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# **Quarterly Report on the Research Activities Involving a Clinical Research Coordinator**

**January 1<sup>st</sup>, 2015 – March 31<sup>st</sup>, 2015**

Prepared by

Mr. Erick M. Carreras

Clinical Research Coordinator

Division of Neurosurgery

Clinical Academic Campus of Vancouver General Hospital

University of British Columbia

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# 1. INTRODUCTION

This report contains up to date information on the ongoing research projects that are supported by the Clinical Research Coordinator (CRC) of the University of British Columbia's (UBC's) Division of Neurosurgery at the Clinical Academic Campus of Vancouver General Hospital (VGH) for the period of January 1<sup>st</sup> – March 31<sup>st</sup>, 2015. The main objective of the report is to familiarize the staff of the Division of Neurosurgery of UBC with the current research activities that are being supported by their CRC. The studies that are supported by the CRC in this report are divided into two categories of ongoing studies: prospective studies, and retrospective studies. Additionally, summer student research projects that have applied for funding are included as their own section. The number of studies per category is presented in the table below (Table 1).

Table 1. Number of studies per category.

<b>Number of Ongoing Studies</b>			
Prospective	Retrospective	Summer Studentships	Total
3 ( 2 new)	6 (4 new)	7 (7 new)	17 (14 new)

Detailed description of the purpose, objective, budget and sample size of each study supported by the CRC is presented in the next three sections of this report.

## 2. ONGOING PROSPECTIVE STUDIES

### 1. Timing of Mobilization After Burr Hole Drainage of Chronic Subdural Haematomas: a randomized study

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**PI:** Dr. Ryojo Akagami

**Co-Investigators:** Dr. Chris Honey, Dr. Albert Tu, Dr. Stephano Chang, Dr. Serge Makarenko, Ms. Bonnie Giovannetti, Mr. Erick Carreras

Funding	Source	Amount	Study period	Anticipated enrolment	# of subjects enrolled	Approvals	Status	Abstract/ Paper/ Manuscript
N/A	N/A	N/A	Sep '14 Sep '16	142	21	obtained	active	N/A

This is a two treatment arm, randomized, prospective study to minimize re-do burr-hole drainage procedures and any other associated complications in patients with chronic subdural haematomas.

Primary Outcomes:

- Recurrence requiring re-do drainage within the 1<sup>st</sup> month post-operatively
- Recurrence requiring re-do drainage between the 1<sup>st</sup> and 3<sup>rd</sup> months post-operatively

The timing of when to mobilize patients after burr-hole drainage of chronic subdural haematomas remains controversial. Traditionally, patients have been subjected to delayed mobilization in order to allow for the theoretical re-expansion of the brain and to decrease recurrence. Timing of bed rest is not consistent among centres and varies from immediately after to 7 days after surgery.

The objective is to determine optimal timing of mobilization in CSDH patients following a burr hole drainage.

*There are 21 participants enrolled in the CSDH Study, 14 of them enrolled during the last quarter.*

### 2. AHCNR Registry: Characterizing Patient Population in the Adult Hydrocephalus Clinical Research Network (AHCNR) – AHCNR Registry

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#### a. Vancouver General Hospital Clinical Academic Campus sub-site of UBC Site

**PI:** Dr. Thomas J. Zwimpfer

**Co-Investigator:** Dr. Brian D. Toyota, Dr. Daniel D. Warren

Funding	Source	Amount	Study period	Anticipated enrolment	# of subjects enrolled	Approvals	Status	Abstract/ Paper/ Manuscript
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N/A	N/A	N/A	Nov '14 no end date	perpetual	5	obtained	active	N/A
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**b. Victoria General Hospital Clinical Academic Campus of UBC Site**

**PI:** Dr. Daniel T. Warren

**Co-Investigator:** Dr. Alexandre Henri-Bhargava

Funding	Source	Amount	Study period	Anticipated enrolment	# of subjects enrolled	Approvals	Status	Abstract/ Paper/ Manuscript
N/A	N/A	N/A	Jan '15 no end date	perpetual	0	obtained	inactive	N/A

A multicenter and multinational registry that collects data on adult hydrocephalus patients to characterize the etiology, understand variability, progression, and current treatment practices for hydrocephalus patients.

The overall purpose of the Registry is to establish and maintain a hydrocephalus patient event database for the Clinical Centers of the AHCRN, a research network newly established to investigate clinical management of adult hydrocephalus.

