

# Measuring outcomes following brain tumor surgery: A registry based approach

Akademisk avhandling

Som för avläggande av medicine doktorsexamen vid Sahlgrenska akademien, Göteborgs universitet kommer att offentligen försvaras i Carl Kylberg, Medicinarelängan 9A, den 17 Juni, klockan 13:00

av Erik Thurin

Fakultetsopponent:

Privatdozent Thomas Picht, MD, PhD

Charité, Universitätsmedizin Berlin, Tyskland

## Avhandlingen baseras på följande delarbeten

- I. Alba Corell, Erik Thurin, Thomas Skoglund, Dan Farahmand, Roger Henriksson, Bertil Rydenhag, Sasha Gulati, Jiri Bartek Jr, Asgeir Store Jakola. Neurosurgical treatment and outcome patterns of meningioma in Sweden: a nationwide registry-based study. *Acta neurochirurgica*, 2019.
- II. Erik Thurin, Alba Corell, Sasha Gulati, Anja Smits, Roger Henriksson, J Bartek, Jr, Øyvind Salvesen, Asgeir Store Jakola. Return to work following meningioma surgery: a Swedish nationwide registry-based matched cohort study. *Neuro-Oncology Practice*, 2020
- III. Erik Thurin, Isabelle Rydén, Thomas Skoglund, Anja Smits, Sasha Gulati, Göran Hesselager, Jiri Bartek Jr., Roger Henriksson, Øyvind Salvesen, Asgeir Store Jakola. Impact of meningioma surgery on use of antiepileptic, antidepressant and sedative drugs: A Swedish nationwide matched cohort study. *Cancer Medicine*, 2021
- IV. Erik Thurin, Petter Förander, Jiri Bartek Jr., Sasha Gulati, Isabelle Rydén, Anja Smits, Göran Hesselager, Øyvind Salvesen, Asgeir Store Jakola. Depression and ability to work after vestibular schwannoma surgery: a nationwide registry-based matched cohort study on antidepressants, sedatives and sick leave. *Acta Neurochirurgica*, 2021

# Measuring outcomes following brain tumor surgery: A registry based approach

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## Abstract

Meningiomas and vestibular schwannomas (VS) are generally slow-growing and benign brain tumors, with low rates of tumor-related mortality. Surgery is rarely the only viable treatment option. In cases where there is no clear difference between treatments concerning survival, it is essential for patients and caregivers to have realistic expectations of how surgery will impact “softer” outcome measures. Surgical complications, reduced ability to return to work, depression, and anxiety can all have a large impact on the quality of life for these patients. Yet the exact rates of these outcomes after surgery for meningioma and VS have received little attention and have not been established. The aim of this thesis was therefore to analyze the postoperative rate of complications, the rate of sick leave, and the use of antiepileptic, antidepressant, and sedative drugs. We have done this using a nationwide registry-based approach, comparing patients to gender and sex-matched healthy controls. No controls were used in Study I.

In **Study I**, we found that the most common short-term complications after meningioma surgery were new or worsened neurological deficits after surgery (14.8%), symptomatic hematoma (9.4%), any postoperative infection (6.4%) new-onset seizure (4.5%), and venous thromboembolism (3%). The 30-day mortality rate was 1.5%.

In **Study II**, we demonstrated that long-term sick leave is common after meningioma surgery. The rates of postoperative sick leave among the included 956 meningioma patients (aged <60) were 51% at one year after surgery and 43% at two years after surgery, while the rate for controls was stable at 14-16%.

In **Study III**, we investigated the impact of meningioma surgery on the use of antiepileptic drugs (AEDs), antidepressants, and sedatives. We found that the use of all three drug groups was elevated at the time of surgery and remained elevated two years after surgery, compared to controls, with a unique pattern for each drug group.

In **Study IV**, we investigated the rate of sick leave and the rate of antidepressant and sedative drug use for VS patients. The rates of patients on sick leave were 34% at one year after surgery and 25% at two years after surgery. The rate for controls was stable at 9-11%. VS patients did not differ significantly in use of antidepressant or sedative drugs compared to controls at two years before surgery, at index date or at two years after surgery.

In summary, we have demonstrated that meningioma surgery has a considerable impact on the rate of sick leave, use of antidepressants and sedative drugs, while this was not seen to an equal extent after VS surgery. Our results will aid caregivers and patients to better predict the clinical outcome after surgery.

**Keywords:** registry-based, neurosurgery, sick-leave, antidepressants, antiepileptic drugs

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