

PROVINCIAL PEDIATRIC HEMOGLOBINOPATHY PROGRAM



Dr. John Wu, MBBS, MSc, FRCP(C)
Director, Hematology Program
BC Children's Hospital

Hemoglobinopathy? What a mouthful! It simply encompasses disorders caused by structural or quantitative abnormalities of hemoglobin – one of the most important and abundant molecules in our body. Our program's mandate is to provide comprehensive care to all the children with hemoglobinopathies, mostly those with thalassemia and sickle cell disease, in our province.

In contrast to children with cancer, these conditions are inherited, chronic life-long conditions that will result in poor health outcomes if comprehensive care is not instituted and followed early in life. The mission of our program is to ensure that all of our patients maximize their potentials and develop into healthy and happy adults.

Historically, these conditions were prevalent in areas where malaria used to ravage – Southeast Asia, South Asia, Middle East, Mediterranean, North and Central (Western) Africa. Heterozygous individuals are protected from early infant mortality due to the malignant type of malaria (falciparum). Through immigration, our province (especially the Lower Mainland) has seen an increase in patients migrating from these at-risk areas of the world.

THALASSEMIA

Beta-thalassemia Major

The carrier rate for beta thalassemia varies from 2-15% in the various at-risk populations. Through the past two decades, our program has taken care of almost fifty children with transfusion dependent beta-thalassemia major. Curative HLA-matched sibling allogeneic hematopoietic stem cell transplantations have been performed on seventeen of our children so far which were successful except for one. Currently, we are looking after about twenty of these transfusion-dependent children with most of the newer patients being immigrants or refugees from high risk population. Iron rapidly accumulates in the body with regular blood transfusions resulting in endocrinopathy, growth failure, cirrhosis, cardiac failure and arrhythmia. Iron chelation therapy is usually started at about 1-2 years after the commencement of regular blood transfusions. Initially, this implies the use of painful nightly subcutaneous infusions of Desferal over 10-12 hours. It is inconvenient and irritating to the skin which can in turn cause non-compliance to this life saving medication. More recently, Exjade, a once-a-day oral iron chelator, has been approved by Health Canada and BC Pharmacare. It is currently being used for children over the age of 6 years. Both iron chelators have significant adverse effects that need careful monitoring. Overcoming the ethnic, cultural, social barriers of care to developing a trusting therapeutic relationship is paramount with these patients/parents.

Hemoglobin H Disease

Alpha thalassemia is also prevalent in the malaria belt. Hemoglobin H disease occurs when three of the four alpha globin genes on chromosome 16 are deleted. Because of the specific mutations involved, it only

occurs in populations of South East Asian and Mediterranean descent. It causes moderate anemia with symptoms of fatigability, jaundice, hepatosplenomegaly, osteoporosis, cholelithiasis and hemosiderosis (later on in life). As hemoglobin H is unstable, oxidizing drugs and severe infections may precipitate a hemolytic crisis. The list of offending medicines is similar to the one we use for G6PD deficiency. Severe viral infections or infection with Parvovirus B19 can cause aplastic crisis requiring urgent transfusions. We usually follow these patients once a year to ensure that they are growing well, knowledgeable about the medical condition, and to promote regular health maintenance.

SICKLE CELL DISEASE

Sickle cell anemia implies homozygosity for the hemoglobin S mutation which results from a single amino acid change in codon 6 on chromosome 11; whereas sickle cell disease further include the heterozygous "sickling states" such as sickle beta-thalassemia, SC, SD, SO conditions. These conditions occur mostly in children of African or Middle Eastern descent. The deoxygenated hemoglobin S polymerizes into long bundles deforming the red cell membrane causing hemolysis and sludging in the microvasculature resulting in ischemic necrosis of tissues (especially the spleen, bone marrow, penis, kidneys). The latter induces a chronic inflammatory state which in turn may cause cerebrovascular disease, thrombosis, pulmonary hypertension and other organ damage. Regular blood transfusion is given to children with or at high risk for ischemic strokes. Children may suffer painful vasoocclusive crises and dangerous acute chest syndrome. Early hydration and analgesia may abort or ameliorate these dreadful conditions, or else, admission for hydration and adequate

