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Trauma-Geriatric

Continuation of poor surgical outcome after elderly brain injury

Sandeep Mohindra, MCh, FRCSEd*, Kanchan Kumar Mukherjee, MCh, Rahul Gupta, MCh, Rajesh Chhabra, MCh

Department of Neurosurgery, Postgraduate Institute of Medical Education and Research, Chandigarh, India

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Abstract

Background: In spite of the decline in mortality among trauma patients, with advanced trauma care, the outcome for elderly patients remains poor. Both operative and nonoperative outcome for elderly patients after head trauma has resisted improvement.

Methods: Forty-five consecutive patients 70 years or older were included in the study. All these patients were admitted from January 2000 to June 2005. Road-traffic accidents caused most of the head injuries.

Results: Most of the patients (n = 33) belonged to severe head injury category. Contusions were the commonest CT scan finding (n = 27), for which surgery was indicated. Unexplained clinical deterioration, in spite of timely surgery and satisfactory postoperative CT scans, in a significant number of patients (n = 29) was noteworthy. Over the same period, the comparative group of younger patients (20-40 years, n = 1026) was also analyzed.

Conclusion: Elderly patients experienced higher mortality and poorer functional outcome. The natural history of traumatized brain among elderly patients remains unchanged till the present times. The nihilistic scenario asks for reevaluation of interventions, relook into the neurobiology of aging brain, and aggressive research for remedial measures for such patients, especially among severe head injury group.

Keywords: Elderly; Head injury; Poor outcome; Surgery

1. Introduction

Serious head injury among patients 70 years or older is associated with high mortality [14]. Reports suggest erring on the side of inactivity for such elderly patients having severe head injury [9]. Withholding surgery or aggressive resuscitation in such a patient remains a difficult and agonizing clinical decision. In spite of such disheartening outcome and anecdotal reports of survivors, compulsive aggressive management continues. Only one third of elderly patients who survive get discharged from hospitals [15]. Recovering adequate neurologic function to lead a meaningful life remains elusive for such patients in a long-term follow-up [5]. The ongoing research toward biology of aging brain and neurochemistry needs to be encouraged and strengthened.

2. Methods and materials

We reviewed the records of all operative head injury patients of 70 years and older from January 2000 till June 2005 admitted under the Department of Neurosurgery of our hospital. The age was ascertained from the closest relative available during the hospital stay of the patient. Patients with uncertain age were excluded. Only operative patients were the part of the study. Neurologic status at admission and just before surgery was noted as described by Teasdale and Jennet [19]. Intubated patients were assigned one point for GCS verbal category. Additional clinical data collected

Abbreviations: CT, computed tomography; EDH, extradural hematoma; GCS, Glasgow Coma Scale; GOS, Glasgow Outcome Score; ICH, intracerebral hematoma; RTA, road traffic accident; SDH, subdural hematoma; TNF, tumor necrosis factor; IL, interleukin.

* Corresponding author. Tel.: +91 0172 2756699; fax: +91 0172 744401.

E-mail address: satya_sandee@yahoo.com (S. Mohindra).

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Table 1
Operative results in elderly (older than 70 years) patients after head injury

GCS (nature of injury)	n, at admission	n, preoperative	Mode of injury			CT scan findings[a]				Outcome (at 6 mo)				Death
			Fall	RTA	Assault	EDH	SDH	ICH	Contusion	GOS 5	GOS 4	GOS 3	GOS 2	
13-15 (mild)	11	5	1	3	1	2	2	–	3	–	4	1	–	–
9-12 (moderate)	2	7	5	2	–	1	1	1	5	–	1	–	1	5
3-8 (severe)	32	33	11	19	3	5	19	4	19	–	1	–	8	24
	45	45	17	24	4	8	22	5	27	–	6	1	9	29

[a] One patient may have more than one type of CT scan findings.

included the mechanism of injury, time from injury to presentation, and cause of death. Patients with a history of unconsciousness from outset were identified (Table 1). All 45 patients underwent CT scan immediately at arrival, and the findings were recorded. Postoperatively, patients were managed with ventilation and tracheostomy, if required. Postoperative CT scans were done for all patients to check for satisfactory hematoma evacuation. Survivors have been followed for a minimum of 6 months and grading of outcome done according to GOS as described by Jennet and Bond [4]. Only GOS 4 and GOS 5 constituted "satisfactory functional outcome."

3. Results

A total of 45 patients (70 years or older) and 1026 patients (aged 20-40 years) were incorporated in the study. The distribution of severity of head injury and their respective outcome is depicted in Tables 1 and 2.

Among the elderly group, the mean age was 72.4 years. The male-to-female ratio was 34:11. Road traffic accident was the commonest cause of head injury (53.3%), whereas SDH (48.9%) and contusions (60%) formed the commonest form of CT finding for which surgical evacuation was indicated (Table 1). Most of the patients presented with a severe head injury (GCS 3-8, 32 patients), and the remainder fell within the moderate (GCS 9-12, 2 patients) or mild (GCS 13-15, 11 patients) head injury categories.

Two patients with mild head injury deteriorated to enter severe head injury category before surgery, whereas 5 deteriorated to moderate head injury. One patient improved from severe head injury category to mild head injury group after resuscitation. A total of 8 patients had medical illness (7 had essential hypertension and 1 had diabetes mellitus). Eight patients had *conte-coupe* type of head injury.

Among mild head injury patients (GCS 13-15, n = 5), there was no mortality, but 4 (80%) were moderately disabled (GOS 4) with no good outcome (GOS 5). Among moderate head injury patients (GCS 9-12, n = 7), 5 (71.4%) died. Again, no good outcome (GOS 5) was noted. Among severe head injury group, all except one had bad outcome (GOS 1 and 2). Only one patient had moderate disability (GOS 4) at follow-up of 5 years. Among 32 deaths, 17 patients never responded to surgical intervention, and an unrelenting march of deteriorating clinical status continued till death. Ten patients stabilized after surgery and then suddenly deteriorated to death, without any obvious cause, whereas 2 patients died of sepsis. There was no patient with good outcome (GOS 5).

In the comparative control group (aged 20-40 years), 63.1% of patients had head trauma due to RTAs. The CT scan findings among the control group showed SDH and contusion to be the more common findings among elderly patients. Favorable outcome was seen in 62.8% of patients, whereas the mortality rate was 25.1%.

3.1. Statistical analysis

The χ^2 analysis of the 2 groups (young and old) was performed in all the subtypes (mild, moderate, and severe) of head injuries separately (Table 3). Among all 3 types of head injuries, the surgical outcome was significantly influenced by age ($P < .001$).

4. Discussion

Since 1979, work published by Teasdale et al [20], the outcome after head injury among elderly remains dismal [21]. Our results also show that elderly patients have poor prognosis after head injury, and mortality rises sharply with advancing age [2,5]. Road traffic accident was the com-

Table 2
Operative results in young patients (20-40 years) after head injury

GCS (nature of injury)	n, at admission	n, preoperative	Mode of injury			CT scan findings[a]				Outcome (at 6 mo)				Death
			Fall	RTA	Assault	EDH	SDH	ICH	Contusion	GOS 5	GOS 4	GOS 3	GOS 2	
13-15 (mild)	229	211	37	102	72	116	7	3	71	178	12	5	4	12
9-12 (moderate)	368	364	91	210	63	122	145	4	156	133	131	23	8	69
3-8 (severe)	429	451	72	335	44	119	182	–	218	75	115	69	15	177
	1026	1026	200	647	179	357	334	7	445	386	258	97	27	258

[a] One patient may have more than one type of CT scan findings.