



ADVANCES IN HEMOPHILIA CARE IN BRITISH COLUMBIA

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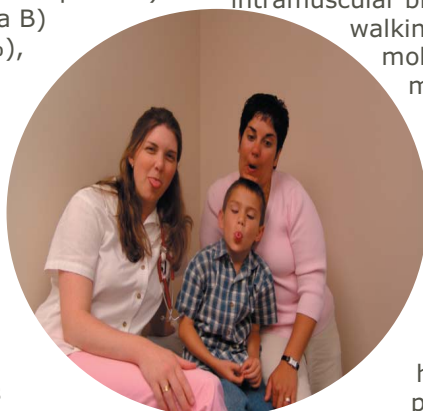
Hemophilia is an inherited bleeding disorder, made famous through its association with the lineages of Queen Victoria and the Russian Romanov family. This sex-linked disorder results from a deficiency in either the factor VIII (Hemophilia A) or factor IX (Hemophilia B) protein at severe (<1%), moderate (1-5 %) or mild (6-30%) levels. Due to high rates of spontaneous genetic mutation in these genes, one-third of newly diagnosed factor VIII deficient, and up to one-sixth of factor IX deficient, children are newly diagnosed cases in a family. This can be attributed to *de novo* germline mutations occurring in the child, his mother or his maternal grandfather. However, a detailed interrogation can sometimes unearth an unsuspected family history. There are no ethnic differences in disease incidence.

Since factor VIII and factor IX proteins are essential components of the intrinsic coagulation cascade, their deficiencies will lead to an inability to form a strong fibrin clot at the site of injury. This, in turn, will lead to delayed bleeding or prolonged oozing at sites of injury in the affected individual. Clinically, Hemophilia A and B are indistinguishable from one another and can only be confirmed by performing specific factor assays. Physiologically, Factor VIII is at normal or elevated levels at birth, whereas Factor IX is only at about half the adult level at birth. This can lead to difficulties in trying to distinguish

between moderate and severe factor IX deficiencies before 6 months of age.

MORBIDITY

During the neonatal period, children with hemophilia may present with persistent bleeding from iatrogenic causes such as heel pricks, venipuncture or circumcision. They generally do not develop the characteristic hemarthroses or intramuscular bleeds until they start walking and become more mobile. Children with mild and moderate hemophilia have few spontaneous bleeds and usually bleed only with surgery or trauma. Hence, in the absence of significant bleeding challenges early in childhood, mild or moderate hemophilia may not present until later on in life.



Jaryn with his mom, Brenda, and Erica Purves in the Hemophilia clinic

Blood within the joint space incites inflammation of the synovium, making it swollen and friable, predisposing it to further joint bleeds. If hemarthroses are not promptly and adequately treated, hemophilic arthropathy develops leading to recurrent bleeding, pain, joint destruction and severe disability. Intramuscular bleeds can lead to compartment syndrome with neurovascular impairment especially in the forearm and shin. Inadequately treated soft tissue bleeds can lead to the dreaded pseudotumor formation. Pseudotumors are expansile, usually peri-osseous, locally invasive lesions that are very resistant to treatment. They can cause compression and erosion of neighbouring organ tissues. Bleeding around strategic areas such as airway and the iliopsoas muscle can be

associated with significant morbidity. Intracranial bleeding occurs in about 3-5% of the patients, usually after trauma. More than half of these patients are left with permanent neurological sequelae. Oral mucosal bleeding after trauma to the tongue, frenulum or after tooth extraction can be quite relentless leading to significant anemia and iron deficiency. Postoperative bleeding can also cause significant morbidity and mortality.

TREATMENT

Hemarthroses, intramuscular bleeds, extensive soft tissue and trauma-related bleeding are generally treated with the replacement of the missing clotting factor (either VIII or IX). All the affected children in the province are given a "Factor First" wallet card updated annually during their clinic visits. It contains the current recommendations for coagulation factor product type and dosing. Families are also sent copies of the annual consultation letters for their record. They are instructed to seek immediate medical care in their local communities for serious injuries (head, eye, neck, chest and abdomen). They are asked to call our clinic for assistance with factor administration, decision making or evaluation of minor injuries if needed. This is important especially to young families as they struggle to master decision making and care. Healthcare professionals taking care of these children are encouraged to call the Pediatric Hemophilia Clinic



for any concerns or questions related to this bleeding disorder and its overall management.