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parenteral analgesia is indicated. It is of high importance that the emergency rooms they attend triage them with high priority with an aim to administer adequate analgesia within the first 30-60 minutes. Overwhelming bacterial infection is still one of the most common causes of death despite vaccinations with pneumococcal and meningococcal vaccines. Long term penicillin prophylaxis is indicated after the age of 2 months. Any sick febrile patient should seek medical attention immediately with early coverage of broad spectrum parenteral antibiotics. Early education and psychosocial support to the parents/patient are critical. Our province has initiated universal newborn screening for sickle cell disease since November 2009 to aim at decreasing mortality and

improving the quality of life in these children. It has been well shown that children being followed in a comprehensive care center with medical staff experienced in this condition have much better health related outcomes. Children with sickle cell disease are usually newer immigrants coming from a diverse culture with different health preconceptions. Again, winning the explicit trust of the patient/parents is paramount in a successful therapeutic relationship.

HEMOGLOBINOPATHY PROGRAM

Heather McCartney is the hemoglobinopathy clinical nurse clinician (Jennifer Keis – maternity leave coverage) who coordinates the

care of these children. The Canadian clinical standard for thalassemia care is published. Free copies of the Guidelines for the Clinical Care of Patients with Thalassemia in Canada can be found at the Thalassemia Foundation of Canada website (www.thalassemia.ca). Guidelines for the care of patients with sickle cell disease is still in preparation.

Our patients are transitioned to the Adult Hemoglobinopathy Program at St. Paul's Hospital around the age of eighteen years. We start our transition teaching many years earlier with a goal to make sure that these individuals will have good knowledge of their own conditions, aware of the importance of health maintenance and health advocacy by the time of their transition.

THROMBOSIS



*Evan Shereck, MD
Clinical Assistant Professor
Director, Thrombosis Service
BC Children's Hospital*

Kids get clots? This is a common question I receive, not only from my friends when I tell them what I do, but also from highly regarded colleagues. Most people are surprised when I tell them about our Thrombosis Service at BC Children's Hospital. After all, if not many kids get clots, what could we possibly do all day?

The truth is that pediatric thrombosis is more common than you would think. Unlike their adult counterparts, over 90% of thromboses during childhood are associated with risk factors which are related to the nature of their illness (e.g. malignancy, sepsis, etc), prolonged immobilization, and the use of central venous catheters. In fact, central venous lines account for 50% of deep venous thrombosis (DVT) cases in children and more than 80% of

cases during the neonatal period. Other risk factors include congenital heart disease, bone marrow transplantation, antiphospholipid syndrome, disseminated intravascular coagulation, trauma, recent surgery, and significant family history of thromboses. As more children survive previously untreatable conditions, we expect to see more thromboses as a consequence.

In order for children with clots to reach our service, it is imperative that the community physicians and other subspecialists recognize the signs and symptoms so early treatment can be provided. I am depending on the great clinical skills of all the physicians across British Columbia working with children to refer these patients quickly or to call to notify us. In fact, you could say that almost every physician working with kids is also part of the thrombosis service...and the most important part at that. Early diagnosis is the key. A delay in starting anticoagulation therapy will cause a greater likelihood of adverse events such as an extension of the thrombus and potential limb gangrene, pulmonary embolism, hemodynamic instability, and increased risk for post-thrombotic syndrome (chronic swelling and pain, and occasionally ulcers, of the affected limb).

The signs and symptoms are entirely dependent on the location of the

thrombus. The most common symptom is a unilateral painful, swollen limb, but may also include shortness of breath and pleuritic chest pain in pulmonary embolism. Severe headaches, blurred vision and neurologic symptoms may be seen in cerebral sinus venous thrombosis. Children typically do not demonstrate the Homans' sign as commonly seen in adults.

If a child is believed to have sustained a DVT, proper imaging should be undertaken according to the location of the suspected thrombus (ultrasound, MRI, CT scan etc.). Once the DVT is recognized, an assessment should be performed to see if the patient can tolerate anticoagulation therapy and, if so, this therapy should be initiated. BC Children's Thrombosis Service can determine which agent is most appropriate for each individual case and will coordinate the dosing. We also educate families about treatment prior to discharge so that they fully understand the medication, how to take it, potential side effects (e.g. bleeding), and when to have blood levels checked. Currently, we prescribe three drugs for anticoagulation: unfractionated heparin, low-molecular weight heparin, and warfarin. Some newer agents are also being used with adult patients now, but have not yet been approved for use in pediatrics. We hope to have some of these newer agents available in the near

future and are eager to participate in these studies. Once the patient is discharged, our Thrombosis Service will remain in contact with the family to ensure that the anticoagulation is going smoothly.

