

# Population-based studies of brain tumor surgery: surgical outcome and prognostic factors

Akademisk avhandling

Som för avläggande av medicine doktorsexamen vid Sahlgrenska akademien, Göteborgs universitet kommer att offentligen försvaras i Arvid Carlsson, Academicum, Medicinaregatan 3, den 1a oktober, klockan 09.00

av Alba Corell

Fakultetsopponent:

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## Avhandlingen baseras på följande delarbeten

- I. Corell A, Ferreyra Vega S, Hoefling N, Carstam L, Smits A, Olsson Bontell T, Björkman-Burtscher IM, Carén H, Jakola AS. The clinical significance of the T2-FLAIR mismatch sign in grade II and III gliomas: a population-based study. *BMC Cancer*. 2020;20(1):450.
- II. Corell A, Carstam L, Smits A, Henriksson R, Jakola AS. Age and surgical outcome of low-grade glioma in Sweden. *Acta Neurologica Scandinavica* 2018;138:359-368.
- III. Corell A, Thurin E, Skoglund T, Farahmand D, Henriksson R, Rydenhag B, Gulati S, Bartek J Jr, Jakola AS. Neurosurgical treatment and outcome patterns of meningioma in Sweden: a nationwide registry-based study. *Acta Neurochir (Wien)*. 2019;161(2):333–341.
- IV. Thurin E, Corell A, Gulati S, Smits A, Henriksson R, Bartek J Jr, Salvesen Ø, Jakola AS. Return to work following meningioma surgery: a Swedish nationwide registry-based matched cohort study. *Neurooncol Pract*. 2020;7(3):320-328.

**SAHLGRENSKA AKADEMIN**  
**SEKTIONEN FÖR KLINISK NEUROVETENSKAP**  
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# Population-based studies of brain tumor surgery: surgical outcome and prognostic factors

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## ABSTRACT

Neurosurgery is the cornerstone in the treatment of a majority of brain tumors. Surgery can sometimes cure or delay tumor progression. However, surgery is associated with risks, and adequate information about the anticipated peri- and postoperative course is important for informed consent. The identification of tumor markers in a preoperative setting is beneficial in lower-grade gliomas, a heterogeneous group in terms of biological behavior where molecular markers play an important role in diagnosis and treatment. We investigated the role of the non-invasive radiological marker T2-FLAIR mismatch by means of a population-based study. The mismatch sign is highly specific for *IDH*-mutated 1p/19q non-codeleted gliomas and thus useful in the preoperative setting. We examined how age affects lower-grade glioma treatment, in addition to short-term postoperative complications. Older patients ( $\geq 60$  years) seem to tolerate neurosurgery compared with younger patients ( $< 60$  years), although a higher rate of neurological deficit occurred postoperatively. Meningioma is the most common intracranial tumor and surgery is the main treatment modality. The short-term postoperative risk for complications after meningioma surgery, both in symptomatic and asymptomatic, was studied. The complication rate in the short-term (30-day) postoperative period in Sweden lies in line with the relevant literature. Through a registry-based approach we studied the return to work long-term (up to two years) after meningioma surgery. The sick leave pattern after meningioma surgery revealed that surgery is associated with considerable risk of long-term sick leave two years after the operation as 57% in meningioma patients returned to work compared with 84% of matched controls. Risk factors for long-term sick leave were history of depression, surgical neurological deficit and higher tumor grade. The present work contributes with elucidating on a promising non-invasive radiological marker and the role of age in lower-grade gliomas, and in patients with meningioma data on the current postoperative risk after meningioma surgery and novel data with regard to return to work.

**Keywords:** Lower-grade gliomas; biomarkers; neurosurgery; segmentation; population-based; registry-based

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