms of CHF can be easily recognized and commonly encountered, further investigations should be performed in an attempt to determine the cause. While some causes of heart failure are idiopathic and respond well to typical medications (β-blockers, ACE inhibitors, and diuretics), other causes may require additional treatment in order to slow or halt progression of the disease. Depending on the underlying cause of the heart failure, this additional treatment may consist of chemotherapy, surgery, or transplantation.

CASE REPORT

History of Presenting Illness

A 67-year-old female first presented to her family physician with a five month history of progressive shortness of breath and fatigue. At the time of this visit she was able to perform her daily activities and was able to ride a stationary bike five miles, three times per week. However, she did state that her exercise tolerance on a flat surface was affected mainly by fatigue. She had no paroxysmal nocturnal dyspnea and no orthopnea. Her medical history included a cerebral vascular event likely secondary to an eight year history of hypertension. At this time it was discovered that she had a left bundle branch block on ECG. Since this incident, she had well controlled blood pressure.

A chest x-ray showed small bilateral pleural effusions, and she was given a bronchodilator. The patient was seen by cardiology two weeks later. The cardiologist noted that she looked depressed, and the patient stated that she was losing weight. Her blood pressure was 110/60 mmHg, (sitting, right arm) and...
CASE AND ELECTIVE REPORTS

her heart rate was 60 bpm and regular. She now had marked bilateral pedal edema and an elevated jugular venous pressure (JVP). Her chest was clear to auscultation. The provisional diagnosis was hypothyroidism or another systemic process that was resulting in hypoproteinemia. However, due to the marked change in her condition since she had been seen by her family physician, a series of investigations were performed (Table 1). The chest x-ray was now consistent with mild CHF and moderate bilateral pleural effusions. There was borderline left ventricular (LV) hypertrophy and pulmonary hypertension with a PA systolic pressure of 50 mmHg on echocardiogram (normal PA systolic pressure varies from 15–25 mmHg). Serum lactate dehydrogenase and transaminases were mildly elevated. She was treated with fluvastatin (Lescol®) 20 mg PO daily, furosemide (Lasix®) 80 mg PO daily with added potassium, amloきて (Norvase®) 2.5 mg PO daily, and acetylsalicylic acid (Aspirin®) 81 mg daily.

The patient was seen again by her cardiologist five weeks later. At this time she was no longer able to ride the stationary bike and was more fatigued. She appeared unwell and complained again of shortness of breath and bilateral leg swelling. Upon examination the cardiologist noted:

1. Blood Pressure 150/110 mmHg (sitting, right arm)
2. Heart Rate 110 bpm and regular (sinus tachycardia)
3. JVP markedly elevated
4. Heart sounds were distant on auscultation
5. Marked bilateral pedal edema
6. Mild bilateral peribobal purpura
7. No heart murmurs were detected
8. No ascites, no organomegaly were present

The patient’s problems now included new onset pulmonary hypertension, severe pedal edema, pleural effusions, and an elevated JVP. She was admitted to hospital for further diagnostic investigations.

Diagnostic Tests
In hospital, the patient underwent another series of investigations (Table 2). These investigations demonstrated pulmonary hypertension, concentric LV hypertrophy, mild global LV systolic dysfunction, severe diastolic dysfunction, mild to moderate mitral regurgitation, and normal coronary arteries. Bilateral pleural effusions were present. An ECG showed decreased voltage in all leads. A pulmonary angiogram revealed elevated pulmonary artery pressure and an ejection fraction of 50% (normal 55–70%). One month later the patient had an endomyocardial biopsy.

Pathology-Endomyocardial Biopsy
The endomyocardial biopsy showed patchy widespread accumulation of material in the interstitium that stained positively with Congo red and showed apple green birefringence in polarized light. These findings are consistent with amyloid protein deposits. The interstitial amyloid appeared to be strangulating certain groups of cardiac myocytes. Amyloid deposition was also prominent in the vessel walls of the small intramyocardial arteries.