The most recent addition to our service is the inclusion of the warfarin point of care monitor program. These are small, portable monitors (similar to a glucometer for diabetics) that allow the patients and their families to check INR levels wherever they may be. This means that families no longer need to travel to the hospital or lab, miss school or work, or be inconvenienced by doing the INR. The monitors provide an instant reading so that dose adjustments or interventions may be taken immediately (after calling in to discuss with the Thrombosis Service) which will lead to a decrease in adverse events. To ensure patient safety, the monitors are validated in our hematopathology laboratory at BC

Children's Hospital and the families undergo several teaching and validation sessions before they are allowed to use the monitors alone at home. Thus far, the families who are involved with the program have been very enthusiastic about their support and say it has transformed their lives.

Overall, the Thrombosis Service at BC Children's, which operates an outpatient clinic every Tuesday afternoon, is growing in leaps and bounds. Along with Jane Braun, Thrombosis Nurse Clinician, we see patients with a wide variety of thromboses or pro-thrombotic disorders and are active in their treatment, education, and long-term follow-up. I am very humbled by all of the support we have received from the hospital and throughout the province. I look forward to even more growth in the program over the next several years and to improving the lives of our patients with or at-risk for thrombosis.

LOOKING FOR CMEs IN HEMATOLOGY?

McMaster University in partnership with the Canadian Hemophilia Society and Bayer Healthcare Pharmaceuticals has recently launched an interactive education program on bleeding disorders. The program, Emergency Management of Bleeding Disorders, is available free to all Canadian Health Care Professionals at can be found at www.eHemophilia.ca

LOOKING FOR A QUICK REFERENCE ON PEDIATRIC HEMOPHILIA?

In 2009, a collaborative effort of BC Children's Hospital, SickKids and Baxter Bioscience created a practical reference titled, **Hemophilia Quick Reference Guide: For Pediatricians and General Practitioners Treating Childhood Hemophilia**. Copies have been distributed to physicians currently caring for hemophilia patients in BC but more booklets or extra copies are available for interested health care professionals. Please email hemophilia_clinic@cw.bc.ca or call 604 875 2345 X 5335 to request a copy.



DR. FRANK JAGDIS RETIRES

After 35 years of pediatric practice in Victoria Dr. Frank Jagdis is finally retiring! His previous attempts to retire were not successful as the patients could not manage without him!

Dr. Jagdis was one of the pioneers in facilitating community involvement in the care of children with cancer. In the early days he worked closely with Dr. Mavis Teasdale in the treatment of children with cancer in British Columbia. Dr. Jagdis notes that in those days he would travel to local communities that had no pediatricians and would give monthly Vincristine in the office as he was not permitted to give this in the local hospital. In the early 1990's it was agreed that a single pediatrician in Victoria should look after all the children with cancer living in that community. Dr Jagdis, being also qualified in infectious diseases, proved to be a wonderful asset and was able to recruit nurses with special expertise and developed facilities for local administration of more complex chemotherapy. Patients are grateful for the expertise provided by Dr. Jagdis which enabled them to enjoy the safe, relaxed and easily accessible oncology unit at Victoria General Hospital. Dr. Jagdis, in conjunction with BC Children's Hospital, also developed the follow up program in Victoria for survivors of childhood cancer and is rewarded by incidental meetings with former patients. Dr. Jagdis was often at Camp Goodtimes during it's infancy, providing medical coverage. He and his family participated in the activities and added a very human touch to patient care.

Dr. Jagdis has passed on his legacy to his daughter Dr. Amanda Jagdis who has already shown an aptitude for cancer research^[1].

On behalf of the Provincial Pediatric Oncology Hematology Network, the Oncology/Hematology/BMT program at BC Children's Hospital and all his patients in Victoria, we thank you Dr. Jagdis and trust you will enjoy a long and fruitful retirement.

