Inpatient Neurosurgical Mortality

General Overview

Neurosurgical inpatient mortality varies depending on patient characteristics, pathology, and surgical context.

- General neurosurgical admissions: 2.7 % 4.5 %
- Adult elective admissions (≥18 years): ~1.95 % during stay
- 30-day post-discharge mortality: +2.5 % (approx.)

Chronic Subdural Hematoma (cSDH)

Study: US national database (2016–2020, >14,000 patients age \geq 40)

- Surgical group: 3.6 % in-hospital mortality
- Medical (non-surgical): 10.9 % in-hospital mortality
- Surgery improved survival but was associated with higher complication rates.

Elderly & Frailty

- Elderly patients (≥65 years): ~4% inpatient mortality
- Frailty impact: ~63 % increased risk of death (OR 1.63)
 - Associated with:
 - 1. More postoperative complications
 - 2. Longer length of stay
 - 3. Higher discharge to rehabilitation or long-term care

High-Risk Conditions

- Severe traumatic brain injury (TBI) with ICP monitoring:
 - 1. ~29.3 % in-hospital mortality
 - 2. 69 % of deaths due to primary brain injury
- Neurosurgical healthcare-associated infections:
 - 1. ~11 % inpatient mortality

Summary Table

Clinical Scenario	Inpatient Mortality Rate
General neurosurgical admissions	2.7 - 4.5 %
Elective adult admissions	~1.95 %
Chronic subdural hematoma (surgical)	3.6 %

Clinical Scenario	Inpatient Mortality Rate
Chronic subdural hematoma (non-surgical)	10.9 %
Elderly patients (≥65)	~4 %
Severe TBI with ICP monitoring	~29.3 %
Neurosurgical infections	~11 %

▲ Key Risk Factors

- **Procedure type** (e.g., craniotomy, TBI, cSDH)
- Patient-specific risks: Age, frailty, comorbidities
- Medical complications: Especially infections
- Care setting: Neurocritical care units show better outcomes

Conclusions

- Most neurosurgical patients have low inpatient mortality (<4 %)
- Non-operative management (e.g., cSDH) or acute TBI increases risk substantially
- Frailty is a powerful predictor, often more than age alone
- In-hospital death is only part of total perioperative risk 30-day mortality adds significant burden

Germany: 2023 Inpatient Mortality Study

In a cross-sectional analysis, Kamp et al. from:

- Brandenburg Medical School Theodor Fontane, Neuruppin
- Immanuel Clinic Rüdersdorf (Palliative and Neuropalliative Care)
- University Hospitals in Heidelberg, Bonn, Jena, Essen
- European Radiosurgery Center Munich
- Witten/Herdecke University
- St. Barbara-Klinik Hamm-Heessen

published in the Neurosurgical Review Journal, analyzed 2023 in-hospital neurosurgical mortality using nationwide billing data in Germany.

- Total cases: 222,158
- In-hospital deaths: 8,338
- Overall mortality: 3.8 %
- Sex disparity: Men 4.2 % vs Women 3.3 %
- High mortality in: Traumatic and hemorrhagic conditions
- Surgical intervention mortality range: 1-9%

Study offers a national benchmark but relies entirely on administrative data.

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□ Critical Review

• Methodology fragility:

Reliance on §21 InEK billing data means:

- 1. No clinical validation
- 2. No severity or comorbidity adjustment
- 3. No timing of events

• Misinterpretation danger:

Raw mortality rates without risk stratification are misleading.

The reported sex difference may reflect unadjusted confounders.

• Incremental novelty:

Similar national audits (UK, US) already exist.

This adds little beyond local replication.

• Discussion gaps:

Authors admit no causal inference, but still present data as benchmarks.

They ignore biases like repeated admissions or misclassification.

• Logical leaps:

Quoting procedure-specific mortality (e.g. 9% for vascular cases)

without clinical context may unfairly penalize high-risk centers.

• Overstated conclusions:

Suggesting policy relevance or clinical utility is unconvincing

without proper risk modeling.

Final Verdict

Flawed epidemiological exercise. Too crude for benchmarking; lacks clinical depth; no actionable utility.

Takeaway Message for Neurosurgeons

Do **not** use raw mortality data from this study to compare providers. Instead, push for **risk-adjusted**, **registry-based outcome tracking**.

Bottom Line

An incomplete administrative snapshot. Inadequate for policy, benchmarking, or clinical decision-making.

Rating (0-10)

2/10 — Large dataset undermined by methodological and interpretative weakness.

Citation

Kamp MA, Jungk C, Schneider M, Fehler G, Santacroce A, Dinc N, Ebner FH, von Sass C, et al. **Inpatient neurosurgical mortality in Germany: a comprehensive analysis of 2023 in-hospital data.** ''Neurosurgical Review''. 2025 Jun 23;48(1):525. doi:10.1007/s10143-025-03664-1. PMID:40545502. Received: 10 Feb 2025; Revised: 19 May 2025; Accepted: 8 Jun 2025. Corresponding author: Marcel A. Kamp <marcelalexander.kamp@gmail.com>.

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