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Research Paper

Epidemiological, Clinical and Prognostic Profiles of Traumatic Brain Injury Patients in the Intensive Care Unit B of Hassan II Hospital of AGADIR

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Abstract :
Background: Severetraumaticbraininjury (TBI) remains a major cause of morbidity and mortalityworldwide, particularlyamongyoungadults. The management of these patients iscomplex, requiringmultidisciplinaryapproaches and rapiddecision-makingbased on clinical and radiologicalindicators.Objectives: This studyaims to describe the initial hemodynamic, respiratory, and radiologicalcharacteristics, the surgical and clinical interventions, and the prognosticoutcomes of patients admittedwithsevere TBI.Methods: A retrospectiveobservationalstudywasconductedanalyzing patients withsevere TBI. Weassessedhemodynamic and respiratoryparameters at admission, radiologicalfindings, surgical interventions, and clinicaltreatments, and evaluated patient outcomesincluding Glasgow OutcomeScale scores and mortality at day 28 post-trauma.Results: The studyhighlightedfrequent hypotension (27.4%) and tachycardia (average HR 101 bpm) on admission. Respiratorydistresswaspresent in 23.29% of patients. CT imagingrevealed a high prevalence of cerebral contusions (86.3%) and cerebraledema (39.06%). Only 12.5% of patients underwentsurgical intervention, predominantly by neurosurgeons (98.63%). Sedationwasadministered in 77% of cases, vasoactive drugs in 45.1%, mechanical ventilation in 73.8%, and tracheostomy in 35.92%. On day 28, 39.1% of patients hadsignificantrecovery, 32.1% weredischarged home, 42.9% weretransferred to other services, and 25% haddied.Conclusion: The findingsemphasize the importance of earlyassessment and individualized management strategies in severe TBI. Prehospital care protocols, accurateclinical and radiologicalassessments, and timely interventions are critical in optimizingoutcomes. The studyadvocates for enhancedprevention of secondary complications, particularly infections and nutritionaldeficiencies.

Keywords: *Severetraumaticbraininjury, hemodynamicparameters, CT scan, neurosurgery, mechanical ventilation, sedation, prognosis, Glasgow OutcomeScale, mortality, ICU stay*

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I. Introduction

The impact of severetraumaticbrain injuries (TBI) on public healthisconsiderable. These injuries, oftencaused by road traffic accidents, falls, or assaults, can lead to long-term complications, affectingindividuals' quality of life and placing a significantburden on healthcaresystems. Hassan II Hospital, as a leadingmedical institution, isfrequentlyinvolvedin the management of patients withsevere TBI. It istherefore essential to understand the prognosticfactorsassociatedwiththese injuries in order to guide clinical management and optimize patient outcomes. In thiscontext, the objective of ourstudyis to identify the epidemiological, clinical, and prognostic profiles of patients with TBI admitted to the ICU B of Hassan II Hospital in Agadir. This studyis part of a broader initiative to improve the quality of care provided to patients, with the ultimate goal of enhancingbothsurvival and quality of life.

II. Materials and Methods

This is a retrospective, cross-sectional, descriptive studyconducted in the ICU B of the regionalhospital center Hassan II of Agadir over a two-yearperiod, from March 2021 to August 2023. Our study population consisted of 65 patients, including all individualswithsevere TBI admitted to ICU B. Weincluded all cases of

isolatedhead trauma as well as thoseassociatedwithother injuries. For each patient, weanalyzedepidemiological, clinical, biological, radiological, and therapeuticcharacteristics.

III. Results

In our study, weobserved a pronouncedgenderdisparityamong patients withsevere TBI, with males representing 93.15% of the sample. This male predominancemay have implications in analyzingprognosticfactors and deservesfurther investigation.

The meanage of patients was 33.5 years, rangingfrom 6 months to 68 years. This agevariabilityindicatesthatwhileyoungadults are mostfrequentlyaffected, severe TBI is a health issue thattranscendsageboundaries.

Regarding the circumstances of the trauma, 68.49% of cases were due to road traffic accidents. Falls and assaultswerealso notable causes, accounting for 24.66% and 6.85% of cases, respectively. Thesefindings are crucial for understanding the mostcommoncontexts in whichTBIsoccur and can inform future prevention and intervention strategies.