Definitive Diagnosis
The pathology findings from the endomyocardial biopsy demonstrated features of cardiac amyloidosis. Detection of free immunoglobulin lambda light chains in the serum confirmed the diagnosis of primary (AL) amyloidosis. A bone marrow biopsy was not performed as it would not have influenced treatment.

Treatment
The patient was treated with a trial of chemotherapy which consisted of melphalan (Alkeran®) 10 mg PO daily for four days and prednisone (Deltasone®) 100 mg PO daily for four days. This treatment was given at intervals of four weeks. The patient was deteriorating quickly, and further treatment options were not explored. Rather, comfort care was initiated. She was also treated with a potassium supplement, nitroglycerine (Minitran®) patch daily, fluvastatin (Lescol®) 20 mg PO daily, quinapril (Accupril®) 5 mg PO daily, furosemide (Lasix®) 120 mg PO daily, and digoxin (Lanoxin®) 0.625 mg PO daily.

Other treatment options for primary cardiac amyloidosis may include cardiac transplantation and bone marrow transplantation. Cardiac transplantation is rarely offered as the transplanted heart becomes infiltrated with amyloid protein. Roig et al. (2009) reviewed the outcome of heart transplant patients with primary amyloidosis and found the five year survival rate was 36%. As post-surgical mortality rates remain high, measures should be taken to reduce the amount of new infiltration of amyloid protein. Recent studies have shown that the survival of patients who receive cardiac transplantation followed by autologous stem cell transplantation (ASCT) was 60% at seven years compared to 39% at four years when no ASCT was provided after cardiac transplantation.

Outcome
The patient passed away five and a half months from the time of her first visit to her family physician and 10 weeks after a definitive diagnosis was made.

### Table 1. Investigations after the First Visit to Cardiology.

<table>
<thead>
<tr>
<th>Test</th>
<th>Results (Normal Ranges in Brackets)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Blood Tests</strong></td>
<td>Normal CBC and differential</td>
</tr>
<tr>
<td></td>
<td>Alkaline phosphatase 115 (40–120)</td>
</tr>
<tr>
<td></td>
<td>Lactate Dehydrogenase 821 (300–600)</td>
</tr>
<tr>
<td></td>
<td>AST 100 (10–40)</td>
</tr>
<tr>
<td></td>
<td>GGT 198 (10–65)</td>
</tr>
<tr>
<td></td>
<td>Creatinine normal</td>
</tr>
<tr>
<td><strong>Serum Protein Electrophoresis</strong></td>
<td>Total 53 (60–80)</td>
</tr>
<tr>
<td></td>
<td>Albumin, alpha 1, alpha 2, and beta-globulin normal</td>
</tr>
<tr>
<td></td>
<td>Gamma globulins 3 (5–17)</td>
</tr>
<tr>
<td></td>
<td>No monoclonal peak identified</td>
</tr>
<tr>
<td><strong>Pulmonary Function Tests</strong></td>
<td>FVC 87% of predicted</td>
</tr>
<tr>
<td></td>
<td>FEV, 71% of predicted</td>
</tr>
<tr>
<td></td>
<td>No change with bronchodilators</td>
</tr>
<tr>
<td><strong>Chest x-ray</strong></td>
<td>Mild congestive heart failure</td>
</tr>
<tr>
<td></td>
<td>Moderate pleural effusions bilaterally</td>
</tr>
<tr>
<td><strong>Transthoracic Echocardiogram</strong></td>
<td>Borderline left ventricular hypertrophy</td>
</tr>
<tr>
<td></td>
<td>Mild tricuspid regurgitation</td>
</tr>
<tr>
<td></td>
<td>PA pressure 50 mmHg</td>
</tr>
<tr>
<td></td>
<td>No evidence of pericardial fluid</td>
</tr>
<tr>
<td></td>
<td>No evidence of RV failure</td>
</tr>
<tr>
<td><strong>Chest and Abdominal Ultrasound</strong></td>
<td>Large bilateral pleural effusions</td>
</tr>
<tr>
<td></td>
<td>Pericardial effusion present</td>
</tr>
<tr>
<td></td>
<td>No ascites, no abnormalities with organs</td>
</tr>
</tbody>
</table>

CBC-complete blood count, AST-aspartate aminotransferase, GGT-gamma-glutamyl transpeptidase, FVC-forced vital capacity, FEV₁-forced expiratory volume in one second, RV-right ventricular.
DISCUSSION

Three types of amyloidosis that can affect the heart are primary amyloidosis (also known as immunoglobulin light chain amyloidosis), senile systemic amyloidosis, and familial amyloidosis. Rarely, secondary (AA) amyloidosis can involve the heart. Secondary amyloidosis may result from chronic infectious or inflammatory states. Primary amyloidosis, which results from various plasma cell disorders, most frequently leads to amyloid deposition in the heart.

