ONGOING RESEARCH STUDIES IN THE NEUROSCIENCES PROGRAM

Quarterly Report on the Research Activities Involving a Clinical Research Coordinator

April 1st 2017 to June 30th 2017

Prepared by

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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 April 1st – June 30th, 2017. 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.

Number of Ongoing Studies				
Prospective	Retrospective	Inactive or Complete Studies	Summer Studentships	Total
14	6	0	3	23

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. **<u>CSDH study</u>: Timing of Mobilization After Burr Hole Drainage of Chronic Subdural Haematomas: a randomized study – PI: Dr. Akagami; Co-PI: Drs. Tu, Chang, Honey, Makarenko**

Funding	Source	Amount	Study period	Anticipated enrolment	# of subjects enrolled	Approvals	Status	Abstract/ Paper/ Manuscript
N/A	N/A	N/A	Sep '14 Sep '17	142	81	Yes	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 1st month post-operatively
- Recurrence requiring re-do drainage between the 1st and 3rd 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 81 participants enrolled in the CSDH Study, 3 of them were enrolled during the last quarter.

2. **<u>AHCRN REGISTRY</u>: Characterizing Patient Population in the Adult Hydrocephalus Clinical Research Network (AHCRN) – AHCRN Registry– PI: Dr. Zwimpfer; Co-PI: Drs. Toyota, Henri-Bhargava, Warren**

Funding	Source	Amount	Study period	Anticipated enrolment	# of subjects enrolled	Approvals	Status	Abstract/ Paper/ Manuscript
N/A	N/A	N/A	Nov '14 no end date	perpetual	122	Yes	Active	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 1st site to have accomplish Neuropsychological Battery Administration Training
- VGH made UBC 1st site to complete Neuropsychological Battery Administration Quality Control

There are 653 participants enrolled in the AHCRN Registry at all participating sites. Of those, 122 are from the VGH site with 25 patients enrolled in the last quarter.

3. **RATE study - Resident Activity Tracker Evaluation Study - PI: Dr. Toyota; Co-PI: Drs. Mendelsohn, Redekop, Singhal, Gooderham**

Funding	Source	Amount	Study period	Anticipated enrolment	# of subjects enrolled	Approvals	Status	Abstract/ Paper/ Manuscript
Yes	RDBC (NGO) BCSPQC (NGO) MD Financial (NGO)		Sep 15 Aug 16	60	59	Yes	active	In submission

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 and standardized tests. 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.

There are 59 residents currently enrolled in the RATE Study. The enrollment has been completed. The manuscript has been submitted.

4. **<u>TOCA 511 Study</u> - A Phase 2/3 Randomized, Open-Label Study of Toca 511, a Retroviral Replicating Vector, Combined With Toca FC versus Standard of Care in Subjects Undergoing Planned Resection for Recurrent Glioblastoma or Anaplastic Astrocytoma – PI: Dr. Toyota; Co-PI: Dr. Yip**

Funding	Source	Amount	Study period	Anticipated enrolment	# of subjects enrolled	Approvals	Status	Abstract/ Paper/ Manuscript
Yes	Tocagen (Industry)		Apr 16 Sep 19	170 in Phase 2; 200 in Phase 3	0	Yes	Active	N/A

Name of Investigational Product: Toca 511, a retroviral replicating vector (RRV) expressing a yeast-derived, codon-optimized cytosine deaminase (CD) prodrug-activator gene, in combination with Toca FC (flucytosine) extended-release tablets.

Primary Objective:
To compare the overall survival (OS) of subjects treated with Toca 511 combined with Toca FC to subjects treated according to standard of care after tumor resection for recurrence of glioblastoma or anaplastic astrocytoma.