From a neurologicalstandpoint, weobservedsignificant variations in the initial Glasgow Coma Scale (GCS) scores of the patients. A notable proportion (43.55%) presentedwith a GCS score below 8, indicatingseverebraininjury and raising important considerations for the complexity and intensity of care required. On the other hand, 24.19% had a GCS score between 8 and 13, reflectingmoderateinjuryseverity. Patients in thisintermediate range maypresent distinct clinical challenges and care needs. Finally, 32.26% of patients had a GCS score between 14 and 15, suggestingmild or no braininjury, whichmay have favorable implications for prognosis and recovery.

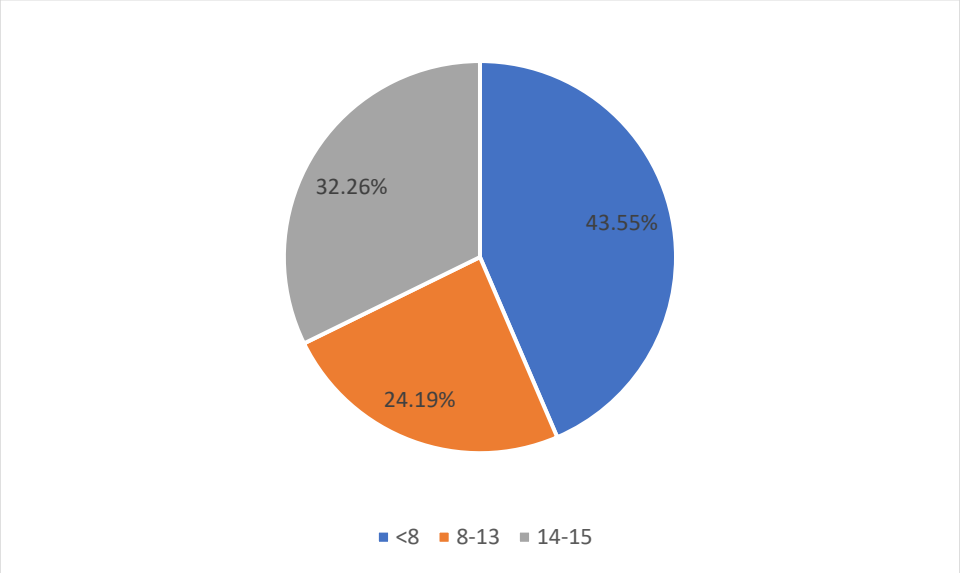

Figure 1 : GCS score of patients

Pupillary and Initial PhysiologicalAssessment

Pupillaryassessmentalsorevealed distinct trends. A majority of patients—60.93%—presentedwithsymmetricallyreactivepupils, a findinggenerallyassociatedwith a more favorable prognosis. However, pupillaryabnormalitieswereobserved in a significantnumber of cases: 20.31% exhibitedmiosis, 6.25% mydriasis, and 12.5% anisocoria. Theseabnormalitiesmayindicatespecificcerebrallesions and have important implications for clinical management and patient prognosis. Thesefindings highlight the diversity of clinicalpresentations in patients withsevere TBI and underscore the need for individualizedevaluation and management to optimizeclinicaloutcomes.

Hemodynamic Profile at Admission

Initial hemodynamicassessmentsalsorevealedsignificant variations. Blood pressure (BP) measurementsshowedwidevariability, with 27.40% of patients presenting a BP of 90/60 mmHg, the mostcommon value observed. This suggests a trend towardarterial hypotension in a subset of patients, potentiallyindicatingshock or associated complications that warrant immediate attention and intervention. Additionally, the averageheart rate (HR) was 101 beats per minute. This elevated HR mayreflect a compensatoryresponse to acute stress or injury, a factor that must beconsidered in the immediate management

and stabilization of patients withsevere TBI. Thesehemodynamic observations are critical for establishing effective early and ongoing management strategies, as theyplaya key role in patient prognosis and guide clinical interventions aimed at stabilization and recovery.

RespiratoryAssessment

Regarding the initial respiratorystatus, relevant data werecollected to assess patients upon admission. The averageoxygen saturation (SpO2) was 98%. Despitethis high average, considerablevariability in individual values wasnoted, suggestingthatsome patients may have experiencedepisodes of hypoxia or hyperoxia—both of which can significantly impact prognosis. Furthermore, the majority of patients (76.71%) showed no signs of respiratorydistressupon admission, a reassuring indication of initial respiratorystability. However, 23.29% of patients didpresentsigns of respiratorydistress. This finding warrants particular attention, as respiratorydistress can be an earlyindicator of imminent complications and maysignificantly influence the clinical course and outcome in severe TBI patients. Theserespiratoryparameters are of critical importance in the initial evaluation and management of patients, guiding prompt interventions to ensureadequateoxygenation and preventsecondary complications such as hypoxia.

