

Brain Tumour Research Fellowship Final Report

Lay summary of research findings

This research study closely investigated the treatment approaches, outcomes and quality of life of adolescents and young adults (AYA) with intracranial germ cell tumours (IGCT), a disease that is categorized into germinoma and non-germinomatous germ cell tumours (NGGCT). One-hundred nineteen Canadian oncologists who treat brain tumours completed our survey which showed that there was significant uncertainty and variability in the management of two hypothetical adolescent patients with IGCT. It was illustrated that the exact same 17-year old patient with localized germinoma has a much higher chance of receiving chemotherapy if he happens to present to a pediatric hospital rather than to an adult hospital. It was also shown the surveyed oncologists were very divided in their selection of the field and dose of radiation therapy for NGGCT, and no particular physician factors predicted for the treatment approaches chosen. A fair proportion of physicians selected non-standard treatments or responded that they did not know which treatment to recommend.

Next, we performed a retrospective review of all 112 patients treated for IGCT at the age of 15-39 years at the British Columbia Cancer Agency and at Princess Margaret Cancer Centre, representing the largest study of IGCT in AYA thus far. It was demonstrated that patients with germinoma who received a large field of radiotherapy (RT) involving the entire brain and spine, or received a smaller field of RT plus chemotherapy had an excellent chance of long-term survival, whereas those who received a smaller field of RT without chemotherapy had a lower chance of long-term survival. There was no clear difference in survival according to field of RT in patients with NGGCT, but there was suggestion that a dose of <54Gy to the tumor bed alone led to a higher chance of relapse.

Lastly, we prospectively examined the health-related quality of life in adult survivors of IGCT and found that it is lower than the general population, particularly in vitality, general health and social functioning.

The results of this multi-part research study illustrate the need for increased knowledge and consistency in the management of AYAs with IGCT. Our survey indicates that some oncologists would select non-standard treatment approaches, while our retrospective review demonstrates that some of these non-standard treatments may lead to inferior survival. The prospective part of our study suggests that quality of life is a significant concern for IGCT survivors, and physical and psychosocial supports should therefore be considered for this population. We believe that our research will help improve the outcomes and quality of life for AYAs with IGCT, and lead to larger research studies that strive towards this same goal.

Bibliography of publications, poster and podium presentations

Manuscripts

Lo A, Hodgson D, Dang J, Tyldesley S, Bouffet E, Bartels U, Cheng S, Hukin J, Bedard P, Goddard K*, Laperriere N* (*co-last authors). Intracranial Germ Cell Tumors in Adolescents and Young Adults: A 40-Year Multi-Institutional Review of Outcomes. *In progress awaiting final edits from co-authors. To be submitted to the International Journal of Radiation Oncology Biology within a month.*

Lo A, Laperriere N, Hodgson D, Bouffet E, Nicholson J, McKenzie M, Hukin J, Goddard K. Canadian Patterns of Practice for Intracranial Germ Cell Tumors in Adolescents and Young Adults. *In progress awaiting final edits from co-authors. To be submitted to the Journal of Neuro-Oncology within a month.*

Abstracts and presentations

- Oral podium presentation #1 at the 5th International CNS Germ Cell Tumor Symposium, Columbus, Jun 8-10, 2017:

Corresponding abstract:

Lo A, Goddard K, Hodgson D, Dang J, Tyldesley S, Bouffet E, Bartels U, Cheng S, Hukin J, Bedard P, Laperriere. A 40-Year Multi-Institutional Review of Intracranial Germ Cell Tumors in Adolescents and Young Adults. 5th International CNS Germ Cell Tumor Symposium, Columbus, Jun 8-10, 2017. *Pediatr Neurol* 014

- Oral podium presentation #2 at the 5th International CNS Germ Cell Tumor Symposium, Columbus, Jun 8-10, 2017:

Corresponding abstract:

Lo A, Laperriere N, Hodgson D, Bouffet E, Nicholson J, McKenzie M, Hukin J, Goddard K. Canadian Patterns of Practice for Intracranial Germ Cell Tumors in Adolescents and Young Adults. 5th International CNS Germ Cell Tumor Symposium, Columbus, Jun 8-10, 2017. *Pediatr Neurol* 01

- Oral podium presentation at the Congress of Pediatric Radiation Oncology Society Association in New York, NY, June 21-24, 2017.

Corresponding abstract:

Lo A, Laperriere N, Hodgson D, Bouffet E, Nicholson J, McKenzie M, Hukin J, Goddard K. Canadian Patterns of Practice for Intracranial Germ Cell Tumors in Adolescents and Young Adults. Congress of Pediatric Radiation Oncology Society Association in New York, NY, June 21-24, 2017.