As of April 2010, Dr. Ewa Lunaczek-Motyka, pediatric oncologist, will care for the pediatric oncology/hematology patients in Victoria until such time as a permanent position is posted.

[1] Jagdis A, Rubin BP, Tubbs RR et al. Prospective evaluation of TLE1 As a diagnostic immunohistochemical marker of synovial sarcoma. *Am J Surg Pathol* 2009; 33:1743-51

HEMATOLOGY PROGRAM

Hematology is a part of the Division of Hematology/Oncology/BMT at BC Children's Hospital, the designated tertiary center. One of the provincial mandates is to provide clinical care, teaching and research on "benign" hematological disorders in children, such as the different cytopenias, bleeding or thrombotic problems, immunologic abnormalities, etc. The Hematology program can be subdivided into General Hematology, Hemophilia, Hemoglobinopathy and Thrombosis Services.

During the weekdays, the Hematology team consists of an attending physician and a clinical fellow. Additionally, a pediatric resident may rotate through the service. Nighttime and weekend coverage is provided by the Oncology on-call team. We see between 150-200 new consultations a year in the outpatient clinic in addition to our regular follow-up patients. We have approximately the same number of urgent and non-urgent consultations on the ward.

Referrals to the Hematology service should include any relevant investigational reports and a comprehensive medical history. This will facilitate triaging and minimize delays.

Please note, there is a short wait list for new patients (non-urgent) for the Wednesday afternoon Hematology clinic.

INTRODUCING THE HEMATOLOGY NURSES



Jane Braun, B.Sc., RN
Thrombosis Nurse Clinician

Jane has been a nurse for 15 years and a hematology nurse for the past 3 years. She works with Dr. Evan Shereck in the thrombosis clinic every Tuesday afternoon.
Clinic hours: Tuesday to Thursday, 8:30 am-4:30 pm
Phone: 604-875-2345 ext 7058 Email: jbrown@cw.bc.ca



Kim Chung, RN, BSN, BSc
Hematology Nurse Clinician

Kim has been a nurse for 14 years and a hematology nurse for the past 8 years.
Clinic hours: Monday to Friday, 8:00 am-4:00 pm
Phone: 604-875-2345 ext 7060 Email: kchung@cw.bc.ca



Kathy Grouchy, RN
Thalassemia Nurse (Part-Time) and Transfusion Safety & Resource Nurse Clinician (Part-Time)

Kathy has worked in the Oncology/Hematology program for over 25 years. She has been a hematology nurse since 2001, working with hemoglobinopathy patients including Thalassemia and Sickle Cell.
Clinic hours: Monday, Tuesday, Friday, 8:30 am-4:30 pm
Phone: 604-875-2345 ext 7145 Email: kgrouchy@cw.bc.ca



Heather McCartney, RN, BSN
Hemoglobinopathy Nurse Clinician

Heather is currently on maternity leave (Jennifer Keis - maternity leave coverage)
Clinic hours: Monday to Friday
Phone: 604-875-2345 ext 7103 Jennifer's email: jkeis@cw.bc.ca
Heather's email: hmccartney@cw.bc.ca



Erica Purves, RN, MN, NP(peds)
Inherited Blood Disorders Nurse Practitioner

Erica has been a nurse for 10 years and a Nurse Practitioner for the past 6 years. Her focus is on bleeding disorders such as Hemophilia, von Willebrand disease, and rare factor and platelet disorders.
Clinic hours: Monday to Friday, 8:00 am-4:00 pm
Phone: 604-875-2345 ext 5334 Email: epurves@cw.bc.ca
Clinic email: hemophilia_clinic@cw.bc.ca

HEMATOLOGY PROGRAM: TRANSITION CARE



Erica Purves, RN, MN, NP(peds)
Nurse Practitioner, Inherited Blood Disorders
BC Children's Hospital

