

Timing of Surgery as a Predictor of Outcome in Traumatic Acute Subdural Hematoma

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ABSTRACT

Objectives: To determine if reducing the time from trauma to surgery is associated with decreased mortality in patients with traumatic acute subdural hematomas.

Background: It remains controversial whether decreasing the time from trauma to surgical intervention is associated with increased survival in patients with traumatic acute subdural hematomas.

Materials and Methods: This is a prospective study of 8 months from August 2013 to April 2014 conducted at the Department of Neurosurgery, PGMI / Lahore General Hospital, Lahore. Adult patients in whom surgical evacuation of acute subdural hematoma was carried out were included in the study. Age / Sex, presenting Glasgow Coma Scale (GCS) and the time passed from trauma to the start of the surgery was noted. The outcome of the patients was categorized according to the Glasgow Outcome Scale.

Results: Forty eight adult patients meeting the inclusion criteria were included in the study. There were 36 males and 12 females. The mortality for patients operated within four hours was 83.3% compared to 75% for patients operated within four to ten hours, and 73.1% for patients operated after ten hours. Two patients (12.5%) in the four to ten hour group, and five patients (19.2%) in the group of patients operated after ten hours had a favourable outcome. Surprisingly, this showed a trend that increased time from trauma to surgery led to a better outcome. However, patients operated early also had more severe neurological injury.

Conclusion: A shorter time from injury to surgical evacuation does not decrease mortality in traumatic acute subdural hematoma.

Key Words: Acute subdural hematoma, mortality.

Abbreviations: GCS: Glasgow Coma Scale. GOC: Glasgow Outcome Scale.

INTRODUCTION

Acute subdural hematoma is a devastating head injury with a mortality of 45 – 90%.¹⁻³ The timing of surgical intervention has been considered a critical factor affecting survival in patients with acute subdural hematomas.⁴ The beneficial effect of early surgical evacuation of acute subdural hematoma in decreasing mortality is, however, a controversial topic.⁵ In their landmark study in 1981 Seelig et al,⁶ found that surgical evacuation of acute subdural hematoma within 4 hours of the injury reduced the mortality to 30%, as compared to a mortality of 90% for patients operated after 4 hours of the injury. However different studies

have since then concluded conflicting results and the topic remains controversial.^{1,2,7,8} The aim of this study was to determine if reducing time from trauma to surgery is associated with decreased mortality in trauma patients with acute subdural hematoma.

MATERIALS AND METHODS

The study was a prospective study conducted in the Department of Neurosurgery Lahore General Hospital Lahore from August 2013 to April 2014 with a duration of 8 months. Adult patients of both sexes in whom surgical evacuation of acute subdural hematoma was

carried out were included in the study. Surgical evacuation was carried out in patients having acute subdural hematoma of more than 1 cm thickness on CT Scan, and midline shift of more than 5 mm.

Age / Sex, presenting Glasgow Coma Scale (GCS) and the time passed from trauma to the start of the surgery was noted.

According to the timing of surgery the patients were divided into 3 groups.

1. Patients operated within 4 hours of the trauma.
2. Patients operated within 4 – 10 hours of the trauma.
3. Patients operated after 10 hours of the trauma.

The outcome of the patients was categorized according to the Glasgow Outcome Scale at 1 month time. Outcome was classified as “favourable” if the Glasgow Outcome Scale (GOS) score was 5 or 4, and classified as “unfavourable” if GOS score was 3 or less.

RESULTS

The study included forty eight patients. Thirty six (75%) of the 48 patients were males and 18 (25%) were females. The age ranged from 14 to 80 years (mean 46.8 yrs). The average GCS score on admission was 7.5 (range 3 – 15). 36 out of the 48 patients died and the mortality was 75%. 12 patients (25%) were alive at one month. Out of these 12 patients 5 patients (10.4%) had an unfavourable outcome and were severely disabled, and 7 patients (15.2%) had a favourable outcome and had functional recovery. The outcome according to the timing of surgery is given in table 1.

DISCUSSION

Acute subdural hematoma (SDH) is one of the most lethal head injuries, and presents a most challenging surgical problem. The reported mortality in literature ranges from 45 – 90%.¹⁻³ The mortality observed in

Table 1: Table showing age, GCS and Mortality at 1 Month.