CT Scan Findings

Whenexaminingpredominant CT scan findings, several key observations emerged. An extradural hematoma (EDH) wasfound in 9.59% of patients, with an equivalent percentage presentingwith acute subduralhematoma (ASDH). Theseserious complications oftenrequire urgent intervention to preventneurologicaldeterioration and improveoutcomes. Cerebral contusions weresignificantly more frequent, affecting 86.30% of the patients. This type of lesion, common in head trauma, may have variable prognostic implications depending on severity and extent. Cerebraledemawaspresent in 39.06% of cases, while 60.94% of patients did not exhibitthis complication. The incidence of cerebraledema highlights the risk of secondaryinjury and worsening of the initial trauma, requiringcareful management to reduceitsnegative impact on neurological and functionaloutcomes. Theseimagingfindingsprovide a detailed perspective on the lesion types associatedwithsevere TBI and can guide treatmentprotocols and management strategies to maximize positive outcomes and reduce complications.

Surgical Interventions

In terms of surgical interventions, a small proportion of patients (12.5%) requiredsurgicalreferral, reflecting the severity of their condition and the urgent need for operative management to mitigaterisks and improveprognosis. Amongthese patients, the vastmajority (98.63%) werereferred to neurosurgery, highlighting the predominantlyneurological nature of the injuries and complications in ourstudy. Only 1.37% of patients werereferred to orthopedic trauma surgery, indicating the predominance of neurotrauma over other types of traumaticinjury in thiscohort. This highlights the complexity and diversity of surgicalneedsamong patients withsevere TBI and underscores the critical importance of a multidisciplinary team capable of addressing a wide range of complications and injuries to improveoutcomes.

Clinical Management

Patient management in ourstudyrevealed distinct trends in clinical interventions. A significantmajority of patients (77.0%) receivedsedation, reflecting the severity of brain injuries and the need to control pain, anxiety, and potentiallyharmfulphysiologicalresponses. In contrast, 23.0% of patients weremanagedwithoutsedation. Regarding vasoactive drug use, 54.9% of patients did not requiresuch agents, while 45.1% did, indicating the need to support cardiovascularfunction and cerebral perfusion in a substantial portion of cases. Mechanical ventilation wasnecessary in 73.8% of patients, underlining the respiratory challenges oftenencountered in severe TBI. Conversely, 26.2% of patients did not requirethis intervention. In terms of blood transfusions, 81.0% of patients did not require transfusion, whereas 19.0% did—suggestingepisodes of significantbloodloss or hemodynamic compromise. Tracheostomywasperformed in 35.92% of cases, primarily for prolongedventilatory support. The main indication for tracheostomywasweaningfrommechanical ventilation (90.0%), followed by neurologicalprognosis (5.0%) and otherreasons (5.0%). These figures reflect the wide range of therapeuticneedsthat must beaddressedthroughpersonalized care to optimizeclinicaloutcomes.

Prognosis

Variousoutcomeswereobservedamong patients withsevere TBI in ourstudy. At Day 28 post-trauma, 39.1% of patients hada Glasgow OutcomeScale (GOS) score of 15, indicatingsignificantrecovery. This findingis essential for evaluating the effectiveness of clinical interventions and the patients' resilience in the face of such injuries. The averagelength of stay in the ICU wasapproximately 20 days, reflectingboth the severity of the

trauma and the time needed for stabilization and recovery. This prolonged ICU stayunderscores the complexity and seriousness of the cases managed. Regardingdischargeoutcomes, 42.9% of patients weretransferred to otherdepartments for continued care. This high proportion of transfers highlights the need for specializedresources and follow-up care. About one-third (32.1%) of patients recoveredsufficiently to return home—an encouragingresultthatdemonstrates the potential for recoveryeven in severe cases. However, a soberingoutcome of ourstudywasthat 25% of patients diedfromtheir injuries or associated complications, a solemnreminder of the critical nature of severe TBI and the urgent need for continuedresearch and intervention to improveoutcomes in thisvulnerable population.

