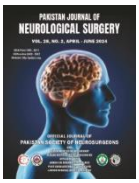

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Original Research

Outcome Difference Between Traumatic and Spontaneous Chronic Subdural Hematoma

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ABSTRACT

Introduction & Objective: Chronic subdural is one of the most common neurosurgical disorders and affects older populations, its incidence increases with increasing age, i.e., 36.6 to 91%. The main objective is to evaluate the outcome difference between traumatic and spontaneous CSDH.

Materials and Methods: A case-control study was conducted in Liaquat University Hospital. The duration of the study was from 1st Jan 2023 to 1st September 2023. The patients included in the study were divided into two groups either spontaneous or old history of trauma less than 3 months. The Pre-operative and post-operative GCS were noted. The post-operative (on discharge) GCOSE was noted.

Results: Total number of 32 patients with 16 in a single group were included, the mean age was 60, out of which 65.6% were males with the most common presentation being AlOC (75%). The mean Pre-operative GCS in the spontaneous and traumatic groups was (8.37 ± 3.87 vs 12.56 ± 2.78) respectively and the traumatic group presented with good GCS (OR 1.417, p- 0.002). After surgery, the mean GCS in the spontaneous and traumatic group was (9.62 ± 5.01 vs 12.81 ± 3.22) (p-0.058). The post-operative GCOSE in the spontaneous group was mostly Grade I (Dead, 56.2%) and Grade VIII (upper good recovery, 62.5%) in the traumatic group. The effect of GCOSE either on each group is significant (p- 0.05) with spontaneous CSDH having 3.07 more chances of being dead.

Conclusion: The spontaneous group holds grave outcomes as compared to the traumatic group. Both Groups do improve immediate Post-operative GCS but the GCOES grading worsens with spontaneous group.

Keywords: CSDH, spontaneous, traumatic, head trauma, no-head trauma, GCS, GCOSE.

Abbreviations: GCS; Glossgow coma scale, GCOSE; Glossgow coma outcome scale extended, CSDH; Chronic subdural hematoma.

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INTRODUCTION

Chronic subdural is one of the most common neurosurgical disorders and the older population is mostly affected and it increases with increasing age. The incidence rate is 36.6 to 91% among the older population that went into surgical evacuation globally with a 12% recurrence rate in Pakistan.[1-3] Chronic subdural hematoma is most commonly a result of minor trauma that causes bridging vein laceration in the subdural space.[4]

Conversely, non-traumatic i.e. spontaneous causes are uncommon, affecting only 3% to 5% of cases and primarily affecting individuals in their fifth to seventh decades.[4] furthermore, the conditions that have been linked to the development of Spontaneous CSDH are advanced age, alcoholism, poorly managed hypertension, bleeding diathesis, renal disease requiring hemodialysis, infection, metastasized tumor, antiplatelet and/or anticoagulant therapy.[5-8]

In literature, most of the studies categorized chronic subdural hematoma with a head injury and without head injury, some pointed out that patients without head trauma had higher mortality and low Glasgow coma outcome scale (P-0.03), some pointed no significant difference, but both these studies didn't highlight the effect on outcome.[5,9] However, the recurrence between groups was pointed out to be 1.3 to 18% with no significant difference between the two groups.[2,3,5]

Highlighting the etiological type of CSDH either Traumatic or spontaneous and its impact on the outcome either good or bad and with or without associated Co-morbid is currently the active area of research. It will be helpful for us to establish the management directories according to a certain type that holds certain outcomes. The main objective of the study was to evaluate the outcome of CSDH concerning the etiological type of CSDH (either spontaneous or traumatic).

MATERIAL AND METHODS

Study Design & Setting

A case-control study was conducted at the Liaquat University Hospital, Hyderabad 1st January 2023 to 1st September 2023.

Study Population & Grouping

The patients presented with Chronic subdural hematoma. Case groups were those patients who had a history of trauma previously while control groups were those who didn't have a history of trauma associated with Co-morbidities.

Sample Size & Sampling Technique

It was calculated via a formula of qualitative analysis of case-control with the values that were taken and calculated from the previous study.[5,10] A convenient sampling technique was used.

Inclusion Criteria

Those patients were included who were with or without a history of trauma, and with or without associated comorbidities.

Exclusion Criteria

The patients who were not willing for surgery.

Data Collection

The patients were included in the study who came through the emergency department or OPD or from another ward. The evaluation of inclusion and exclusion criteria was done and data was included on a pre-designed questionnaire. For the control group (spontaneous) the patients went through further investigations like hematological profile, viral profile, and CT brain angiography before intervention (depending upon the severity of the condition). Patients were gone through surgical interventions like burr hole drainage or through and through burr hole drainage or

decompressive craniotomy. The patients were followed up to the discharge or death and on discharge the Glasgow coma Outcome scale extended was noted and all the data was recorded on pre pre-designed questionnaire.

