



# Review of Literature on Post-traumatic Epilepsy in Extradural Hematoma Patients: A Case for Further Comprehensive Research

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The early and aggressive management of extradural hematomas (EDH) is a classical teaching during neurosurgery residency.<sup>1-3</sup> Posttraumatic seizures (PTS) after EDH share a significant percentage of causality, but apparently remain a less studied entity. The major literature analyzing EDH with PTS dates back to the late 20th century and there are only a couple of recent studies.<sup>4-7</sup> Additionally, an often-debated issue is the role of prophylactic antiepileptic drugs (AEDs) in patients suspected of having high chances of developing PTS.<sup>8,9</sup> Uniform use of AEDs in all cases can lead to drug-related side effects and complications and in some cases unnecessary AED dependence.<sup>9,10</sup>

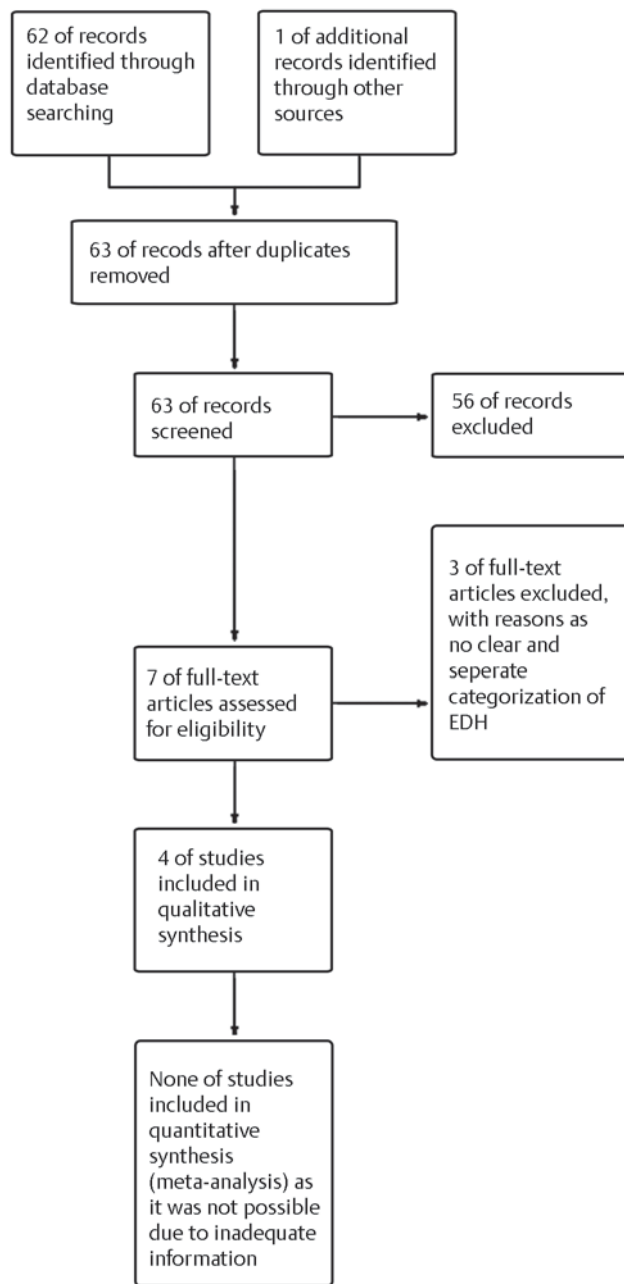
An online search PubMed database was performed by using literature and using the search strategy “(((“extradural haematoma”[All Fields] OR “hematoma, epidural, cranial”[MeSH Terms] OR (“hematoma”[All Fields] AND “epidural”[All Fields] AND “cranial”[All Fields]) OR “cranial epidural hematoma”[All Fields] OR (“extradural”[All Fields] AND “hematoma”[All Fields]) OR “extradural hematoma”[All Fields]) AND (“epilepsy”[MeSH Terms] OR “epilepsy”[All Fields])) AND (“seizures”[MeSH Terms] OR “seizures”[All Fields])) AND (“anticonvulsants”[All Fields] OR “anticonvulsants”[MeSH Terms] OR “anticonvulsants”[All Fields])” on PTS after EDH returned only a handful of articles (► Fig. 1).<sup>4,5,7</sup> Three studies were excluded as there was no clear categorization of intracranial hematomas,<sup>11</sup> diagnosis of extradural hematoma not clearly mentioned,<sup>12</sup> and no clear description of seizure groups.<sup>13</sup>

One of the early reports was by Bryan Jennett from the Institute of Neurological Sciences, Glasgow in 1975.<sup>5</sup> The peculiarity of this report was that the case series was of

the pre-CT era and surgical interventions were based only on clinical findings. Among patients of seizures due to posttraumatic intracranial hematomas (excluding chronic subdural hematomas), EDH was reported as a cause of early seizures (within 1 week of head injury) in 10% (15/146) and late seizures in 22% (13/59) patients. Jennett also found out that only 2% of early PTS patients had an evolving EDH. The next significant report came in 1991 by Jamjoom et al from Bristol.<sup>4</sup> They categorized EDH patients with epilepsy in two subgroups, based on CT findings into those with exclusive EDH and those with other intradural traumatic insults.<sup>4</sup> Although they found the overall incidence of late epilepsy to be 6%, in the pure EDH group, it was only 2% as against 17% of those with additional intradural damage. Another data analysis from a multicentre North American TBI database of 795 patients from 1989 to 2000 was reported by Ritter et al in 2016.<sup>7</sup> Among the various findings, EDH was found to be the cause of early and late PTS in 14.5% and 16.9%, respectively. The most recent report on the incidence of PTS due to EDH came from the series of 484 TBI patients by Pormontree et al from Thailand in 2019.<sup>6</sup> The authors analyzed early PTS in TBI patients from April 2017 to March 2018. Twenty-seven patients (5.6%) had early PTS due to various intracranial insults. Among these, EDH was found to have an adjusted odds ratio of 3.98 on multivariate analysis ( $p$  value = 0.001).

PTS is a known complication of head injury.<sup>6,7,10,14-17</sup> Whether they occur in the early (within a week) or in late posttraumatic period, this sequela of brain injury can significantly deteriorate the quality of life and is considered an independent factor.<sup>6,7,14-17</sup> All the contemporary studies on





**Fig. 1** Prisma chart of the studies extracted using keyword-based PubMed search.

posttraumatic epilepsy (PTE) are in patients with intradural injuries.<sup>10,16,18</sup> Hence, considering the significant share of PTE attributed to EDH in the tune of 15 to 20%, there is an emergent need to undertake a well-formulated study to understand the exact correlation in the current advanced imaging era and then accordingly tailor the prophylactic antiepileptic treatment.

### Conflict of Interest

None declared.

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