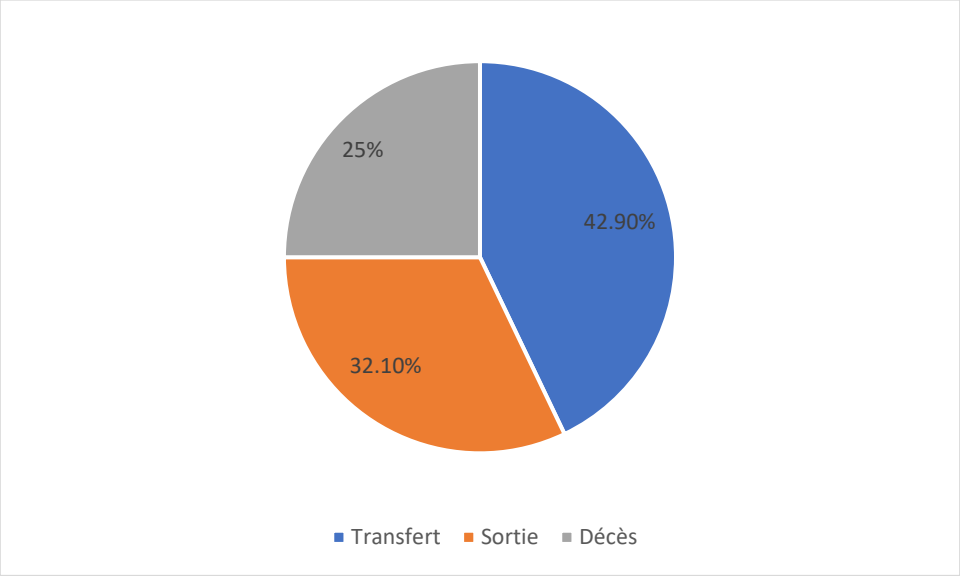

Figure 2 : Prognosis of patients

Eachprognosticelementprovides insight into the challenges and opportunitiesassociatedwith the management of severetraumaticbrain injuries (TBI), and serves as a foundation for improved intervention and management strategies to optimize patient outcomes.

IV. Discussion

In ourstudy, weobserved a significant male predominanceamong patients withsevere TBI, with males accounting for 93.15% of the sample. Existingliterature supports this trend, suggestingthat men are approximately 40% more likely to sustain a TBI (1). A specificstudy (2) conducted in Qatar foundthat 90% of patients hospitalizedwithsevere TBI over a five-yearperiod (2014–2019) were men. Furthermore, anotherstudy (3) identified patient gender as an important determinant of outcomes in severe TBI and exploredsex-relateddifferences in epidemiological, clinical, treatment, and mortalitycharacteristicsrelated to TBI. An Austrianstudy (4) alsoinvestigatedgenderdifferences in outcomesfollowingsevere TBI, suggestingthatfemalegendercouldbe an independentrisk factor for unfavorableoutcomesafter TBI.

Regarding patient age in ourstudy, the meanwas 33.5 years, whichalignswith the identification of middle-agedindividuals as frequentlyaffected by severeTBIs. Severe TBI is a health issue thattranscendsagebarriers, as shown by the agevariability (6 months to 68 years) in oursample.

In terms of trauma circumstances, wenotedthat 68.49% were due to road traffic accidents, whilefalls and assaultsaccounted for 24.66% and 6.85% of cases, respectively. The prevalence of road traffic accidents as the leading cause of severe TBI is an area thatcouldbenefitfromfurther investigation, particularly to develop effective prevention and intervention strategies.

In ourstudy, weobservedsignificant variations in the Glasgow Coma Scale (GCS) scores among patients withsevere TBI. According to the standard GCS classification, a score below 8 indicatesseverebraininjury, a score between 9 and 13 indicatesmoderateinjury, and a score between 14 and 15 indicatesmild or no braininjury (5). Thus, our observations reveal a notable distribution of braininjuryseverityamong patients, with 43.55% presentingwithseverebraininjury, 24.19% withmoderateinjury, and 32.26% withmild or no injury.

