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Risk factors for In-Hospital Mortality in Cervical Spinal Cord Injuries: a nationwide, cross-sectional analysis of concomitant injuries, comorbidities, and treatment strategies in 4,008 cases

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Background: Cervical spinal cord injuries (CSCIs) present challenges with potential severe neurological complications. Despite advances in care, in-hospital mortality remains a concern.

Research question: This study explores the impact of patient-related factors and therapeutic strategies on in-hospital mortality in individuals with CSCIs.

Design: In this cross-sectional study (2019–2021), we utilized data from the German Diagnosis Related Groups system to analyze main diagnoses, patient demographics, concomitant diagnoses (ICD 10), and procedures (OPS). Data specific was extracted from the German InEK GmbH database.

Methods: Differences in comorbidities and injuries were analyzed using the Chi-square test. Odds ratios (OR) were used to analyze potential risk factors for in-hospital mortality.

Results: In the analysis of 4,008 hospital admission cases, an in-hospital mortality rate of 8.9% (n=355) was observed. The patient cohort demonstrated a male predominance at 72.8%, with a higher male mortality rate (n=257, 72.4%). 64.01% of the patients were aged over 60 years and they presented a significant risk factor for increased mortality (OR 1.95; $p<0.001$). Vertebral fractures at the levels C5 and C6 were the most common concomitant spinal injuries (0.16%), while concomitant fractures at C1 and C2 were associated with a significant risk for mortality (OR 3.05, $p<0.001$; OR=2.45, $p<0.001$). Pneumonia occurring after 48 hours of hospitalization was associated with an increased risk (OR 2.03, $p>0.001$). Additional traumatic subdural hemorrhage occurred in 0.2% of cases, correlating with elevated mortality (OR 2.21, $p=0.01$). 55.9% of cases underwent operative intervention, with the remainder opting for conservative management.

Discussion: Concomitant injuries and comorbidities indicating frailty and medical complications increase in-hospital mortality risk. The study highlights the need for thorough health assessments in patients CSCIs, encouraging personalized and optimized treatment strategies.