Primary amyloidosis affects 4.5 of 100,000 individuals. It often occurs in patients over the age of 40, and the median survival of individuals with primary amyloidosis who present with heart failure is six months. Primary amyloidosis is caused by the accumulation of monoclonal immunoglobulin light chain (AL) fragments that deposit as misfolded amyloid fibrils into various tissues. These light chain fragments arise from clonal B cell disorders. 20 percent of patients with light-chain amyloidosis have multiple myeloma while the rest have other B cell disorders such as B-cell lymphoma or Waldenström macroglobulinemia. The deposition of the amyloid fibrils leads to organ dysfunction. Amyloidosis is diagnosed histologically by means of a biopsy from the affected tissue. In the heart (Figure 1), amyloid deposits appear as amorphous pink material in the interstitium or walls of intramyocardial blood vessels on routinely stained slides. With special histochemical stains, such as the Congo red stain, amyloid appears salmon-coloured in ordinary light but shows apple green birefringence in polarized light. Because amyloid can be caused by deposition of a number of different proteins, additional studies, including immunohistochemical stains on the tissue biopsy, are needed to distinguish them.

CONCLUSION

Early recognition may improve the poor prognosis of these individuals. Studies have found that cardiac amyloidosis should be considered when the patient presents with rapidly progressing dyspnea, a non-dilated cardiomyopathy with thickening of the LV wall on echocardiogram, and low voltage ECG (in contrast to high voltage usually seen with ventricular thickening) with or without a pattern that resembles a myocardial infarction. Myocardial biopsies must be performed for a definitive diagnosis to be made. Primary amyloidosis with cardiac symptoms is a devastating disease where symptoms progress rapidly, and patients often only...
live for months. There is little that can be done to treat cardiac amyloidosis, but continued research provides hope for patients and families affected by this tragic illness. While the prognosis remains poor, early recognition of the underlying cause of heart failure of unknown origin will facilitate management of a patient with cardiac amyloidosis and aid in attempts to improve the outcome of the patient.

DEDICATION

To the most beautiful, compassionate, and supportive woman that I have known. You showed great strength throughout your life, and this did not falter in the last few months as you fought this illness. You continue to teach us today. We will miss you always.

REFERENCES

A Case of Interstitial Cutaneous Sarcoidosis

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ABSTRACT

A 57-year-old African-American woman with pulmonary sarcoidosis presented to the emergency room with a large solitary violaceous plaque on her right lower leg. The lesion, initially diagnosed as cellulitis, was ultimately diagnosed as interstitial cutaneous sarcoidosis. Classically, sarcoidosis is characterized histologically by non-caseating granulomas with a paucity of inflammatory cells ("naked granulomas"); however, in 16–20\% of cases, an interstitial histiocytic pattern is noted under the microscope. Various treatment regimens have been described for cutaneous sarcoidosis, including the use of tetracycline and its derivatives. The patient described in this report was treated with oral minocycline (Minocin\textsuperscript{\textregistered}) and topical clobetasol propionate (Dermovate\textsuperscript{\textregistered}) ointment, with significant improvement in both the appearance and symptomatology of the lesion.

KEYWORDS: cutaneous sarcoidosis, cutaneous infection, necrobiosis lipoidica, granuloma annulare, minocycline, clobetasol propionate

A 57-year-old African-American woman, with known pulmonary sarcoidosis, was seen in a Toronto emergency department with a one-day history of redness, swelling, and intense burning pain in her right lower leg. A large violaceous plaque had been present on the extremity for two years time and had been slowly increasing in size. The lesion was occasionally painful, and periodically the leg became edematous; however, the patient had never before experienced this degree of pain or swelling.

