Unos 50
millones de
personas al año
tiene un evento
de daño cerebral
traumático

Clasificación:

- Trauma cerrado
- **X** Trauma penetrante
- **X** Explosión

Sintomatología diversa



Daño primario:
 Focal (fractura, hemorragia, necrosis, etc).
 Difuso (aceleración y desaceleración: daño axonal, en oligodendrocitos y vascular, edema e isquemia)

Daño secundario:

Excitotoxicidad

Disf. Mitocondrial

Estrés oxidativo

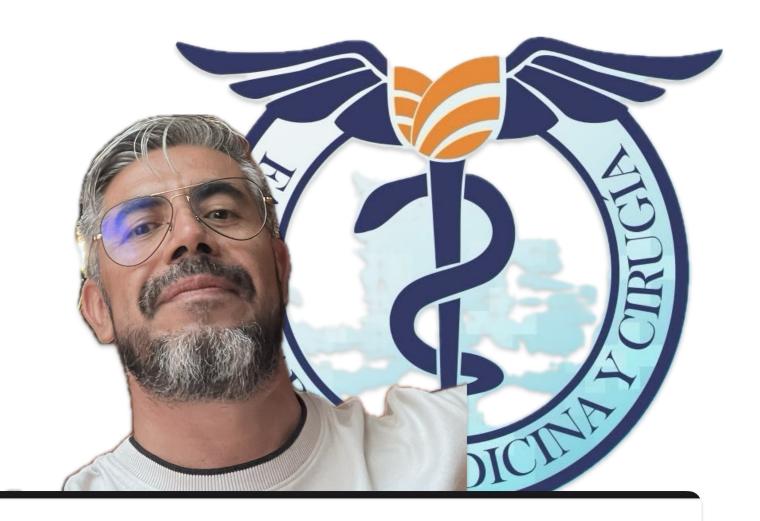
Peroxidación lipídica

Neuroinflamación

Degeneración

axonal

Apoptosis





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Traumatic Brain Injuries: Pathophysiology and Potential Therapeutic Targets

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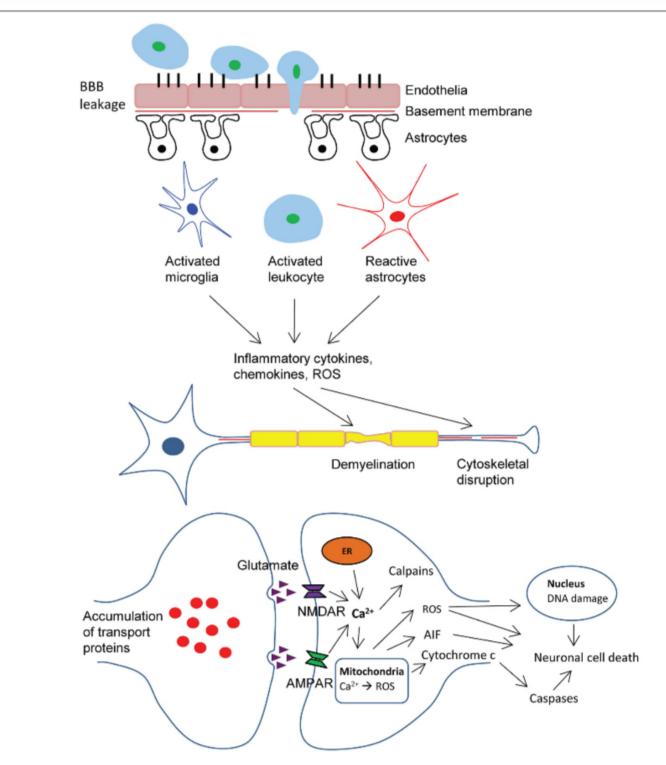


FIGURE 1 | Schematic representation of pathophysiology of traumatic brain injury (TBI). BBB dysfunction caused by TBI insult allows transmigration of activated leukocytes into the injured brain parenchyma, which is facilitated by an upregulation of cell adhesion molecules. Activated leukocytes, microglia and astrocytes produce ROS and inflammatory molecules such as cytokines and chemokines that contribute to demyelination and disruption of axonal cytoskeleton, leading to axonal swelling and accumulation of transport proteins at the terminals, hence compromising neuronal activity. Progressive axonal damage results in neurodegeneration. In addition, astrogliosis at the lesion site causes glial scar formation, which creates a non-permissive environment that impedes axonal regeneration. On the other hand, excessive accumulation of glutamate and aspartate neurotransmitters in the synaptic space due to spillage from severed neurons, glutamate-induced aggravated release from pre-synaptic nerve terminals and impaired reuptake mechanisms in traumatic and ischemic brain activate NMDA and AMDA receptors located on post-synaptic membranes, which allow the influx of calcium ions. Together with the release of Ca²⁺ ions from intracellular store (ER), these events lead to the production of ROS and activation of calpains. As a result of mitochondrial dysfunction, molecules such as apoptosis-inducing factor (AIF) and cytochrome c are released into the cytosol. These cellular and molecular events including the interaction of Fas-Fas ligand ultimately lead to caspase-dependent and -independent neuronal cell death. BBB, blood-brain-barrier; ROS, reactive oxygen species; AMPA, α-amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid; NMDA, N-methyl-d-aspartate; ER, endoplasmic reticulum.