Timing of Surgery	No. of Patients	Mean Age	Outcome at 1 Month		
			Mean Presenting GCS	Dead	Alive
≤ 4 hrs	6	41.33 yrs	5.2	5 (83.3%)	1 (16.7%)
4 – 10 hrs	16	44.25 yrs	6.3	12 (75%)	4 (25%)
≥ 10 hrs	26	49.7 yrs	8.8	19 (73.1%)	7 (26.9%)
Total	48	46.8 yrs	7.5	36 (75%)	12 (25%)

Table 2: Showing outcome of Alive Patients at 1 Month.

Timing of Surgery	No. of Patients	Mean Age	Outcome at 1 Month		
			Alive	Several Disability	Functional Recovery
Total					

our series is 75% which falls within this range.

The role of timing of surgery has in decreasing the mortality of traumatic Acute Subdural Hematoma is a controversial topic.⁵ It is generally supposed that “the higher mortality associated with acute SDHs can be lowered by rapid surgical intervention, and that surgery should be performed as soon as possible.”^{1,8,9}

In 1981, Seelig et al.⁶ in their study found that the delay from injury to operation was the factor of greatest therapeutic importance in determining the mortality of patients suffering from acute subdural hematoma. Patients undergoing surgery within the first four hours had a 30 percent mortality, as compared with 90 percent mortality in those who had surgery after four hours (P < 0.0001). Haselsberger et al¹⁰ reported that the mortality of patients with acute SDH rose from 47 to 80% when the time from onset of coma to operation exceeded 2 hours. They concluded that the timing of surgical evacuation of hematoma is the most important controllable factor affecting survival.

But there are studies which have found no statistically significant difference between patients operated early or late. Wilberger et al⁴ in 1991, found that mortality in patients with admission GCS scores less than 8 who underwent surgery within 4 hours of injury was

59% versus 69% for those who underwent surgery after 4 hours. Although it showed a better outcome with early surgical intervention, the difference was not statistically significant. Stone et al¹¹ also reported no significant difference in outcome between comatose patients undergoing surgery less than 4 hours after injury, and those operated on between 4 and 12 hours after injury (69 vs. 75% mortality). Koc et al² in 1997 and Johnv et al⁷ in 2012 also concluded that time from injury to surgical evacuation did not affect mortality and outcome.

Still there are studies that found that early surgery was associated with increased mortality. Hatashita et al¹ in their study found that the mortality for patients with GCS scores of 4 – 6 operated on within 4 hours of injury was 62% in contrast to 33% for those operated on from 4 to 10 hours. John M et al⁸ also reported that there appeared to be a trend indicating that increased time to surgery was associated with good outcome. Tien HC et al⁵ reported that increased time from trauma to surgery was associated with lower mortality. Patients operated early in their study, however, also had more severe neurological injury. Dent et al¹² also found that patients operated early had a significantly lower functional survival (early = 24% vs. delayed = 51%). Although the patients operated early in their study too had more severe head injury evidenced by their lower GCS scores (Early = 7 vs. Delayed = 8.4).

In our series of patients the highest mortality (83.3%) was observed in patients operated within 4 hrs, with lesser mortality (75%) for patients operated within 4 – 10 hrs, and the least mortality (73.1%) for patients operated after 10 hrs. Favorable outcome was also seen only in the 4 – 10 hrs and the ≥ 10 hrs group. 2 patients (12.5%) in the 4 – 10 hrs group and 5 patients (19.2%) in the ≥ 10 hrs group had favorable outcome. This shows a trend indicating that increased time to surgery was associated with a better outcome. The results of our study are thus similar to other studies^{1,5,8,12} that found lesser mortality and more favorable outcome with increased time to surgery after trauma in patients suffering from Ac SDH. Also similar to the studies of Tien HC et al⁵ and Dent et al¹² in our study too the patients having early surgical evacuation had more severe injuries evidenced by lesser mean GCS (5.2) for patients operated in ≤ 4 hrs hours, as compared to increased mean GCS (6.3) of patients in the 4-10 hrs group and mean GCS (8.8) for the ≥ 10 hrs group. The hypothesis that early surgical evacuation decreases mortality and improves outcome in patients of traumatic Ac SDH was thus not proved out in our

series.

Limitations of Study

This is study of small duration (6) months and less number of patients. There is need of bigger study with groups having similar GCS, time of surgery and outcome narration.

Comments by Peer Reviewer

This study has limitations because outcome was linked to “duration of time before surgery”. Infect the G.C.S has more importance. The better outcome is in better G.C.S group (operated late). It would have been ideal if outcome was narrated in relation to G.C.S and timing of surgery in similar groups with similar G.C.S.

CONCLUSION

A shorter time from injury to surgical evacuation does not decrease mortality or improve outcome in patients presenting with traumatic acute subdural hematoma.

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