The patient's past medical history was remarkable only for pulmonary sarcoidosis, which was currently stable, and for which she was being followed by a respirologist. At the time of presentation, the patient was not experiencing any shortness of breath, cough, or sputum production; she was experiencing only minimal non-specific chest discomfort, a symptom which had remained unchanged for several years. She was not taking any medications, and her pulmonary function tests had remained stable over the previous six months.

Initially, the emergency room physician suspected an underlying deep vein thrombosis based on the symptoms of redness, swelling, and pain in the lower limb. However, when a venous ultrasound revealed normal and patent vessels in the limb, a diagnosis of “dermatitis with superimposed cellulitis” was made. The patient was given a seven-day prescription for cephalexin (Keflex\textsuperscript{\textregistered}), at a dose of 500 mg daily, and an urgent referral to a Toronto University Dermatology clinic was made.

When assessed in the dermatology clinic shortly thereafter, the patient reported no improvement in the appearance or symptomatology of the limb while on cephalexin (Keflex\textsuperscript{\textregistered}). The lesion was noted to be a large, well-demarcated violaceous plaque, which measured 15 cm x 25 cm in size and also was present circumferentially around the lower leg. The plaque was significantly indurated, delineated by an erythematous border, and mildly tender to palpation. Photographs of the lesion were taken (Figure 1).

Because the patient was known to have systemic sarcoidosis, a diagnosis of cutaneous sarcoidosis seemed likely. Based on the clinical appearance of the lesion, a diagnosis of erythema nodosum—a non-specific manifestation of cutaneous sarcoidosis—was favored.\textsuperscript{1,2} A punch biopsy was performed in order to confirm this diagnosis, and tissue cultures (including

SOAP Note.

\textbf{Subjective}

One-day history of redness, swelling, and burning pain in right lower leg. Extensive lesion present on the extremity for two years time, slowly increasing in size. No current medications.

\textbf{Objective}

Large, well-demarcated violaceous plaque, delineated by an erythematous border. Significant induration with mild tenderness to palpation. No evidence of local or systemic infection. Negative tissue cultures. Histology: interstitial dermal histiocytic infiltrate, with no well-formed granulomas.

\textbf{Assessment}

Interstitial cutaneous sarcoidosis. DDx: cutaneous infection, necrobiosis lipoidica, and granuloma annulare.

\textbf{Plan}

Minocin\textsuperscript{\textregistered}, at a dose of 100 mg twice daily, for one month’s time. Dermovate\textsuperscript{\textregistered} ointment, to be applied once daily, for one month. Indefinite use of Minocin\textsuperscript{\textregistered} and Dermovate\textsuperscript{\textregistered} ointment at a reduced dose. Regular follow up with a dermatologist.
cultures for fungus and atypical mycobacteria), as well as a Gram stain, were obtained.

The results of the biopsy were unexpected. The clinical diagnosis of erythema nodosum was excluded due to the absence of panniculitis (inflammation of the subcutaneous adipose tissue). However, no well-formed granulomas were present either, which would support the diagnosis of classic cutaneous sarcoidosis. Instead, an interstitial histiocytic infiltrate was observed extending from the upper layers of the dermis into the subcutaneous tissue (Figures 2, 3, and 4). The presence of histiocytes was supported by positive staining of the glycoprotein Cluster of Differentiation 68 (CD68) (Figure 5).

Interstitial histiocytic infiltrates are known to occur in skin infections, drug reactions, and infrequently in cutaneous sarcoidosis. The differential diagnosis in this patient included cutaneous sarcoidosis, other granulomatous diseases (such as necrobiosis lipoidica and granuloma annulare), drug reaction, and infection. Given the patient’s negative drug history, the absence of growth on tissue culture, and the overall clinical picture, the most
appropriate diagnosis became interstitial cutaneous sarcoidosis.