Recombinant factor VIII (Recombinate® or Kogenate FS®) and recombinant factor IX (BeneFix®) concentrates are the mainstays of treatment and have had

a remarkable safety record of 15 years with no infectious concerns. Children with mild Hemophilia A (factor VIII level 6-30%) can alternatively be treated with desmopressin (DDAVP) for minor surgical procedures, dental work or minor injuries if they have shown to be responsive by a previous challenge test. The adjunct use of an antifibrinolytic agent, such as tranexamic acid (Cyklokapron®), for mouth and nose bleeds has been shown to decrease the duration of bleeding and minimizing the need for multiple factor concentrate dosing. As for hemarthroses, basic supportive care measures such as resting the site of injury (e.g. using crutches), icing, compression and elevation are very important. Post hemarthrosis rehabilitation with joint mobilization and muscle strengthening should also be emphasized.

HEMOCARE PROGRAM - HOME INFUSION OF FACTOR CONCENTRATE

Prompt and adequate treatment with factor concentrate is essential for the treatment of hemarthroses. This has prompted the development of home infusion programs in the late 1970s.

"Homecare" has become the mainstay of care for families with individuals affected with moderate and severe hemophilia. It enables families to have a shortened delay to obtaining treatment, avoiding under-treatment due to inability to get to a hospital, and enhancing normalcy and security for the child and family. Short and long term pain and suffering are also minimized by the early treatment of hemarthroses, soft tissue or muscle bleeds.

Home treatment allows children with hemophilia to engage in most reasonable activities safely if factor treatment is given prior to the activity in order to cover for the "high risk" period. The ability to provide immediate treatment with factor concentrates has significantly decreased the incidence of hemophilic arthropathies, and has much improved the quality of life in the affected individuals. Hemophilia homecare entails that families learn not only how to prepare and infuse factor concentrate, but to also take responsibility for making



Alessandro receiving factor from his mother.

appropriate minor treatment decisions independently. Intensive teaching and reinforcement of the decision making process on when and how to treat, the appropriate handling and documentation of the use of factor concentrate are the cornerstones of care. Documentation is essential for interim clinical evaluation, blood product tracking, product accountability and overall product need forecasting.

SPORTS ACTIVITIES

Extreme sports activities should not be allowed. All patients and their families are given methodical education on healthy sports choices. They are taught to avoid sports with high velocity (dirt biking), rough contact (football) or unpredictable conditions (water-skiing). They are encouraged to keep themselves physically active in order to develop strong muscles, good flexibility and balance. Physical fitness has been shown to decrease bleeding complications. Activities such as swimming, walking and cycling are encouraged. Any activity causing recurrent bleeding should be avoided and prophylaxis with factor concentrate should be considered.

PROPHYLAXIS

Most individuals with severe hemophilia in British Columbia are on prophylactic factor treatment. This consists of the administration of factor concentrate on a regular basis (1-4 times per week) commencing at around the age of one to three years before the occurrence of permanent joint damage from recurrent hemarthroses. Poor peripheral venous access at this age can be a real challenge, and central venous line insertion may be required to sustain this treatment regime. The dose of factor concentrate should always be given in the morning before activity starts, and on days with the most anticipated activities. Extra doses should be given on special occasions such as on sports days. The frequency of prophylaxis should be tailored to the specific needs of the individual.

Significant factor inhibitor formation is a dreaded complication, and occurs in about 15% of Factor VIII and about 3-5% of Factor IX deficient individuals after the first 20-50 factor exposures. High titre inhibitor makes the infusion of factor useless,

and can cause significant morbidity and mortality. There is early evidence suggesting that exposure to factor concentrate early in life (less than one year) or intensive exposure, such as for perioperative coverage, may increase the incidence of inhibitor development. Hence, the exposure to factor concentrate should be minimized during the first year of life, and elective surgeries, such as circumcision, avoided.

The use of coagulation factor products costs British Columbian taxpayers over 22 million dollars per year. It is imperative to ensure that their usage is appropriate and accountable.