Methodology: This is a multicenter, randomized, open-label study of Toca 511 and Toca FC versus standard of care (SOC) that comprises Investigator's choice of either single agent chemotherapy (lomustine or temozolomide) or bevacizumab administered to subjects undergoing resection for first or second recurrence (including this recurrence) of glioblastoma or anaplastic astrocytoma. Subjects will be randomized at the time of surgery in a 1:1 ratio to receive either Toca 511 and Toca FC or control. Repeat scans will be obtained every 6 weeks for the first year and every 3 months after that.

Subjects may receive any standard of care treatment following progression or discontinuation from study due to toxicity. Crossover to the Experimental arm is not allowed, unless the primary endpoint is met and the Sponsor notifies the sites.

The ethics application has been approved by CREB and the VCHRI approval is pending.

There are no participants enrolled in the Tocagen Trial. Patient enrolment has closed.

5. **<u>QoL aneurysm study</u> - Quality of life in patients diagnosed with unruptured cerebral aneurysm: prospective single-center series - PI: Dr. Gooderham; Co-PI: Drs. Dandurand, Redekop, Haw**

Funding	Source	Amount	Study period	Anticipated enrolment	# of subjects enrolled	Approvals	Status	Abstract/ Paper/ Manuscript
Yes	TAAF (NGO)		Jan 16 Dec 17	150	81	Yes	Active	N/A

Aneurysms may require endovascular or microsurgical treatment if ruptured, growing, symptomatic or of significant size. The goal of prophylactic treatment of an aneurysm is to increase the number of years with good quality of life.

The main goal of the present study is to identify how does the diagnosis of an unruptured cerebral aneurysm and its subsequent treatment impact quality of life as measured by SF-36 and EQ5D in patients. We aim to quantify if the impact in quality of life varies overtime. We aim to verify if the choice of technique (endovascular vs microsurgical) has an impact on quality of life in the short and long term. We will explore the relationship with other variables such as gender, medical comorbidities, aneurysm location, and postoperative complications.

Quality of life will be assessed via the SF-36 and the EQ5D tool at time 0 (time of diagnosis) and at 1 year for patients with an untreated cerebral aneurysm. Quality of life will be assessed via the SF-36 tool at time 0 (time of diagnosis), 6-8 weeks postoperative follow-up and at 1-year postoperative follow-up in the patients who have been treated. The latter group will be divided in 2 sub-groups: endovascular and microsurgical (clipping).

Ultimately, we will compare quality of life in untreated unruptured cerebral aneurysms patients with general population at time 0 and 1 year. We will compare quality of life in coiled unruptured cerebral aneurysm patients at time 0, 6-8 weeks and at 1 year. We will compare quality of life in clipped unruptured cerebral aneurysm patients at time 0, 6-8 weeks and at 1 year. We will compare quality of life between clipped and coiled patients at time 0, 6-8 weeks and at 1 year.

There are 81 participants currently enrolled in the QoL Aneurysm Study, 17 of them were enrolled during the last quarter.

6. LAANTERN Registry – PI: Dr. Toyota; Co-PI: N/A

Funding	Source	Amount	Study period	Anticipated enrolment	# of subjects enrolled	Approvals	Status	Abstract/ Paper/ Manuscript
Yes	Monteris (Industry)		Jan 16 Dec 19	150	15	Yes	Active	N/A

The NeuroBlate® System (NBS) is a minimally invasive robotic laser thermotherapy tool that is being manufactured by Monteris Medical. It employs a pulsed surgical laser to deliver targeted energy to abnormal brain tissue. To further understand performance and utilization of NBS in current standard of care, post-market multi-center registry called LAANTERN (Laser Ablation of Abnormal Neurological Tissue using Robotic Neuroblate system) is designed to collect baseline, procedural and follow-up data on patients that are already scheduled to be treated with NBS in observational manner for publication purposes.