This distribution may have important implications for clinical management and patient prognosis. Patients with a GCS score below 8 oftenrequire more intensive care and presentconsiderableclinical challenges due to the severity of theirbraininjury. On the other hand, patients withintermediate or higher scores may have

differentclinicalneeds and challenges and generally a betterprognosis. Accurate identification of braininjuryseverityusing the GCS is crucial to guide clinical management and predict patient outcomes (6,7).
It has also been notedthatmild GCS scores (13–15) can sometimesunderestimate the severity of radiological injuries, as observed in a study (8) where 42% of childrenwithmild GCS scores hadserious to critical structural brain injuries. This underscores the need for comprehensiveclinicalevaluation in addition to the GCS for accurateassessment of TBI severity.
Our findings are consistent with a study (9) thatalsoexamined the distribution of GCS scores in a tertiary trauma center, althoughspecificdetails of the distribution were not provided in the availableexcerpt. These observations highlight the importance of understanding GCS score distribution and its implications for clinical management and prognosis in ourhospital setting.
Pupillaryassessment in ourstudyrevealed a majority of patients (60.93%) withsymmetricallyreactivepupils, oftenassociatedwith a more favorable prognosis. On the other hand, pupillaryabnormalitiessuch as miosis (20.31%), mydriasis (6.25%), and anisocoria (12.5%) wereidentified, whichmayindicatespecificbrain injuries and have significant implications for clinical management and prognosis.
Pupillaryreactivityassessmentis a standard component of neurologicalevaluation in patients withsevere TBI. This evaluationistypicallyperformedusing a manual light source, althoughinterpretation of the resultsmaybe subjective. Automatingpupillometry can offer more accurate and reproducibleassessments (10). Abnormalpupillaryresponses or pupil size (anisocoria) are oftenassociatedwithneurologicaldeterioration and correlatewithpoorneurologicalprognosis (11). For instance, abnormalpupillaryreactivity can be an earlyindicator of increasedintracranial pressure, whichiscommonaftersevere TBI and maybeassociatedwithunfavorableoutcomes (12).
The NeurologicalPupil index (NPi), derivedfromautomatedpupillometry, has been explored to assessneurologicalprognosisaftersevere TBI. One study (13) foundthatearlyassessment of NPi values couldpredictneurologicaloutcomesfollowingsevere TBI.
Our findingsalignwiththesestudies, highlighting the diversity of clinicalpresentationsamong patients withsevere TBI and the importance of carefulpupillaryevaluation. The pupillaryabnormalitiesidentified in oursample, such as miosis, mydriasis, and anisocoria, mayindicatespecificbrain injuries and have implications for clinical management and prognosis. These data underscore the need for individualizedevaluation and management to optimizeclinicaloutcomes in patients withsevere TBI.
Initial HemodynamicFindings Weobservedsignificant variations in the initial hemodynamicparametersamong patients withseveretraumaticbraininjury (TBI). Blood pressure (BP) wasrecorded at 90/60 mmHg in 27.40% of patients, representing the mostcommonlyobservedmeasurement. This tendencytowardarterial hypotension maybe a criticalindicator of shock or otherassociated complications, requiringimmediate attention and intervention. Furthermore, the averageheart rate (HR) was 101 beats per minute, whichmayreflect a compensatoryresponse to acute stress or the injuryitself. Thesehemodynamicfindings are crucial for developingboth initial and ongoing management strategies.
Managing patients withsevere TBI requirescareful attention to hemodynamicparameters. Hypotension and hypoxia are twoeventsassociatedwithsecondarybrain injuries, emphasizing the importance of maintainingadequatecerebral perfusion to avoidfurther damage (14,15). Hypotension, in particular, mayindicate a state of shockrequiringimmediate intervention to preventserious complications such as hemorrhage, multi-organdysfunction, and cardiopulmonaryarrest (16).
Earlyhemodynamic variations followingsevere TBI mayalsobeassociatedwithsystolicdysfunction, although the exact relationship has not been fullyexplored (17). The elevatedheart rate observed in ourstudymayreflect a compensatoryresponse to acute stress or injury, a factor thatshouldbeconsidered in immediate management and patient stabilization. Thesefindingsunderscore the importance of precisehemodynamicassessmentearly in the care of severe TBI patients and the need to adaptclinical interventions based on initial parameters to optimizeoutcomes.
Initial RespiratoryParameters Weexamined the initial respiratoryparameters of severe TBI patients at the time of admission. The averageoxygen saturation (SpO2) was 98%, althoughconsiderable variation wasobserved, suggestingthatsome patients may have experiencedepisodes of hypoxia or hyperoxia. Additionally, 76.71% of patients did not presentwithrespiratorydistressupon admission, while 23.29% did show signs of respiratorydistress, necessitating close attention.
Respiratory management iscritical in patients withsevere TBI. Observational data suggestthatthese patients oftenreceivehigher tidal volumes and lowerlevels of PEEP (positive end-expiratory pressure) than non-neurological patients, yettheyrequire longer durations of mechanical ventilation and exhibithigher rates of hospital-acquiredpneumonia, tracheostomy, and mortality (18). The primary objective of respiratory management is the prompt prevention and control of intracranial hypertension and secondarybrain injuries, as well as ensuringadequateoxygendelivery to injuredbrain tissue (14).