EXCITING CHANGES IN HEMOPHILIA CARE IN BRITISH COLUMBIA

Exciting changes in hemophilia care have taken place over the past year, ushering in a renewed focus on excellence in comprehensive clinical care for the approximate 100 children and families affected by this disorder in British Columbia. In June 2004, the Provincial Pediatric Hemophilia Program was relocated from the Mary Pack Arthritis Centre at VGH to BC Children's Hospital. The adult clinical component was relocated to St. Paul's Hospital. Dr. John Wu (Medical Director), Dr. Jeff Davis (Hematologist), Erica Purves (Advanced Practice Nurse), Anne Rankin (Physiotherapist), Tanya Strubin (Social Worker), and Sally Hiew (Program Secretary) comprise the "core" pediatric comprehensive care team at BC Children's Hospital. We strive to evaluate all patients on an annual or semi-annual basis and have been working to provide true chronic disease care through a multidisciplinary, comprehensive care approach. Additional efforts to support and liaise with community partners have been successful and will continue to be built on in the following years along with other current innovations, such as electronic record keeping and increased preventative health education.



Hemophilia Clinic Team
Dr. Jeff Davis Dr. John Wu Erica Purves
Sally Hiew Anne Rankin

Vancouver is proud to be hosting the biennial congress meeting of the World Federation of Hemophilia from May 21 to 25, 2006. Over 4,000 delegates from all over the world will be congregating here to present some of the latest innovations in scientific and clinical research, and will be sharing state-of-the-art care information with health care providers, affected individuals and their families.

CLINIC CONTACT INFORMATION

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Sally Hiew - Program Secretary
(604) 875 2345 local 5335

USEFUL WEB LINKS

Canadian Hemophilia Society: <http://www.hemophilia.ca/en/index.html>
Hemophilia Emergency Guidelines: <http://www.hemophiliaemergencycare.com/index.html>
World Federation of Hemophilia: <http://www.wfh.org/>

FURTHER READING

Bolton-Maggs PH, Pasi KJ. Haemophilias A and B. Lancet. 2003;361:1801-1809.
Chalmers EA. Haemophilia and the newborn. Blood Rev. 2004; 18:85-92.
Teitel JM, Barnard D, Israels S, Lillicrap D, Poon MC, Sek J. Home management of haemophilia. Haemophilia. 2004;10:118-133.





Hemophilia World Congress 2006
May 21-25, 2006
Vancouver Convention and Exhibition Centre
Vancouver BC
(www.hemophilia2006.org)

FactorFirst

Guidelines for Emergency Management of Hemophilia and Von Willebrand Disease



Major / Life-Threatening Bleeds

- Head (intracranial) and neck
- Chest, abdomen, pelvis, spine
- Iliopsoas muscle and hip
- Massive vaginal hemorrhage
- Extremity muscle compartments
- Fractures or dislocations
- Any deep laceration

Treatment for Major / Life-Threatening Bleeds

Hemophilia A: (severe / moderate / mild)
Recombinant factor VIII concentrate 40-50 IU/kg

Hemophilia B: (severe / moderate / mild)
Recombinant factor IX concentrate 100-120 IU/kg >15 yrs
Recombinant factor IX concentrate 135-160 IU/kg <15 yrs
The dosage for recombinant factor IX is substantially higher because of its lower recovery, particularly in children

Von Willebrand Disease:
A VW factor containing factor VIII concentrate such as Humate-P 60-80 Ristocetin cofactor units/kg

All major bleeding episodes should be considered potentially critical (life- or limb-threatening). The goal is to raise the factor level to 80-100% immediately.

Minor Bleeds

- Nose (epistaxis)
- Mouth (including gums)
- Joints (hemarthroses)
- Menorrhagia
- Abrasions and superficial lacerations

Treatment for Minor Bleeds

Hemophilia A: (severe / moderate)
Recombinant factor VIII concentrate 15-25 IU/kg

Hemophilia A: (mild)
DDAVP 0.3 ug/kg (max. 20 ug)

Hemophilia B: (severe / moderate / mild)
Recombinant factor IX concentrate 35-50 IU/kg >15 yrs
Recombinant factor IX concentrate 50-70 IU/kg <15 yrs
The dosage for recombinant factor IX is substantially higher because of its lower recovery, particularly in children

Von Willebrand Disease:
Type I and Type 2A or 2B known to have used DDAVP safely and effectively - DDAVP 0.3 ug/kg (max. 20 ug)
For patients not responding to DDAVP (such as Type III) use Humate-P 40-60 Ristocetin cofactor units/kg

For mucosal bleeds in all above add:
Cyklokapron 25 mg/kg po tid/qid 1-7 days
(contraindicated if hematuria)

Dosages are patient specific - these are general guidelines only. Round doses up to the nearest vial.
If the products listed are not available, please call the nearest Canadian Blood Services Centre.