**Primary Objectives:**

- To describe the natural history and treatment response for adults with previously untreated congenital hydrocephalus
- To describe the assessment and treatment of patients with Normal Pressure Hydrocephalus (NPH)
- To describe the complications associated with shunt surgery
- To determine the role for treatment with Endoscopic Third Ventriculostomy (ETV)

The Registry will provide previously unavailable epidemiological information about hydrocephalus patients seen throughout the participating Clinical Centers. This information will provide the basis for multi-institutional studies to be carried out by the AHCRN that may ultimately improve the clinical care for adults with hydrocephalus throughout the world. The continuing collection of such information serves to provide data necessary for hypothesis generation and study design. Examples of preliminary study designs include, but are not limited to, the following: preliminary power analysis, sample size determination, and recruitment projections. Radiologic imaging data will provide a unique opportunity to assess aspects of adult hydrocephalus diagnosis, management, and outcomes.

**Accomplishments of Merit:**

- VGH made UBC 1<sup>st</sup> site to have accomplish Neuropsychological Battery Administration Training

- VGH made UBC 1<sup>st</sup> site to complete Neuropsychological Battery Administration Quality Control
- UBC is 1<sup>st</sup> and only site to have more than one hospital included as an additional study sub-site in the network: Vancouver- and Victoria- General Hospitals.

*There are 45 participants enrolled in the AHCRN Registry, 5 of which are from the VGH sub-site of the UBC site; and of which, 1 was enrolled in the last quarter.*

### **3. Resident Activity Tracker Evaluation Study ~ *New this quarter***

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**PI:** Dr. Brian D. Toyota

**Co-Investigators:** Dr. Danny Mendelsohn, Dr. Gary J. Redekop

Funding	Source	Amount	Study period	Anticipated enrolment	# of subjects enrolled	Approvals	Status	Abstract/ Paper/ Manuscript
N/A	N/A	N/A	Apr. '15 - Aug. '15	60	N/A	pre-approval	inactive	N/A

Medical resident work hour restrictions remains a large topic of debate in the Accreditation Council for Graduate Medical Education; and more importantly, also in the Royal College of Physicians and Surgeons of Canada.

An adequate number of hours of sleep play an important role in medical residents' performance, and quality of life. Factors associated with medical resident fatigue and prolonged work hours include the following: an increase in automobile accidents, negative effect on well-being, an increase in stress, relationship-related stress, and decreased performance in both simulated tasks<sup>1-3</sup> and standardized tests<sup>4,5</sup>. Formal changes to resident work-hours regulation have not been imposed for Canadian medical residents. On-call duties vary substantially across medical specialties further complicating the issue. The actual physical demands of resident on-call duties and the impact on sleep duration and number of interruptions have not been comprehensively investigated to date.

This study will be the first in literature to measure average and maximum heart rate, sleep duration and interruptions, and number of steps taken per day in medical resident trainees, across non-surgical and surgical specialties and when the residents are on or off call. Such novel results will help advance and guide current discussion on resident work hour restriction towards a more comprehensive conclusion.

*The RATE Study has yet to begin – no participants to report in this quarter.*

### 3. ONGOING RETROSPECTIVE STUDIES

#### 1. The Incidence of Vertebrobasilar Compression of the Brain Stem

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**PI:** Dr. Chris Honey

**Co-Investigators:** Dr. Navid Khezri, Dr. Manraj K.S. Heran

Study period	Approvals UBC CREB/VCHRI	Charts reviewed /sample size	Status	Abstract/Paper/ Manuscript	Funding
Apr.-Aug. '15	pre-submission	0 / 100	not started yet	N/A	N/A

Incidence of neurovascular compression at the level of midbrain by the vertebrobasilar artery in the adult general population has not been studied in the English-language global literature.

Objective:

- Determine the incidence of midbrain neurovascular compression by the vertebrobasilar artery in the adult general population

The results from this study will lay the groundwork for a subsequent retrospective study of the incidence of neurovascular midbrain compression by the vertebrobasilar artery (VA) in patients with chronic cough. Should the incidence of neurovascular compression of the midbrain by the VA be significantly associated with a positive diagnosis for chronic cough patients when compared to the incidence of neurovascular compression of the midbrain by the VA in the general public, then there will be evidence to support performing microvascular decompression of the VA as a treatment of chronic cough in chronic cough patients that present with midbrain neurovascular compression by the VA.