The transition of youth with chronic disease from pediatric health services to adult oriented ones, has been a hot topic for many years in many disease areas. Adolescence is generally a time of increased independence and opportunity, and adding the additional responsibility of mastering self management of a chronic illness, along with these developmental tasks, can be difficult. Experimentation, strong peer influence, the need for peer approval, as well as changing family relationships can also significantly impact and sometimes derail previously stable health. Youth with chronic hematological disorders need to be knowledgeable about their disease. They need to be able to understand their treatment, as well as perform it independently in some cases. It is essential they can independently communicate and advocate for their care with health care providers and understand how to make healthy lifestyle choices, including choices where limits should be set due to their health condition. (i.e. sport choices) This is a tall order for many youth to do alone and necessitates deliberate guidance and support from health care providers, teachers, parents and friends for success. For the past several years, the BCCCH hematology program has made transition care initiatives a priority area, realizing good transition care starts well before adolescence and builds progressively on opportunities for physical, psychological, and social growth.

Many pediatric health interventions, from providing parent teaching to optimizing early medical treatments; indirectly work to preserve the health of children so they can reach adulthood in a prime state. We felt some initiatives that directly influenced growth toward adult self behaviours were lacking so some priorities were set and are highlighted below.

Summer Camp at the Zajac Ranch:

Blossoming independence and the development of identity are beginning to show in the pre-adolescent years in many children. Summer camp can be a great way to encourage growth and development in a safe and fun environment. In 2005, our program held our first summer camp for children with chronic blood disorders at Camp Zajac in Mission (see www.zajacranch.com). We are now in our 5th year and looking forward to another successful summer program.

Self Infusion Training (Hemophilia):

Regular treatment for many hemophilia patients (severe and moderate phenotypes) often means receiving regular intravenous infusions of factor VIII or IX. Many families in our program are trained to do intravenous infusions at home when their children are young and most families become quite comfortable and adept at managing routine and minor issues independently. Unfortunately it cannot be assumed that children assimilate this skill seamlessly. Purposeful teaching and supervision is essential to the developing youth's understanding of their disease and factor infusions. Parents must also be encouraged to slowly let go over their long standing patterns of care and move into the coaching and support role in order to facilitate independence.

Both individual and several group teaching sessions have been held over the past few years with success targeting boys 9 years and up. Key components to teaching sessions have focused on youth gaining an understanding their disease, understanding why factor infusions are given, skill development in venipuncture and administration and knowing when health advice is necessary. Gaining the ability to self infuse factor is often a major milestone in self management for many boys and many take great pride in accomplishing this skill.

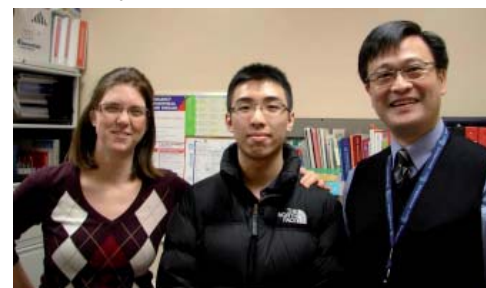
Transition Evening at St Paul's Hospital:

St Paul's Hospital Hemophilia/Hemoglobinopathy program is the adult center for patients with inherited bleeding disorder and hemoglobinopathies in British Columbia. Transfer of care occurs generally as the patient reaches their 18th birthday. Transfer of care can be difficult due to the previous long relationship, trust and comfort youth and their families

have with our program at BC Children's and the familiarity of pediatric care. To ease this change and embrace the transition, BC Children's and St Paul's teamed up to host a transition evening at St Paul's Hospital to orient and welcome new patients down to their program. Guided by the National Canadian Hemophilia Society's transition toolkit (of which two of our team members contributed to the development) – both evenings were well attended and received excellent patient (and provider) feedback.

Teen Networking / Knowledge Opportunities

Two teen evenings have been held over the past years focused on education and networking for teens of all ages, the first specifically for teens with Thalassemia, the second brought together all chronic patients in collaboration with the youth health program. Topics addressed were knowledge building, communication with employers, advocating for one's health needs and more. Several additional opportunities for teen patients to attend national meetings have also happened over the past few years thanks to the support of the thalassemia society and Canadian Hemophilia Society. These have been fantastic in stimulating interest and knowledge as well as providing peer interaction with similarly affected peers.



