FACTORS INFLUENCING THE OUTCOME IN SURGICALLY TREATED PATIENTS WITH TRAUMATIC ACUTE EXTRADURAL HEMATOMA

Ahmed Hafez Farhoud, Mohamed Abbas Ali, Ahmed Saeed Elkady, Mohamed Mahmoud Mohamed Elmaadawi

Department of Neurosurgery, Faculty of Medicine, Alexandria University

Introduction

Traumatic brain injury (TBI) remains a leading cause of morbidity and mortality worldwide, with extradural hematoma (EDH) representing a critical neurosurgical emergency that demands prompt diagnosis and timely intervention. Extradural hematomas, whether of arterial or venous origin, can cause rapid neurological deterioration due to mass effect and raised intracranial pressure. Despite advancements in neuroimaging and emergency management, predicting outcomes in surgically treated EDH patients continues to pose clinical challenges. The present study was designed to identify and analyze the factors that significantly affect outcomes in patients with traumatic acute extradural hematoma (AEDH) who underwent surgical evacuation.

Aim of the work

The aim of this study is to identify factors influencing the outcome in surgically treated Patients with traumatic acute extradural hematoma.

Patients and Methods

This prospective observational study was conducted at the Neurosurgery and Emergency Departments of Alexandria Main University Hospital and affiliated hospitals between 2023 and 2025. A total of 116 patients of all age groups, presenting with traumatic EDH and treated surgically, were Included. Patients with thin-rim AEDH not requiring surgery, those who arrived at the emergency room flaccid, or had significant polytrauma were excluded. The study employed detailed clinical, radiological, and operative data collection, followed by statistical analysis to identify prognostic indicators.

Results

Among patients with acute epidural hematoma (EDH), 80.2% were male (mean age 29.4 years). The most common causes were falls (52.6%) and road traffic accidents (37.1%). Preoperative GCS was 13–15 in 51.7%, 9–12 in 32.8%, and 4–8 in 15.5%. Anisocoria occurred in 19.8%, and 5.2% were on antithrombotic therapy.
Radiologically, the temporo-parietal region was the most frequent hematoma site (36.2%). Hematoma volumes ranged from 20–>60 mL, with midline shift >10 mm in 27.6%. Skull fractures were observed in 68.1%, and 22.4% had associated intracranial injuries. Surgery was performed within 12 hours in 72.4% of cases.

Favorable outcomes (GOS 4–5) were achieved in 85.3%, with a 3.4% mortality rate. Significant predictors of poor outcome included age >60 years, lower GCS, anisocoria, antithrombotic use, larger hematoma volumes, midline shift >10 mm, and associated intracranial injuries. Interestingly, skull fractures were associated with better outcomes. Early surgery within 12 hours correlated with improved prognosis. Sex, trauma mechanism, and hematoma thickness were not significant outcome predictors. These findings emphasize the critical role of early diagnosis and intervention in EDH management.

Table (1): Analysis of the effect of Age, Preoperative GCS, Anisocoria and Antithrombotic drugs on the outcome of surgery.

Factors affecting outcome		n.(%) 116 (100%)	Outcome		X2 P value
			Good (GOS 4-5) n (%)	Poor (GOS 3, 2, 1) n (%)	
1. Age	(0-10) years	15 (12.9%)	14 (93.3%)	1 (6.7%)	24.508 0.001*
	(11-20) years	22 (19%)	21 (95.5%)	1 (4.5%)	
	(21-30) years	37 (31.9%)	34 (91.9%)	3 (8.1%)	
	(31-40) years	28 (24.2%)	24 (85.7%)	4 (14.3%)	
	(41-50) years	8 (6.9%)	5 (62.5%)	3 (37.5%)	
	(51-60) years	4 (3.4%)	1 (25%)	3 (75%)	
	> 60 years	2 (1.7%)	0 (0%)	2 (100%)	
2. Preoperative GCS	13-15	60 (51.7%)	59 (98.3%)	1 (1.7%)	47.5 0.0001*
	9-12	38 (32.8%)	34 (89.5%)	4 (10.5%)	
	4-8	18 (15.5%)	6 (33.3%)	12 (66.7%)	
3. Anisocoria	No	93 (80.2%)	83 (89.2%)	10 (10.8%)	5.711 0.025*
	Yes	23 (19.8%)	16 (69.6%)	7 (30.4%)	
4. Antithrombotic drugs	No	110 (94.8%)	98 (89.1%)	12 (10.9%)	25.193 0.001*
	Yes	6 (5.2%)	1 (16.7%)	5 (83.3%)	

Table (2): Analysis of the effect of radiological findings and time interval between injury and surgery on the outcome of surgery.

Factors affecting outcome		n.(%) 116 (100%)	Outcome		X2 P value
			Good (GOS 4-5) n (%)	Poor (GOS 3, 2, 1) n (%)	
1. Location of hematoma	Temporo-parietal	42 (36.2%)	32 (76.2%)	10 (23.8%)	17.329 0.004*
	Frontal	29 (25%)	29 (100%)	0 (0%)	
	Parietal	24 (20.7%)	23 (95.8%)	1 (4.2%)	
	Temporal	12 (10.3%)	7 (58.3%)	5 (41.7%)	
	Occipital & post fossa	9 (7.8%)	8 (88.9%)	1 (12.1%)	
2. Hematoma volume	(20-40) ml	64 (55.2%)	60 (93.8%)	4 (6.2%)	9.50 0.009*
	(41-60) ml	41 (35.3%)	32 (78%)	9 (12%)	
	> 60 ml	11 (9.5%)	7 (63.6%)	4 (36.4%)	
3. Midline shift	< 10 mm	84 (72.4%)	81 (96.4%)	3 (3.6%)	39.091 0.002*
	> 10 mm	32 (27.6%)	18 (56.2%)	14 (43.8)	
4. Associated skull fracture	Yes	79 (68.1%)	73 (92.4%)	6 (7.6%)	9.871 0.003*
	No	37 (31.9%)	26 (70.3%)	11 (29.7)	
5. Associated brain injuries	Yes	26 (22.4%)	14 (53.8%)	12 (46.2%)	26.58 0.001*
	No	90 (77.6%)	85 (94.4%)	5 (5.6%)	
6. Time interval between injury and surgery	< 12 hrs	84 (72.4%)	76 (90.5%)	8 (9.5%)	6.57 0.04*
	(12-24) hrs	26 (22.4%)	19 (73.1%)	7 (26.9%)	
	> 24 hrs	6 (5.2%)	4 (66.7%)	2 (33.3%)	

Conclusion

This study demonstrated significant associations between patient outcomes and several key factors, including age of the patient, preoperative Glasgow Coma Scale (GCS) score, pupillary abnormalities, the use of antithrombotic drugs, location of hematoma, hematoma volume, midline shift, associated skull fractures, associated intracranial injuries, and the time interval between injury and surger. These findings can help clinicians predict the prognosis of EDH and make decisions for optimal surgical interventions in patients with EDH.