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 ≥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

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Request further breakdowns per pathology, procedure, or hospital volume? Just ask.

In a Cross-sectional analysis Kamp et al. from:

- Brandenburg Medical School Theodor Fontane, Neuruppin, Germany - Immanuel Clinic Rüdersdorf (Palliative and Neuropalliative Care), Rüdersdorf near Berlin, Germany - University Hospital Heidelberg, Heidelberg, Germany - University Hospital Bonn, Bonn, Germany - European Radiosurgery Center Munich, Munich, Germany - St. Barbara-Klinik Hamm-Heessen, Hamm, Germany - Witten/Herdecke University, Witten, Germany - Jena University Hospital, Jena, Germany - Alfried Krupp Hospital, Essen, Germany published in the *Neurosurgical Review* Journal, to establish 2023 in-hospital neurosurgical mortality rates across Germany using nationwide hospital billing data.

Germany recorded an overall 3.8 % in-hospital neurosurgical mortality in 2023 (8,338/222,158 cases), with significant gender disparity (men > women) and diagnosis-specific variance. Traumatic and hemorrhagic conditions had highest fatality, surgical intervention mortality ranged 1–9 %. The study offers a national benchmark but is limited by administrative data lacking clinical depth or causality.

- **Methodology fragility**: Reliance on billing datasets (§ 21 InEK) introduces severe bias—diagnoses and procedures are defined by coding practices, not clinical validation. No cross-checking with patient

records, no severity stratification, no time-to-event data—makes all mortality rates superficial at best. - **Misinterpretation danger**: Presenting crude mortality rates without risk adjustment (e.g. age, comorbidity, functional status) is misleading. The significant sex difference (3.3 % vs 4.2 %) could reflect confounding, not true gender effect. - **Incremental novelty**: Similar national audits exist (e.g. UK, US); this offers no new methodological or analytical insight. It merely transposes known benchmarks to Germany without advancing granularity. - **Inadequate discussion of limitations**: Authors acknowledge lack of causal inference but still present data as benchmarks. They fail to address potential misclassification or repeated admissions bias—they assume one fatal case equals one patient death. - **Logical leaps**: Highlighting procedure-based mortality (e.g., vascular reconstructions 9 %) without denominator contextualization (case complexity, emergent status) is irresponsible—it risks penalizing high-risk centers. - **Conclusions overstate utility**: The claim that this “may inform clinicians, policymakers, and patients” is hollow—administrative aggregate mortality without granularity lacks actionable inference for any stakeholder.

Final verdict

Flawed epidemiological exercise. Data too crude to serve as quality benchmark; superficial sex analysis; absent risk adjustment severely limits interpretability.

Takeaway message for neurosurgeons

Don’t use these raw mortality figures to compare providers—coding bias and missing clinical context invalidate comparisons. This study should be a starting prompt for more robust, risk-adjusted outcome registries, not a final benchmark.

Bottom line

An incomplete administrative snapshot with limited validity. Cannot support meaningful benchmarking or policy decisions.

Rating (0–10)

2/10 — large dataset but undermined by lack of clinical depth and risk stratification.

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.
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