This is a multi-center registry that will include data collection at baseline (prior to NeuroBlate® procedure, which is also referred as the index procedure), during index procedure, discharge and up to 24-month follow-up. Up to 1,000 patients may be enrolled at up to 50 study sites. Most of

the enrollment will occur prospectively; however, the data collection for patients who already underwent a procedure with NBS may also take place retrospectively. For example, if the patient already had a NBS procedure, he/she may be approached about study participation. If the patient agrees to participate in the study, the data collection will be initiated once Informed Consent Form (ICF) is signed (e.g., demographics, procedure, and discharge data will be collected retrospectively and future follow-up visits collected prospectively).

There are 15 participants currently enrolled in the LAANTERN Registry, 2 of them were enrolled during the last quarter.

7. CanTBI Biobank & Registry – PI: Dr. Toyota; Co-PI: Drs. Honer, Brubacher, Carrion, Wellington, Torres, MacKay, Walley; Coordinator: Angela Aquino

Funding	Source	Amount	Study period	Anticipated enrolment	# of subjects enrolled	Approvals	Status	Abstract/ Paper/ Manuscript
Yes	Brain Canada (NGO)	Unknown	Jul 15 - ongoing	350	95	Yes	Active	N/A

Aim

1) To develop a national biobank by linking existing regional biobanks.
2) The creation of a national database of patients with TBI.
3) To link the national biobank and database with health care utilization data.
4) To promote collaboration among TBI scientists

Methods

We will prospectively enrol infants, children and adults with mild, moderate and severe TBI from intensive care units, emergency departments and sports concussion clinics. Serum, cerebrospinal fluid, brain samples and DNA will be collected using standard operating procedures. We will expand current biobanks and develop new regional biobanks dedicated to TBI patients. A core data set will be collected electronically, linked to tracked biosamples.

Inclusion Criteria

Patients with acute mild, moderate or severe TBI.
First study blood sample taken < 24 hours since TBI.
Patient and/or the substitute decision maker can speak and read English and/or French.
Patient is >19 years of age.

Exclusion Criteria

Neurodevelopmental disorder pre-injury.
Brain death is confirmed or suspected at the time of enrolment, determined by the attending intensivist, neurosurgeon or other physician.
Patient suffered a stroke, or has ongoing neurologic deficit from a stroke.
Patient has significant disruptive neurologic issues.

8. Nicotine Replacement Therapy: Clinician Survey – PI: Dr. Gooderham; Co-PI: Drs. Chang, Dandurand

Study period	Approvals UBC CREB/VCHRI	Charts reviewed /sample size	Status	Abstract/Paper/ Manuscript	Funding
Jul 16 Dec 16	Yes	50/50	Active	N/A	N/A

Between 50-66% of aneurysmal subarachnoid hemorrhage (aSAH) patients are active smokers, a notable statistic considering that smoking tobacco more than doubles the risk of aneurysmal SAH. Smoking gives aSAH patients an increased risk of in-hospital complications such as vasospasm or delayed cerebral ischemia (DCI) as well as increased mortality if they continue to smoke after discharge. Therefore the use of smoking cessation therapies during their hospital stay is a critical aspect for their clinical outcome. At the moment our findings demonstrate however, that there is an insufficiency of any guidelines that exist on the management of tobacco dependence in patients hospitalized for aneurysmal SAH. We performed a systematic review of randomized and controlled observational studies evaluating the impact of nicotine replacement therapy (NRT) on clinical outcomes in patients hospitalized with aSAH which showed NRT generally improved or did not impact short-term outcomes in smokers with aneurysmal SAH.

The purpose of this study is to evaluate vascular neurosurgeons' practice and beliefs regarding nicotine replacement therapy in subarachnoid hemorrhage patients. We will be asking Canadian neurosurgeons with a practice encompassing the management of aSAH to complete an online questionnaire, which should take under 5 minutes to complete and is only 4 questions long. They will be approached via email with an attached consent cover letter, outlining the study and requesting them to voluntarily complete the survey. Their responses for the 4 questions will be anonymous and have no identifying information. Response rates for each of the multiple choice segments of the questions will be reported using percentages and qualitative descriptions of optional open-field textboxes responses will be displayed.