BC Cancer Agency Annual Conference

Pediatric Oncology Agenda

NOVEMBER 3-5, 2005 - CANCER AND THE FAMILY

Westin Bayshore, Vancouver BC

Every year the Provincial Pediatric Oncology/Hematology Network organizes a day for health care professionals providing care to pediatric oncology patients to gain new knowledge and to network and share with others across the province. The Pediatric Oncology sessions will be held on Saturday, November 5, 2005. Please visit the BC Cancer Agency conference website (www.bccancer.bc.ca/HPI/AnnualConference/default.htm) for other topics offered during the rest of the 3-day conference.

Saturday, November 5, 2005

0830-0915 Radiation Oncology *Speaker: Dr. Karen Goddard*

0915-1000 The Management of Hematopoietic Stem Cell Transplant Patients Post Transplantation in the Community
Speaker: Dr. Wasil Jastaniah

1000-1030 Coffee

1030-1130 Neurocognitive Impact of Cancer Treatment *Speaker: Dr. Dina McConnell*

1130-1200 Reducing Treatment for Children with Cancer - The Challenge for the Future *Speaker: Dr. Chris Fryer*

1200-1300 Lunch

1300-1400 Challenges in Care in the Community *Speakers: Dr. Marie Hay, Denise Murray*

1400-1500 Psychosocial Support for Families in the Community

Speakers: Dr. Corina Brown, Jennie Ireland, Dr. Jocelyne Lessard, Sharon Paulse

1500-1530 Teen Mentor Program *Speaker: Dan Mornar*

1530-1630 Parenting a Child with Cancer *Panelists: Parents*

Other sessions that may be of interest to pediatric oncology health care providers

Friday, November 4, 2005: Clinical/Scientific Session

0830-0850 Triumph Over Tragedy *Speaker: Dan Mornar*

Saturday, November 5, 2005: Family Practice Oncology Network Session

1030-1100 Pediatric Oncology - Follow-Up Adult Survivorship *Speaker: Dr. Sheila Pritchard*



Network Activities

Education Events

An education day on palliative care was held at Prince George Regional Hospital on May 17, 2005. Dr. Hanna Reysner and Cindy Stutzer focused on topics specific to pediatric oncology patients such as "Transitioning from Curative to Palliative Care" and "Pain Management". There was excellent interactive discussion and case studies.

A Hematology Education Day was held at Kelowna General Hospital on June 16, 2005. Dr. John Wu and Erica Purves presented on the management of hemophilia and sickle cell anemia as well as thrombosis and anticoagulation therapy in children.

Contact us if you wish to have continuing education related to pediatric oncology/hematology held in your region.

Website

The PHSA IM/IT team has been uploading the content of our website www.kidscancer.bc.ca to the new Content Management System. We appreciate your patience and we hope to revise and update the website content once the PHSA team completes the migration.

Palliative Care Working Group

Norms of Practice for pediatric oncology palliative care have been established and circulated to key individuals in the regional centres for review and feedback. These will be available on the website soon.

Psychosocial Care Working Group

We are compiling a list of available psychosocial services for pediatric oncology patients and their families throughout the province. Please assist us by giving us the names and organizations of professionals or volunteers in your area.

Long Term Follow-Up

We were not able to secure funding from PHSA for the Surveillance Program for Adult Survivors of Childhood Cancer. We are pursuing other funding sources and hope to implement a clinic in the summer of 2006.

Fraser Valley Pediatric Oncology Program



Treatment Room at Surrey Memorial Hospital

Lani Lardizabal, RN, BN
Oncology Clinician

The Fraser Valley Pediatric Oncology Program, which started in November 2001, is located at Surrey Memorial Hospital, within the Child Health Centre and adjacent to the Pediatric Inpatient Unit. The program serves patients in the rapidly growing Fraser Valley, spanning Burnaby to Boston Bar. Currently we have 20 children in active treatment and 38 children in long term follow-up treatment. We are fortunate to have the dedicated services of two part-time oncologists. Dr. Derek Prevost, a pediatric oncologist from BC Children's Hospital (BCCH), directs the program. In October 2004, we welcomed another pediatric oncologist, Dr. Hanna Reysner, to the program. Dr. Reysner brings with her expertise in Palliative Care.