#### 2. Review of Perisellar Meningioma Surgical Resection at Vancouver General Hospital

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**Co-Investigators:** Dr. Serge Makarenko

**PI:** Dr. Ryojo Akagami

Study period	Approvals UBC CREB/VCHRI	Charts reviewed /sample size	Status	Abstract/Paper/ Manuscript	Funding
Sep '14-Mar '15	obtained	53 / 53	manuscript	1. WB & MH Chung Research Day, Vancouver, B.C. '14 2. North American Skull Base Society Meeting in Tampa, Florida '15	none

This is a retrospective review of the perisellar meningiomas that were operated on by Dr. R. Akagami in Vancouver General Hospital between January 1<sup>st</sup>, 2001 – December 31<sup>st</sup>, 2013, with an open craniotomy approach, but may have been candidates for endoscopic treatment.

The treatment of perisellar meningioma intracranial tumours has remained a challenge over the past several decades, mainly attributed to the high risk of visual pathway involvement and vascular encasement. Surgical approaches have remained the mainstay of definitive treatment, with subfrontal, pterional, frontolateral, and orbitofrontal variants most commonly used. Extended endoscopic transsphenoidal surgery is emerging as an alternative option for treatment of these lesions. Endoscopic transsphenoidal surgery provides wider access to the anterior skull base when compared to the classical microscopic transsphenoidal approach, with recent technological advances such as angled endoscopes and image guidance have extended the success rates of this novel approach.

Objectives:

- Characterize patients’ suprasellar and meningioma anatomy
- Investigate their outcomes following transcranial resection of the meningioma tumour by Dr. R. Akagami

The aim is to have those patients who may have been candidates for endoscopic surgery identified based on radiographic tumour characteristics, and then compared against those patients who had perisellar meningiomas with anatomy not suitable for endoscopic treatment. A review of the cases that were operated on transcranially will then be established in an effort to compare the outcomes in lesions that have anatomy appropriate for endoscopic surgery. It is hypothesized that those patients that had perisellar meningiomas with anatomy suitable for endoscopic surgery will have more favourable post-operative outcomes from transcranial surgery.

### **3. Case Study: Ipsilateral Lateral Corticospinal Tract Innervation; an Anatomic Variant ~** *New this quarter*

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**PI:** Dr. Ryojo Akagami

**Co-Investigators:** Mr. Jerry Ku, Y3 MD

Study period	Approvals UBC CREB/VCHRI	Charts reviewed /sample size	Status	Abstract/Paper/ Manuscript	Funding
Apr. – Aug. ‘15	approved	0 / 1	consent	N/A	none

Ipsilateral lateral corticospinal tract innervation is a rare but recognized anatomical variant of motor innervation.

Objective:

- To report a case of ipsilateral lateral corticospinal tract innervation discovered during intra-operative monitoring for a neurosurgical procedure.



- To further characterize this anatomic variant by magnetic resonance (MR) tractography

Current research published around ipsilateral lateral corticospinal tract innervation consists of case reports of ipsilateral motor defects following stroke or literature surrounding congenital tract malformations. We will report a case of ipsilateral lateral corticospinal tract innervation discovered incidentally during intra-operative monitoring for a neurosurgical procedure, which was further characterized by magnetic resonance (MR) tractography. This has never been previously reported in the literature, and may help in providing better understanding upon this condition as well as how to manage patients with this anatomic variation.

#### **4. Thromboprophylaxis in Traumatic Brain Injury: an assessment of timing of treatment ~** *New this quarter*

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**PI:** Dr. Morad Hameed

**Co-Investigators:** Dr. Joseph Margolick, Dr. Charlotte Dandurand, Mr. Simon Prinsley, Dr. David C. Evans, Dr. Peter Gooderham, Dr. Donald Griesdale, Dr. Mypinder S. Sekhon, and LCol Naisan R. Garraway, MD

Study period	Approvals UBC CREB/VCHRI	Charts reviewed /sample size	Status	Abstract/Paper/ Manuscript	Funding
Apr. '15 – ongoing	pre-approvals	0 / 351	pre- submission	N/A	none

Timing of thromboprophylaxis following a traumatic brain injury (TBI) has been shown to be a contributing factor to complication rates and length of stay in TBI patients.

Objective:

- Determine optimal timing of thromboprophylaxis protocol implementation follow a traumatic brain injury

The results from this study will assist in guiding the continual improvement of health care protocols, such as the one for thromboprophylaxis use following TBI.