9. PET/CT & Neurosurgical Resection – Dr. Toyota; Co-PI: Drs. Yip, Mendelsohn, Wilson, Bénard

Funding	Source	Amount	Study period	Anticipated enrolment	# of subjects enrolled	Approvals	Status	Abstract/ Paper/ Manuscript
Yes	Neuro-onc. Fund (NGO)	Unknown	Oct 2016 – Oct 2018	40	0	No	Pre-submission	N/A

Purpose

To study the use of Positron Emission Tomography to improve the extent of resection for gliomas.

Hypothesis

The 11C-Methionine PET/CT tracer is an amino acid analogue that can visualize tumour not clearly identified on diagnostic MRI. Use of 11C-Methionine PET/CT will permit better surgical resection and lead to better survival for patients with gliomas.

Primary Objective
To assess the extent of surgical resection of gliomas with preoperative and postoperative PET/CT imaging with 11C-Methionine and 18F-Fluorodeoxyglucose (18F-FDG)

10. The Digital Physiotherapist – Dr. Toyota; Co-PI: Drs. Zemmar, Eng

Funding	Source	Amount	Study period	Anticipated enrolment	# of subjects enrolled	Approvals	Status	Abstract/ Paper/ Manuscript
No	N/A	N/A	Mar 2017 – Oct 2018	400	0	CREB & VCHRI Pending	In submission	N/A

Purpose
The main goal of this project is to develop a database which will record everyday life movements of the upper extremity (arms and hands) and lower extremities (legs and feet). We will use this information to determine what "normal" movement is. We then compare impaired movement after CNS injury to the "normal" movement database to identify the weakness in the injured patient. That knowledge is then used to selectively train the injured brain circuits. We furthermore plan to develop a device which will allow the patient to do physiotherapy exercise using their cellphone and virtual reality glasses.

Significance of Study
Repetitive physiotherapy is key in order to gain neuroplasticity and repair impaired neuronal circuits that are damaged by CNS injury. Long waiting times for physiotherapists or inability to afford a private physiotherapy are known obstacles for patients. By developing a device that selectively identifies impaired muscle groups and allows the patient to carry out targeted physiotherapy from anywhere at any time, we aim to allow the patient to carry out repetitive physiotherapy and enhance neuroplasticity to improve functioning of those nerve cells in the brain that orchestrate the weakened motion. With this approach we hope to create a new and effective avenue to treat patients with CNS injury more effectively.

11. Moyamoya QoL Study – Dr. Gooderham; Co-PI: Drs. Dandurand, Yip – ***new study this quarter***

Funding	Source	Amount	Study period	Anticipated enrolment	# of subjects enrolled	Approvals	Status	Abstract/ Paper/ Manuscript
No	N/A	N/A	May 2017 – May 2019	100	0	CREB & VCHRI Pending	Pre-submission	N/A

Purpose
Moyamoya disease is a rare and chronic disease characterized by the progressive occlusion of intracranial vessels. The supraclinoid carotid arteries are the first arteries affected. It rarely affects the posterior circulation. Small collateral vessels begin to form at the base of the brain as the larger vessels become occluded giving it the characteristic appearance of a «puff of smoke» on angiographic radiological studies. This disease can present with ischemic stroke or intracranial hemorrhage depending on the age of the patient.

Objectives
The main goal of the present study is to identify how does the diagnosis of Moyamoya disease, its different clinical presentations and its subsequent treatment impact quality of life as measured by SF-36, EQ5D and 49-item Stroke-Specific Quality of Life Scale (SSQOL) in patients. We aim to verify if the choice of technique (direct or indirect bypass) has an impact on quality of life. We will explore other variables such as clinical presentation (incidental, ischemic or hemorrhagic), radiological features (cerebrovascular reserve and evidence of ischemic stroke), gender, medical comorbidities, postoperative complications and length of time after diagnosis and treatment.

