Mortality and longevity after traumatic spinal cord injury in Switzerland from 1990 to 2011: A 21-year longitudinal study

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Understanding spinal cord injuries (SCIs)

**Spinal Cord Injury (SCI)**
- Neurological damage
- Can cause life-long motor and sensory impairment below the lesion level
- Complete or incomplete

**Traumatic Spinal Cord Injury (TSCI)**
- Caused by acute exposure to energy on the spinal cord resulting in lesion
  - E.g., Traffic accident, fall, sports-related injury
Swiss Spinal Cord Injury (SwiSCI) cohort

No registry in Switzerland for spinal cord injuries; no nationwide estimates of:
- Incidence
- Prevalence
- Mortality

Swiss Spinal Cord Injury (SwiSCI) cohort:
- Covers active specialized rehabilitation centers for spinal cord injury (SCI)
- Persons admitted for first rehabilitation at a specialized center
- 16 years and older
- Non-traumatic or traumatic spinal cord injury
Epidemiology of Traumatic SCI in Switzerland

Comparison of European Incidence Rates

- Traumatic SCI incidence rate (IR):
  - 18 per million population (admitted to specialized rehabilitation)
  - Likely underestimated
- Men at higher risk for TSCI than women
- Most TSCIs due to falls and sports/leisure-related accidents

Currently no estimates of longevity or mortality outcomes after TSCI in Switzerland

Objective

Provide estimates of longevity and mortality outcomes after TSCI in Switzerland stratified by key sociodemographic and SCI-specific characteristics.
Risk factors for premature mortality

- Time-at-risk starts with date of spinal cord injury until death or end of the study
- Flexible parametric survival model:
  - Hazard ratios (HRs)
  - Marginally-adjusted survival probabilities

Life expectancy

- Skew-normal regression:
  - Marginally adjusted LE at age 30 years
Between 1990 and 2011:
- 2’435 persons cases of TSCI
- 19’704.35 person-years (PYs) of follow-up time
- 379 deaths

In the period 2000-2011:
- Increase in the average age between decades
- More severe lesions
Risk factors for premature mortality

Older age, tetraplegia, completeness of lesion and TSCIs due to falls and other causes were associated with an increased risk of premature mortality

- No difference between males and females
- No evidence of interaction between age and cause of TSCI
  - Differentials in propensity of mortality according to etiology
- Interaction between lesion level and completeness
  - Synergistic effect representing joint influence
With increasing time since injury, discrepancy in survival also increases

- TSCI is a livable condition, but with cumulative wear-and-tear
  - Physical
  - Mental
- Suggests an accumulation of mortality risk related to SCI characteristics
  - Secondary health conditions
  - Changes in immune system
  - Accelerated aging
- Can help to identify modifiable risk factors
With an attained age of 30 years...

- The general population [GP] has an average of 53.2 life years [LYs] remaining (2011).
- Estimated remaining LYs consistently less than that of the GP; 10-20 years.
- The largest divergence observed for tetraplegic and complete lesions.
Population-based study (SCI-specialized rehabilitation)

Follow guidelines for stratification
- To facilitate comparisons with other studies

Comprehensive update of vital status (see poster #4423)
- Inverse-probability weights to limit bias due to loss to follow-up

No information on cause of death (CoD)
- Linkage with the SNC to obtain this information is ongoing (SNSF funded project)

Incomplete data on factors contributing to risk of premature mortality (e.g., comorbidities and associated injuries)
- CoD can help to draw inference on underlying contributing factors
**Disparities in mortality and life expectancy according to SCI-specific characteristics**

- Need to identify modifiable, contextual factors that contribute to these risk differentials
- Analysis of cause-specific mortality can help to offer insight into health conditions influencing disparities