Our program offers level III care to children residing in the Fraser Valley. We have central line and chemotherapy certified nurses administering inpatient and outpatient chemotherapy which includes intravenous infusions requiring supportive care greater than 6 hours. We also provide intrathecal chemotherapy, supportive care for fever and neutropenia, and other treatment related effects. Our hospital provides diagnostic services such as echocardiograms, glomerular filtration rate analysis, audiograms, bone scans, and bone marrow biopsies. Surrey Memorial Hospital is located next to The Fraser Valley Cancer Centre where some pediatric oncology patients can receive radiation therapy.

Last spring, Lani Lardizabal, a nurse from our inpatient unit who has experience from the Oncology Program at BCCH, joined us as our Oncology Clinician. We have a rotating group of outpatient clinic nurses: Donna Drake, Barb Cyr, Nancy Bell, and Gwen Faschoway, who all work in the

oncology clinic. These nurses greet the children and their families and deliver the day-to-day care. Many of our inpatient nurses are chemotherapy and central line certified as well and provide relief in the clinic and/or care for our inpatient oncology children.

Our oncology program consists of a multidisciplinary team which includes a Psychologist (Dr. Corina Brown), Social Worker (Amrin Khan-Jamal), Dietician (Cindy Rae), Occupational Therapist (Sandra Fellowes), Physiotherapist (Chiara Singh), Speech-Language Pathologist (Colleen Miller), two Child Life Specialists (Paula Black and Susie Hauff), Audiologist (Karin Rennert), and a Pharmacist (rotating position). The team meets monthly to discuss patients in both active treatment and in long term follow-up care.

The Oncology program's Child Life Specialists, in partnership with the Starlight Foundation and the City of Surrey's Recreational Services, have been able to provide weekly yoga classes to patients and families, and these have been well attended. As well, a Parent Group, under the guidance of the BC Childhood Cancer Parents' Association, was formed in October 2004. The group was created to give support to parents, by parents. The group is led by Suzanne Dunbar (an oncology parent) and has monthly

meetings on-site. These meetings are open to all families in the Fraser Valley area. A Sibling Support Group headed by Dr. Corina Brown is also under development with hopes of starting this fall.



Through donations to our hospital foundation and community support, we were able to have a mural of a wonderful jungle theme painted in our treatment room. These donations also allowed for the

purchase of other comfort items such as a television, a DVD player, movies, and a video game system which all help to distract the children during their various treatment interventions.

Families have expressed that they are happy to be able to receive care closer to home and feel secure knowing that the clinic maintains close ties to BCCH.



Fraser Valley Pediatric Oncology Team

Barb Cyr

Derek Prevost Lani Lardizabal Hanna Reysner Donna Drake Corina Brown
Amrin Khan-Jamal

Kelowna Parent Support Group

On May 27, 2005, two parents, Kelly May and Lauren Kathler, representing the BC Childhood Cancer Parents' Association (BCCCPA), and Dan Mornar, representing the Oncology/Hematology/BMT program at BC Children's Hospital, held a "town hall" meeting in Kelowna, BC, with parents of children with cancer and blood disorders. Invitations were sent to 60 families from 12 communities in the BC interior. Ten parents attended the meeting. It was a great opportunity for everyone to discuss the opportunities and challenges facing parents, children and health care professionals in the treatment of childhood cancer.

As part of the Provincial Pediatric Oncology/Hematology Network, BCCCPA hopes to forge strong ties with many parents, children and families from across BC. A return to Kelowna in the Fall of 2005 is planned with meetings in Kamloops, Prince George and Vancouver Island to follow.

If you are interested in participating, please contact Dan Mornar (dmornar@cw.bc.ca, 604-875-2345, ext 6477).



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

Publications Mail Agreement No. 41074013

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:

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Congratulations

Congratulations to our inaugural dragon boat team "The Strength Within". The majority of paddlers on this team are young cancer survivors, many being first-time paddlers.



In their first appearance at the 2005 Alcan Dragon Boat Festival, they participated in four races, placing 8th, 8th, 4th and a very thrilling 2nd.



Congratulations to all the teens, coaches, families and supporters!

Teen Adventures - Spirit Quest 2005

Teen Adventures - Spirit Quest was first started in the Summer of 2000. Since then, teens with blood disorders and teen cancer survivors have participated in 22 expeditions.

These have included kayaking, river rafting, horseback riding, tallships sailing, dog sledding, skiddoing, and surfboarding.



All activities are sponsored by the Oncology/Hematology/BMT department

through Balding for Dollars. For more information about Teen Adventures - Spirit Quest, contact Dan Mornar at dmornar@cw.bc.ca or (604) 875-2345 ext 6477.