#### **5. Frequent Recurrence of Pilocytic Astrocytomas in Adults: a retrospective review**

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**PI:** Dr. Brain D. Toyota

**Co-Investigators:** Dr. Julia Sharma, Dr. Stephen Yip, Dr. Alan Nichol, Dr. Veronica Hirsch

Study period	Approvals UBC CREB/VCHRI	Charts reviewed /sample size	Status	Abstract/Paper/ Manuscript	Funding
Aug. 6 <sup>th</sup> , '11 - ongoing	obtained	35 / 35	Statistical Analyses	N/A	none

Pilocytic astrocytomas (PAs) are well circumscribed, slow-growing WHO grade I tumors of the CNS that generally follow a benign course (88%-100% survival at 5 years), and are rare in adults. Recent studies have shown however, PAs in adults not only show recurrence rates of 30%, but also malignant transformation in half of the cases that repeat surgery.

Objectives:

- Perform a cohort analysis of an adult patient population with PAs
- Identify any associations between adult PA features and a decrease in progression free survival and overall survival
- Relate immunohistochemistry to patient outcome

Current literature of similar studies have the limitation of small sample sizes, and further research needs to be completed. The authors plan to provide said needed research.

**6. Urgent Lateral Canthotomy Post-Percutaneous Cavernous Sinus Superior Orbital Fissure Puncture For Endovascular Obliteration of Cavernous Dural Arteriovenous Fistula: Case Report and Review of the Literature ~ *New this quarter***

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**PI:** Dr. Charles Haw

**Co-Investigator:** Dr. Ahmed Badar, Dr. Manraj K.S. Heran

Study period	Approvals UBC CREB/VCHRI	Charts reviewed /sample size	Status	Abstract/Paper/ Manuscript	Funding
Nov. '14 – Mar. '15	obtained	1 / 1	Manuscript	N/A	none

A carotid-cavernous fistula case study, treated with a percutaneous transorbital cavernous sinus puncture via the superior orbital fissure puncture, and a subsequent coil embolization, is presented.

Objectives

- Discuss technique of direct superior orbital fissure puncture of the cavernous sinus for embolization of CCFs and management of a potentially serious intra-procedural complication.

Arteriovenous shunts between the internal and or external carotid arteries and the cavernous sinus are called carotid cavernous fistulas (CCF). Morbid signs and symptoms of CCFs include proptosis, ophthalmoplegia, chemosis, and decreased visual acuity and or visual loss. What has become the mainstay approach is transvenous endovascular embolization. Coil embolization by transfemoral-inferior petrosal (IPS) approach is used in the majority of cases. An alternative approach includes direct puncture of the inferior ophthalmic vein or cavernous sinus through the superior orbital fissure. The different techniques available, and potential untoward ramifications of said techniques are discussed with example of case at Vancouver General Hospital.

## 4. SUMMER STUDENTSHIPS TO COME ~ *New this quarter*

### 1. **Deep Brain Stimulation for Spasmodic Dysphonia Secondary to Essential Tremor**

<b>PI:</b>	Dr. Chris R. Honey
<b>Student</b>	Ms. Vivian Braithwaite, Y3 B.Kin.
<b>Funding</b>	UBC Summer Studentship Research Program – <i>Applied; pending results</i>

### 2. **Predictive Markers for Malignant Brain Tumors**

<b>PI:</b>	Dr. Brian D. Toyota
<b>Student</b>	Mr. Ryan (Quinn) Parker, Y2 MD
<b>Funding</b>	UBC Summer Studentship Research Program – <i>Applied; pending results</i>

### 3. **Collection and Submission of Clinical, CSF and Radiological Data of Patients Being Assessed at Vancouver General Hospital Adult Hydrocephalus Clinic as Part of the Adult Hydrocephalus Clinical Research Network (AHCRN)**

<b>PI:</b>	Dr. Charles Haw
<b>Student</b>	Mr. Nicholas Salterio, Y1 B.Sc.
<b>Project Supervisor:</b>	Dr. Thomas J. Zwimpfer
<b>Funding</b>	UBC Summer Studentship Research Program – <i>Applied; pending results</i>

### 4. **Collection of clinical, CSF and radiological data of patients being assessed at the Vancouver General Adult Hydrocephalus Clinic as part of the Adult Hydrocephalus Clinical Research Network (AHCRN)**

<b>PI:</b>	Dr. Thomas J. Zwimpfer
<b>Student</b>	Ms. Michelle Tran, Y5 Unclassified
<b>Funding</b>	UBC Summer Studentship Research Program – <i>Applied; pending results</i>

**5. Perioperative Quality of Life in Patients with Cushing's Disease**

<b>PI:</b>	Dr. Ryojo Akagami
<b>Student</b>	Mr. Vincent Ye, Y1 MD
<b>Funding</b>	1. UBC Summer Studentship Research Program 2. Neurosurgery Research and Education Foundation's Medical Student Summer Research Fellowship – <i>Both: applied; pending results</i>