- Poster and short oral presentation at the University of Toronto Department of Radiation Oncology Research Day, April 21, 2017.

Corresponding abstract

Lo A, Goddard K, Hodgson D, Bouffet E, Nicholson J, McKenzie M, Hukin J, Laperriere, N. Canadian Patterns of Practice for Intracranial Germ Cell Tumors in Adolescents and Young Adults.

- Oral podium presentation at the 2017 Canadian Association of Radiation Oncology Annual Meeting in Toronto, ON, Sept 13-16, 2017

Corresponding abstract:

Lo A, Laperriere N, Hodgson D, Bouffet E, Nicholson J, McKenzie M, Hukin J, Goddard K. Canadian Patterns of Practice for Intracranial Germ Cell Tumors in Adolescents and Young Adults. 2017 Canadian Association of Radiation Oncology Annual Meeting in Toronto, ON, Sept 13-16, 2017. Radiotherapy & Oncology.

- Poster presentation at the 49th Congress of the International Society of Paediatric Oncology (SIOP) in Washington, DC. Oct 12-15, 2017

Corresponding abstract:

Lo A, Hodgson D, Dang J, Tyldesley S, Bouffet E, Bartels U, Cheng S, Hukin J, Bedard P, Goddard K. A 40-Year Multi-Institutional Review of Intracranial Germ Cell Tumors in Adolescents and Young Adults. 49th Congress of the International Society of Paediatric Oncology (SIOP) in Washington, DC, Oct 12-15, 2017. *Pediatr Blood Cancer* 64(suppl 3):P-312

- Poster presentation at the Society of Neuro-Oncology Meeting in San Francisco, CA, Nov 16-19, 2017

Corresponding abstract:

Lo A, Hodgson D, Dang J, Tyldesley S, Bouffet E, Bartels U, Cheng S, Hukin J, Bedard P, Goddard K. A 40-Year Multi-Institutional Review of Intracranial Germ Cell Tumors in Adolescents and Young Adults. Society of Neuro-Oncology Meeting in San Francisco, CA, Nov 16-19, 2017. *Neuro-Oncology* 19(suppl_6):vi212-vi213

- Oral presentation at the Society of Neuro-Oncology Meeting in San Francisco, CA, Nov 16-19, 2017

Corresponding abstract:

Lo A, Hodgson D, Dang J, Tyldesley S, Bouffet E, Bartels U, Cheng S, Hukin J, Bedard P, Goddard K. A 40-Year Multi-Institutional Review of Intracranial Germ Cell Tumors in Adolescents and Young Adults. Society of Neuro-Oncology Meeting in San Francisco, CA, Nov 16-19, 2017. Neuro-Oncology 19(suppl_6):vi225-vi225

- Poster presentation at the 18th Biennial Canadian Neuro-Oncology Meeting in Banff, AB, May 10-12, 2018

Corresponding abstract

Lo A, Laperriere N, Hodgson D, Goddard K. Long-term health-related quality life in adult survivors of pediatric intracranial germ cell tumor. 18th Biennial Canadian Neuro-Oncology Meeting in Banff, AB, May 10-12, 2018. Le journal canadien des sciences neurologiques 45(S3):S1

- Poster presentation at the 2018 International Symposium on Pediatric Neuro-Oncology Meeting in Denver, CO, July 1-3, 2018

Corresponding abstract

Lo A, Laperriere N, Hodgson D, Goddard K. Long-term health-related quality life in adult survivors of pediatric intracranial germ cell tumor. 18th International Symposium on Pediatric Neuro-Oncology, Denver, June 29-July 3, 2018. Neuro-Oncology 20 (suppl_2):i88-i89

- Poster presentation at the 2018 Canadian Association of Radiation Oncology Annual Meeting in Montreal, QB, Sept 12-15, 2018

Corresponding abstract

Lo A, Laperriere N, Hodgson D, Goddard K. Long-term health-related quality life in adult survivors of pediatric intracranial germ cell tumor. 2018 Canadian Association of Radiation Oncology Annual Meeting in Montreal, QB, Sept 12-15, 2018. Radiotherapy & Oncology. 120(suppl 1): S127

- Poster presentation at the 2018 American Society for Radiation Oncology (ASTRO) Annual Meeting in San Antonio, TX, Oct 21-24, 2018.

Corresponding abstract

Lo A, Laperriere N, Hodgson D, Goddard K. Long-term health-related quality life in adult survivors of pediatric intracranial germ cell tumor. 2018 ASTRO in San Antonio, TX, Oct 21-24, 2018. Int J of Rad Onc Biol Phys 2018 Nov 1. 102 (suppl 3):e466-467-.