Prehospital management of severe TBI shouldadhere to Advanced Trauma Life Support (ATLS) principles, maintainingoxygen saturation and blood pressure withintarget ranges (19). Pathophysiologicalmechanisms, such as sympatheticstorm, maycontribute to respiratory complications seen in brain injuries, whereimmediatesympatheticdischargeoccursafter trauma, leading to elevated plasma adrenalinelevels (20).

Our findings on initial respiratorystatusalignwiththis information, indicatingthatwhilemost patients did not exhibitrespiratorydistress at admission, a notable proportion did, requiringcarefulevaluation and management. Variations in oxygen saturation values also highlight the need for continuous monitoring and appropriate management to preventepisodes of hypoxia or hyperoxia, both of which can have significantprognostic implications. Theserespiratory data are critical for the initial assessment and management of patients, guidingimmediate interventions to ensureadequateoxygenation and preventsecondary complications.

RadiologicalFindings In ourstudy, weexaminedpredominant CT scan findingsamong patients withsevere TBI. Epiduralhematomas (EDH) and acute subduralhematomas (ASDH) werepresent in 9.59% of patients, whilecerebral contusions affected a large majority of the sample (86.30%). Cerebraledemawasidentified in 39.06% of patients.

Computedtomography (CT) is essential for guiding the management of TBI by identifyingintracranialpathological conditions. It is crucial for initial triage and monitoring, allowing for rapiddetection of primary and secondary injuries requiringneurosurgical intervention (21). In severe TBI, CT and MRI are used to assessserious complications such as skull fractures, intracranialhemorrhages, and cerebraledema (22).

Regardinglesiondetection, one study (23) showedthat CT identifiedlesions in 68% of cases, while MRI detected 54%, highlightingCT'ssensitivity in detectingtraumatic injuries. Anotherstudy (24) foundthat 80.1% of cases had CT abnormalities, reflecting the prevalence of craniallesionsalsoobserved in ourstudy.

CT findings can also have prognostic implications. A study (25) examined scans from 72 severe TBI patients to determinewhether the type, location, or size of lesionscorrelatedwithneurologicalfunction changes, patient outcomes, or catecholaminelevels. Lesionswereclassified as focal or diffuse, underlining the importance of radiologicalevaluation in the prognosis and management of severe TBI.

These CT scan findingsenhanceourunderstanding of the types of injuries associatedwithsevere TBI in this population and may guide treatmentprotocols to maximize positive outcomes and minimize complications. The high prevalence of cerebral contusions and edema in oursampleemphasizes the importance of carefulevaluation and management to minimizenegative impacts on neurological and functionaloutcomes.

Surgical Interventions In ourstudy, only 12.5% of patients withsevere TBI requiredsurgical intervention, underlining the severity of their condition. The vastmajority of thesesurgeries (98.63%) wereperformed by neurosurgeons, highlighting the predominance of neurological complications associatedwithsuch injuries. This trend alignswithexistingliterature. For instance, a population-basedstudy (26) revealedthat 27% of patients with CT-identifiedlesionsrequired one or more emergency neurosurgicalprocedures.

Available data suggestthatapproximately 10–15% of severe TBI patients presentwith injuries requiringspecialized care, mainly in intensive care units (ICU), and thisoftenincludes a combinedmedical-surgicalapproach, eventhough the scientificevidencesupportingmost interventions remainslimited (27). In the U.S., around 100,000 patients annuallyrequireneurosurgicalevacuation of an intracranialhematoma due to severe TBI (28).

Surgical intervention is a crucial aspect of severe TBI management, especially for substantialintracranialhematomasthatrequireevacuation. Literaturealsosuggeststhat all patients with CT-identifiedtraumaticbrain injuries undergosurgeryregardless of their Glasgow score, and the preferredsurgicalapproach for acute subduralhematomaiscraniotomy, with or withoutboneflapremoval or duraplasty (29).

