

# Elderly and Mild Brain Trauma: Future Directions for Research Studies

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The world population is aging. It is estimated that almost two billion people will be older than 60 years by 2050 [1]. In the USA, in 2030 one in five residents is expected to be 65 years or older with a projection to doubling the current number in 2050 [2].

As direct consequence, geriatric trauma is increasing both in absolute number and in proportion of annual admissions causing a challenge for the health care system worldwide.

Traumatic brain injury (TBI) represent a major cause of mortality and morbidity which involves globally more than 10 million individuals annually [3].

Since TBI used to be prevalent in young people, nowadays we are witnessing in a shift in the epidemiology of TBI towards elderly. This is the result of mainly two factors: first, the aging of population as seen above; second, the decrease of traffic accidents due to the improvement of traffic safety which allowed falls to become the most important cause of TBI. And falls account for over 65% of TBI-related hospital admissions in elderly [4].

Epidemiological studies show that the majority of TBI in older patients is mild with an incidence ranging from 60 to 80% [5].

Mild TBI (mTBI) is defined by the Neurotraumatology Committee of the World Federation of Neurosurgical Societies as a head injury presenting with initial Glasgow Coma Score (GCS) of 14 or 15.

This cohort of patients represents a challenge for clinicians because of the unique physiologic and clinical factors, including frailty, chronic health diseases and polypharmacy, which make them more prone to primary and secondary injury following TBI, regardless of severity.

Despite what was discussed above, the researcher in the last 15 years do not seem to have found interest in exploring a common address for management of mTBI in the elderly.

In 2004, the World Health Organization (WHO) instituted a task force on mTBI with the scope of finding methodological issues and research recommendations. After 10 years, the main research priorities included focus on the elderly and the development of validated clinical prediction rules for prognosis [6].

In 2015, the American Association for Surgery of Trauma performed a member survey disclosing that 65% of the participants thought that geriatric trauma patients are undertriaged and not transferred appropriately to higher levels of care. Reported concerns were the lack of uniformly accepted protocols, primarily for mTBI [7].

More recently, a group from University of Cambridge completed an extensive epidemiologic literature review with the conclusion that though increased admissions of elderly patients following TBI there was little or no evidence of corresponding increase of age of patients recruited for TBI in studies around the world [8].

Finally, in a large cohort study including about 6000 mTBI older patients, Cheng et al. concluded that mTBI is an independent significant risk factor of death in the elderly and emphasized the need for head injury prevention and research [9].

With awareness that both Emergency and Neurosurgery Departments are everyday in challenge with the management of TBI in elderly, recently, our group performed a literature review trying to delineate the concerns behind this management and to elaborate some practical evidence-based guidelines for help [10].

Results are quite disappointing: most of the literature has a low level of evidence.

From our review emerged that the majority of mTBI in the population over 65 years old is still undertriaged, and medical or surgical treatment are often delayed or avoided due to the advanced age.

This despite evidence suggests that outcome may be improved with more invasive monitoring, aggressive care and specialized rehabilitation. Also, for patients who need neurosurgical intervention, evidence that craniotomy will negatively affect outcome is lacking. When operated, mTBI elderly patients show a more favorable outcome than who do not undergo surgery.

Our review supports the idea that age should not be the sole factor for limiting care in mTBI patients.

Other important shortcomings evidenced by our work are the absence of specific guidelines for elderly, although mild brain trauma in aged people is far different from younger patients, and the lack of studies that correlate polypharmacy or comorbidities with outcome. This is especially true for anticoagulation/antiplatelet therapy which is an independent risk factor for both immediate and delayed intracerebral hemorrhage, and it is significantly associated with worse outcome and higher mortality. From the literature review emerged an ongoing debate on the management of these patients without reaching a useful solution, and also no clear indications are detailed on when to restart anticoagulation/antiplatelet medications if discontinued after a mTBI.

Assuming that life expectancy is constantly increasing as well as the world population over the age of 65 years, reduction in mortality and morbidity should be the aim of managing patients with TBI in this cohort. Since severe TBI still represents a challenge in both young and older people, current outcome data from mTBI in elderly show a condition that cannot be sustained in the future by families, society, and health care systems.

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There is a strong need for more research on geriatric mTBI addressed to prevent falls, to reduce the impact of polypharmacy, and to define specific management strategies based on the identification of patients who have chance of unfavorable outcome despite of mild trauma.

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