12. Early Palliative Care Trial – Dr. Brian Toyota; Co-PI: Drs. Rance, Ayling, See, Yeomans, Bunn, Sakaluk – ***new study this quarter***

Funding	Source	Amount	Study period	Anticipated enrolment	# of subjects enrolled	Approvals	Status	Abstract/ Paper/ Manuscript
No	N/A	N/A	May 2017 – May 2019	100	0	CREB & VCHRI Pending	In-submission	N/A

Purpose

The purpose of this research proposal is to conduct a randomized trial of early palliative care for patients diagnosed with glioblastoma (GBM), which would be the first study of its kind in this patient population. The aim is first, to attempt to enhance the quality of life of patients with GBM. And second, to potentially increase survival after diagnosis with GBM.

Design and Methodology
The proposed study is a non-blinded randomized control trial where patients with newly diagnosed GBMs will be randomized to either early palliative care plus standard oncologic therapy or standard oncologic therapy alone. It is a collaborative effort between palliative care physicians, neuro-oncologists, and neurosurgeons. Patients with histopathology confirmed GBM will be recruited into this study.

13. UVFS QoL Validation Study – Dr. Ryojo Akagami; Co-PI: Drs. Gooderham, Makarenko – ***new study this quarter***

Funding	Source	Amount	Study period	Anticipated enrolment	# of subjects enrolled	Approvals	Status	Abstract/ Paper/ Manuscript
No	N/A	N/A	May 2017 – May 2019	60	0	CREB & VCHRI Pending	Pre - submission	N/A

Purpose
We have designed a Unified Visual Function Scale (UVFS) based on the definition of legal blindness and the fitness to drive as a quick, accurate, and easy-to-use tool for evaluating visual outcomes (Makarenko et al. 2017, in print). UVFS needs to be tested for inter- and intra-observer

reliability, as well as its correlation to be able to reflect quality of life impact. Other scales such as Visual Function Questionnaire (VFQ-25) or Activities of Daily Vision Scale (ADVS) have been used in attempts to correlate visual function to quality of life, but these are also unsuitable for routine clinical use. This study hopes to correlate UVFS to these scales, as well as establish its reliability for capturing quality of life assessments.

Objective
We have two objectives. First, we will attempt to characterize visual outcomes of patients with lesions affecting the optic apparatus, and then investigate the accuracy of our new Unified Visual Function Scale to correlate with the visual quality of life data. We hope to demonstrate that the Unified Visual Function Scale is able to not only provide clinically useful information, but also reflect impact of vision on patient quality of life.

14. EVD Complications in Canada – Dr. Ryojo Akagami; Co-PI: Dr. Makarenko - ***new study this quarter***

Funding	Source	Amount	Study period	Anticipated enrolment	# of subjects enrolled	Approvals	Status	Abstract/ Paper/ Manuscript
No	N/A	N/A	Feb 2017 – Feb 2019	500 (across Canada) 50 (VGH site)	0	CREB & VCHRI Pending	Pre - submission	N/A

Context
Placement of external ventricular drain (EVD) catheters is a common neurosurgical procedure typically performed in emergent situations for the treatment of hydrocephalus and raised intracranial pressure (ICP). The procedure is associated with a number of complications resulting in significant morbidity. Comprehensive, prospective studies are lacking in describing the incidence of these complications and associated risk factors. A multi-centre prospective study is required in order to adequately investigate the complication profile of EVD catheter placement.

Design
This is a prospective multi-centre observational study to be conducted at 12 Canadian neurosurgical centres forming part of the Canadian Neurosurgery Research Collaborative (CNRC). The CNRC is a Canadian research network made up of 12 neurosurgery residents representing the participating sites, and supported by attending neurosurgeons. The CNRC is bound by an agreement signed by all residents to protect the confidentiality of data and privacy of patients.