Surgical management of severe TBI patients isprimarilycarried out by neurosurgeons due to the nature of the lesions and complications. This is consistent withourfindingthat the majority of surgical interventions in ourstudywereperformed by neurosurgeons. Only a small proportion of patients werereferred to a trauma surgeon, reflecting the predominance of neurological over other types of traumatic injuries in ourstudy. The complexity and diversity of surgicalneedsamongsevere TBI patients underscore the critical importance of a multidisciplinary team capable of addressing a wide range of complications and injuries to improve patient outcomes.

Clinical Interventions A large number of patients in ourstudyrequiredspecificclinical interventions to manage complications associatedwithsevere TBI. Sedationwasadministered to 77.0% of patients, likelyreflecting the need to control pain, anxiety, and adverse physiologicalreactions. Research (30) supports general and neuro-specific indications for sedation in patients with acute brain injuries. Vasoactive drugswereadministered to 45.1% of patients, possibly to support cardiovascularfunction and cerebral perfusion, consistent withstudies (31) citing the use of phenylephrine or norepinephrine for blood pressure support post-TBI.

Mechanical ventilation wasrequired for a significantmajority of patients (73.8%), whichalignswithliterature (32) indicatingthat TBI patients oftenneed invasive mechanical ventilation, posing unique clinical challenges. Regardingblood transfusion, 19.0% of patients received transfusions, potentially due to significantbloodloss or otherhemodynamic issues requiring intervention. Lastly, tracheostomywasperformed in 35.92% of patients, possiblyreflecting a prolongedneed for respiratory support.

Theseclinical intervention data highlight the complexity and variety of care required in severe TBI cases. Theyalsoemphasize the need for robustclinicalprotocols and multidisciplinary teams to optimize patient management and improveoutcomes. Compared to existingliterature, our rates of interventions such as sedation and mechanical ventilation appear consistent with trends observed in severe TBI management.

OutcomesIn ourstudy of patients withsevere TBI, weobservedvariousprognosticoutcomes. At day 28 post-trauma, 39.1% of patients achieved a Glasgow OutcomeScale (GOS) score of 15, indicatingsignificantrecovery. Literature shows thatprognostication of severe TBI outcomesis essential but challenging due to the heterogeneity of the condition (33). Our significantrecovery rate is a key indicator for assessing the effectiveness of clinical interventions and patient resilience.

The average ICU stay in ourstudywas about 20 days. This extended ICU stayreflects the complexity and severity of cases managed, in line withliteraturesuggestingthatsevere TBI is a major cause of mortality, long-termdisability, and cognitive impairment, oftenrequiringprolonged intensive care (34).

Regarding patient outcomes, 42.9% weretransferred to otherdepartments for continued care, highlighting the need for resources and specialized care to manage ongoing complications and needs. Prior studies have alsoassessedfunctionaloutcomesduring the first yearaftermoderate to severe TBI, emphasizing the importance of evaluating major life functions at various post-trauma intervals (35).

About one-third, or 32.1%, of patients recoveredsufficiently to return home, an encouragingoutcomethatreflects the recoverypotential of a significant portion of patients despite the severity of their injuries. Prospective longitudinal studies (36) on long-termoutcomes in severe TBI remainlimited, but they highlight the importance of clinical interventions and continued care to improve patient prognosis.

However, a grimoutcome in ourstudywasthat 25% of patients diedfromtheir injuries or complications. This mortality rate alignsvariablywithexisting data. One study (37) reported in-hospital and six-monthmortality rates of around 15% and 20%, respectively, in severe TBI patients treated in ICUs. Another article reportedmortality rates rangingfrom 30% to 40% in severe TBI cases (38). In resource-limited settings, a study (39) showed a mortality rate of 33.0%, withmostdeathsresultingfromseverehead trauma. Severe TBI remains a significant cause of morbidity and mortality, especially in youngadults. The challenge of evaluating long-termneurologicaloutcomesaftersuch injuries isoftencharacterized by uncertainty, underscoring the urgent need for ongoingresearch and interventions to improve patient outcomes (40).

V. Conclusion

The clinicalfindings at admission in ourcohortagain highlight the urgent need to establish a prehospital care strategy for trauma patients to improveprognosis. Beyond the initial difficulties, the concerningmorbidity and mortality rates underscore the importance of ourstudy, advocating for the implementation of strategiesaimed at improving care, particularly in the prevention of infectious and nutritional complications.

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