Sarcoidosis is a systemic disease of unknown etiology that can affect virtually any organ system of the body. Although people of any age, and of either sex, can be affected, sarcoidosis occurs more commonly in people of Irish, Scandinavian, and African-American descent. Involvement of the skin has been estimated to occur in 20–35% of cases. Because involvement of the skin commonly occurs early in the course of systemic illness, a skin biopsy can provide opportunity for early diagnosis. Most commonly, cutaneous sarcoidosis presents as asymptomatic flesh-coloured papules. However, the morphologic appearance of sarcoid lesions are notoriously varied. Because of this, sarcoidosis has earned the reputation of being one of the “great imitators” in medicine. In this particular case, other “great imitators,” such as syphilis, were not investigated.

When cutaneous sarcoidosis is suspected clinically, a skin biopsy should be performed in order to support the diagnosis. The typical histological appearance of sarcoidosis is that of a granulomatous dermal infiltrate, comprised of epitheloid histiocytes. These granulomas tend to involve few or no inflammatory cells and thus are commonly referred to as “naked granulomas.” However, like the clinical presentation of cutaneous sarcoidosis, the histologic presentation of the disease can be diverse, and several atypical patterns have been described, including that of an interstitial histiocytic pattern.

In two retrospective studies, this particular pattern was seen in 16–20% of cases of cutaneous sarcoidosis. Interstitial sarcoidosis is a diagnosis of exclusion; one must first rule out the more common causes, including skin infection and drug reaction. In this particular case, a differential diagnosis—which also included necrobiosis lipoidica as well as granuloma annulare—was considered. However, the diagnosis of interstitial cutaneous sarcoidosis was favored due to the clinical history of pulmonary sarcoidosis.

Because very few placebo-controlled studies have been conducted, current treatment recommendations for cutaneous sarcoidosis are based on anecdotal evidence and data from uncontrolled case series. The use of oral corticosteroids has been described for severe cutaneous involvement; however, because of their significant side effects, these agents are not prescribed for extended periods of time. Intra-lesional triamcinolone or high-potency topical steroids may be effective when cutaneous lesions are both small and limited in number. In several instances, long-term remission has been achieved through the use of high-potency topical steroids under occlusive dressings. Due to their long-term safety profile, tetracyclines and their derivatives are often the treatment of choice, with minocycline having been reported to produce complete remission in up to two-thirds of cases.

The patient in this case was seen in follow up shortly after the biopsy results were obtained, and minocycline (Minocin®) was prescribed at a dose of 100 mg twice daily for one month. The patient was also instructed to apply clobetasol propionate (Dermovate®) ointment to the plaque once daily for the duration of the month. This therapy resulted in rapid and dramatic improvement in the appearance of the lesion. In order to sustain these results, the patient was instructed to reduce the dose of minocycline (Minocin®) to 100 mg once daily and to apply the clobetasol propionate (Dermovate®) ointment only intermittently as required. Regular follow-up with a dermatologist was also recommended.

In conclusion, cutaneous sarcoidosis is a disease that can present in a variety of ways, both clinically and histologically. Awareness of the heterogeneity of cutaneous manifestations will allow clinicians to consider this disease more often, providing increased opportunity for early diagnosis and treatment. The diagnosis of sarcoidosis is one that requires clinical-pathological correlation. In this case, the diagnosis was based on the presence of confirmed systemic sarcoidosis as well as clinical and histologic features that were compatible with atypical cutaneous sarcoidosis. Although no consensus currently exists for the treatment of this condition, the patient in this report responded well to oral minocycline (Minocin®) and topical clobetasol propionate (Dermovate®) ointment.

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A glimpse of rural British Columbia

A white forest
Smithers, BC, December 2010
Submitted by: Tara Dawn

Farmer’s market booth
Kaslo, BC
Submitted by: Shannon Turvey

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Submitted by: Ranita Manocha

Inukshuk
Inuvik, NWT, August 2009
Submitted by: Dipen Thakrar

Port Hardy, BC
October 2010
Submitted by: Dianne Fang

Hunting for mountain goat
Dease Lake, BC
Submitted by: Breanne Abbott

“Escape Route”
Nanaimo, BC
Submitted by: Leslie Anderson

Challenges of accessing maternity services in remote BC
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