Hypothesis
This study hypothesizes that in patients with EVD-catheters placed urgently (e.g. in the setting of intracranial hemorrhage or traumatic brain injury), the rates of EVD catheter-related complications including EVD catheter infection, hemorrhage and misplacement are influenced by patient, catheter and operator-related factors as described above.

3. ONGOING RETROSPECTIVE STUDIES

1. Biomarkers in Malignant Brain Tumors Study - PI: Dr Toyota; Co-PI: N/A

Study period	Approvals UBC CREB/VCHRI	Charts reviewed /sample size	Status	Abstract/Paper/ Manuscript	Funding
Jun 15 Aug 16	Yes	151/151	Active	N/A	N/A

Objective:

To conduct a retrospective clinical chart review of our institution's glioblastoma cases to compare the predictive and prognostic value of molecular markers to that of traditional histological diagnoses.

This is a retrospective chart review involving charts of patients with glioblastoma treated at VGH from 2010-2014. We have created a database to register basic patient demographics, treatment protocols and outcome. Specific to our study, we classified the tumors by classic histologic description and grading as well as new cutting edge diagnostic molecular and genetic analysis.

Based on this database, we will stratify the patients into outcome categories based on classical grading and newer molecular markers. A statistical analysis of this data will then be conducted in order to compare the predictive value of these classic histologic methods with the newer methods for patient outcomes.

Quinn Parker was a summer student who had obtained UBC SSRP funding for the summer. The chart review has been completed, and we await statistical analysis.

2. QoL Retrospective Study - Quality of Life after Surgery in Patients with Pituitary Tumors and Acromegaly – PI: Dr. Akagami; Co-PI: Dr. Fatehi

Study period	Approvals UBC CREB/VCHRI	Anticipated Enrollment	Status	Abstract/Paper/ Manuscript	Funding
Dec 15 Dec 16	Yes	63	Active	N/A	N/A

Patients with pituitary tumors have been previously noted to report decreased quality of life (QoL). These studies have used a variety of validated questionnaires (such as SF36 and AcroQoL) to assess the physical, cognitive and psychological well-being of patients affected by functional and non-functional tumors. Predictably, QoL is variably affected by different types and extents of tumor. Studies which have focused on patients with acromegaly have generally shown improvement of QoL after treatment (GH<2ng/ml). However, it is not clear whether the improvement of QoL is primarily driven by the correction of hormonal imbalances. In fact, a recent study from Korea found that AcroQoL scores were similar between patients with controlled and uncontrolled disease.

This will be a retrospective review of QoL after pituitary surgery in patients with acromegaly. Any patient that lacks the SF36 questionnaire will be contacted, consented and given a copy to complete. All charts of patients who have previously undergone this procedure with Dr. Akagami shall be assessed. Multivariate analysis will be used to determine the factors which most impact QoL improvement post-operatively.

3. **<u>3D Segmentation Study</u>** - Computational 3D Segmentation of Cerebral Vasculature for Evaluation of Cerebral Aneurysms , **PI: Dr. Gooderham; Co-PI: Drs. Hamarneh, Chew, Mendelsohn**

Study period	Approvals UBC CREB/VCHRI	Anticipated Enrollment	Status	Abstract/Paper/ Manuscript	Funding
Jan 10 Dec 15	Yes	500	Active	N/A	None

The primary objective of this study is to develop computer software using advanced imaging analysis techniques that can accurately detect cerebral aneurysms on CTA scans. The secondary objective of this study is to develop computer software that can detect changes in the size and shape of aneurysms over time in the same patient.

We hypothesize that advanced imaging analysis techniques will be able to be applied to CTA scans to successfully and accurately detect cerebral aneurysms and compare their size and shape at different points in time in the same patient.