Erica Purves and Dr. John Wu with one of their adolescent patients, Dennis Ngo, who has recently been transitioned to St. Paul's Hospital

CONCLUSION:

Young adults who have a healthy self concept and possess solid knowledge about their chronic disease will be able to turn their attention toward the other life transitions in their lives such as moving out, finding employment without seeing their disease as a barrier. Small initiatives and purposeful efforts from parents, pediatricians, family doctors and other health teams can help children obtain the health skills they need to master in adolescence and grow into healthy adults.

Return Undeliverable Canadian Addresses to
BC Children's Hospital
Provincial Pediatric Oncology/Hematology Network
Attn: Paulina Chen, Network Coordinator
Room A119, 4480 Oak Street
Vancouver, BC V6H 3V4

The Provincial Pediatric Oncology/ Hematology Network

The Network is an interdisciplinary organization whose goal is to ensure appropriate diagnosis, management, follow-up, and end-of-life care for pediatric patients with malignancies and blood disorders. The Network supports community hospitals and practitioners, and develops partnerships with other health care facilities to enable seamless and integrated care for patients and families on treatment and off treatment. It will further develop and enhance the research programs of basic, translational, and clinical research to better childhood cancer control and improve outcomes for these patients and their families.

For More Information

To learn more about the Provincial Pediatric Oncology/Hematology Network, or to submit articles or stories to this newsletter, please contact:

Paulina Chen, RN, BSN
Network Coordinator
604-875-2345 ext 7435
ppchen@cw.bc.ca

Dr. Chris Fryer
Network Clinical Consultant
604-875-2345 ext 6884
cfryer@cw.bc.ca

Steering Committee Chairs

Dr. Mason Bond
604-875-2406
mbond@cw.bc.ca

Barbara Poole
604-675-8000 ext 7999
bpoole@bccancer.bc.ca

UPCOMING EDUCATIONAL OPPORTUNITIES

PEDIATRIC ONCOLOGY WORKSHOPS FOR COMMUNITY HOSPITALS

April 19, 2010 Nanaimo Regional General Hospital
April 21-23, 2010 Victoria General Hospital

If you would like more information about any of these sessions, please contact Paulina Chen, Network Coordinator, ppchen@cw.bc.ca, or 604-875-2345 ext 7435.

BC CANCER AGENCY ANNUAL CANCER CONFERENCE 2010

"Interdisciplinary Cancer Control for the 21st Century"

November 25-27, 2010, Westin Bayshore, Vancouver, BC
More information to come...

UPCOMING ACTIVITIES

RETREAT YOURSELF

May 27-31, 2010
Edenvale Retreat and Conference Center, Abbotsford, BC

Five day retreat for young adult cancer survivors from all over the country to share concerns, talk about the stuff that makes cancer tough and unique for young adults and to hear fellow survivor presentations. For more information: www.youngadultcancer.ca/retreat_yourself/p/west/

TEEN ADVENTURES / SPIRIT QUEST 2010

All activities are sponsored by the Oncology/Hematology/BMT Department through Balding for Dollars. Cost for each adventure is \$190/teen which covers transportation and equipment rental. Policy remains that no one is denied a trip due to financial concerns. For more information about Teen Adventures/Spirit Quest 2010 or to register for one of these adventures, please contact:

Dan Mornar, dmornar@cw.bc.ca, 604-875-2345 ext 6477 or Nita Takeuchi, ntakeuchi@cw.bc.ca, 604-875-2664

May 16-20, 2010: Tofino Adventure
A 5-day surfing, kite flying and beachcombing adventure in Tofino, BC at the Chesterman Beach House

June 27-30, 2010: Kayaking Adventure
A 4-day Yakkity Yak adventure in the Broken Islands - Kayaks and Killer Whales.

July 23-26, 2010: Horseback Adventure
A 4-day horseback trip and 'Giddyup' Adventure in the Chilcotin/Cariboo at Crystal Waters Ranch.

August 22-25, 2010: Whitewater Rafting Adventure
A 4-day whitewater adventure on the Thompson and Fraser rivers with Kumsheen Raft Adventures.

CAMP GOODTIMES

Summer recreation program providing a unique summer experience for children and teens with cancer and their families. There are various sessions for kids, teens, and families as well as a Leaders In Training program. For more information about any of these Camps, visit the Canadian Cancer Society website www.cancer.ca and click on Support Services.