4. **<u>Trigeminal Schwannoma Study:</u> PI: Dr Akagami; Co-PI: Dr. Makarenko**

Study period	Approvals UBC CREB/VCHRI	Anticipated Enrollment	Status	Abstract/Paper/ Manuscript	Funding
Mar 16 Feb 17	Yes	30	Active	N/A	N/A

This is a retrospective review of trigeminal schwannomas that were operated on by Dr. R. Akagami at Vancouver General Hospital between 2001-2015 with an open craniotomy approach. Our aim is to characterize the clinical presentation against imaging findings, and document the natural history of the TS tumours with respect to management strategy that includes surgical resection, radiotherapy, and observation.

We have two objectives. First, we will attempt to characterize the patients' trigeminal schwannoma anatomy with respect to location in middle and posterior cranial fossae, and then investigate their outcomes following transcranial resection of tumour by Dr. R. Akagami. We hope to correlate the patient's clinical presentation with the tumour anatomy with respect to sensory and motor symptoms, and then compare these against those of the findings in literature.

5. **<u>Current glioblastoma outcomes in BC</u>** – **PI: Dr. Toyota; Co-PI: Dr. Fatehi**

Study period	Approvals UBC CREB/VCHRI	Anticipated Enrollment	Status	Abstract/Paper/ Manuscript	Funding
Jul 16 – Dec 16	Yes	200	Active	N/A	N/A

Glioblastoma remains a lethal diagnosis with well-recognized failures in truly effective curative strategies. However there have been incremental improvements over the past decade that has predicted 2.5-fold improvements in 2-year survival. This prediction was based on a handful of studies describing new treatment strategies and bio-marker revelations. Our study seeks to document the actual 'real-world' change in glioblastoma outcomes. The objective is to establish

the overall and median survival of a current cohort of patients treated for glioblastoma in B.C. undergoing standard treatment algorithms.

6. Reliability of UVFS Study – Dr. Ryojo Akagami; Co-PI: Drs. Gooderham, Makarenko – ***new study this quarter***

Study period	Approvals UBC CREB/VCHRI	Anticipated Enrollment	Status	Abstract/Paper/ Manuscript	Funding
Jun 2017- Jun 2019	No	30	Pre-Submission	N/A	N/A

Purpose
This is a study in inter- and intra-observer reliability. We will select 30 de-identified patients with pituitary lesions affecting vision. We will obtain their last visual acuity and visual fields assessments (Goldmann's visual fields) following surgical resection, and a UVFS score will be assigned as a consensus decision by the study investigators. We will then perform additional individualized assessments done by two neurosurgeons, two neurosurgery residents, and two medical student trainees. The reviewers will be presented with a formal visual field assessment as well as visual acuity scores, and asked to assign the UVFS score. These will be presented 3 different times to limit recall bias (total of 90 scores will be applied).

Analysis
We will use three statistical tests to assess inter- and intraobserver reliability. The interclass correlation coefficient (ICC) will be used to measure both inter-and intra-observer agreement for total UVFS scores (two-way mixed effect model, in which people effects are random, and measures effects are fixed). Fleiss's kappa will be used for multiple raters to measure interobserver agreement, and Cohen's kappa will be used to evaluate intraobserver agreement.

4. INACTIVE OR COMPLETE STUDIES

None this quarter.

5. SUMMER STUDENTS

1. AHCRN Summer Student Project

PI: Dr. Charles Haw
Student: Mr. Nicholas Salterio, Y3 B.Sc.
Project Supervisor: Dr. Thomas J. Zwimpfer
Funding: VGH Foundation Hydrocephalus Fund

2. Predicting Shrinkage in Vestibular Schwannomas

PI: Dr. Ryojo Akagami
Student: Vincent Ye, Y3 MS
Project Supervisor: Dr. Ryojo Akagami
Funding: SSRP

3. Low grade gliomas, natural history and response to treatment

PI: Dr. Brian Toyota
Student: Bohan Hans Yang, Y1 MS
Project Supervisor: Dr. Brian Toyota
Funding: SSRP