Statistical Analysis

The data was entered into SPSS version 22, and the data was divided into categorical, Ordinal, and continuous categories. Initially, the descriptive analysis was performed, that is mean for continuous and Frequency for other categories. Then the data was divided into two study groups and for the P-value of parametric continuous variable, the T-test was performed and Mann-Witney U, Wilcoxon signed rank test for non-parametric continuous variable. However, the p-value for the categorical variable was calculated via the chi-square test. The ODD ratio for continuous variables was calculated by binary logistics regression, for more than two categorical data multinomial logistics regression was performed and for ordinal data, ordinal logistics regression and generalized linear model were used. Due to the weak stratification of the sample, the control of confounding bias. i.e. the effect of co-morbidities on the outcome scale (GCOSE) is done by performing ordinal regression logistics.[11]

RESULTS

Epidemiological Analysis

A total number of 32 patients were included in the study. The mean age was 59.90 ± 15.31, the mean age of females was greater than males and both were normality distributed. Most of the patients were male (65.6%) and altered consciousness (75%) was the most common Clinical presentation. Regarding co-morbidities Hypertension (21.9%) was a common one, however the tumors that were presented elsewhere in the body include hepatoma, CA breast, CA prostrate, and Ca rectum. The infection included Hepatitis C virus, dengue, and pulmonary Tuberculosis. The other conditions included were Asthma, benign prostate hyperplasia, and epilepsy (Table 1).

Table 1: General Epidemiological data.

Variables	Numbers (%)
Mean Age (Years)	59.90
Male	58.28
Female	63.00
Gender	
Male	21 (65.6)
Female	11 (34.4)
Clinical Presentation	
Altered consciousness	24 (75)
One-sided weakness	19 (59.4)
Headache	1 (3.1)
Fits	1 (3.1)
Co-morbidities	
Hypertension	7 (21.9)
Diabetes	4 (12.5)
Anticoagulant therapy	2 (6.3)
Tumour (elsewhere)	5 (15.6)
Infection	5 (15.6)
Others	2 (6.3)
Location	
Unilateral	27 (84.4)
Bilateral	5 (15.6)

Grouping Analysis

The group was divided into 16 patients each. The mean age in traumatic groups was higher as compared to the spontaneous group with more proportion of males as well. Regarding clinical presentation, one-sided weakness is more common in the traumatic group. Regarding co-morbidities, the distribution is somewhat harmonious except for the presence of tumors elsewhere and infection; the occurrence of spontaneous CSDH will be 2.45% more if there is a tumor elsewhere in the body, which is significant. The infection was non-significantly more in the spontaneous group and there was a 5% will be more chance that infection could result in spontaneous CSDH, although the odd ratio was non-significant (Table 2).

Operative Analysis: The mean pre-operative GCS was 10.42 ± 3.94 with 12.56 in the traumatic group, which was significantly more as compared to spontaneous groups; however, the data was not normally distributed. There are 1.42% more chances that traumatic CSDH will present with better GCS as compared to the Spontaneous group. Burr hole drainage was the common procedure that was performed and one craniotomy was done and two left for conservative management. The mean post-operative GCS was 11.22 and was higher in the traumatic group (12.81), however, the data is borderline significant and there will be a 1.196% chance that surgery will result from good post-operative GCS in traumatic CSDH but if the correlation of mean pre-operative GCC and mean post-operative GCS, the difference between them was not significant (P-0.21) (calculated by Wilcoxon signed rank test) (Table-3).

Table 2: Grouping Analysis.

Variables	Numbers (%) Case (Traumatic)	Control (Spontaneous)	P-value	Odd Ratio
Mean age	61.25	58.56	0.143^	1.012*
Gender				
Male	12 (75)	9 (56.3)	0.229	0.429
Female	4 (25)	7 (43.7)		
Clinical presentation				
Altered consciousness	12	12	0.657	1.00
One-sided weakness	12	7	0.074	0.26
Headache	-	1	0.50	2.06
Fits	-	1	0.50	2.06
Co-morbidities				
Hypertension	4	3	0.50	0.692
Diabetes	3	1	0.30	0.289
Anticoagulant therapy	1	1	0.76	1.00
Tumour (elsewhere)	0	5	**0.022**	**2.45**
Infections	1	4	0.166	5.00
Others	1	1	0.758	1.00
Location				
Unilateral	14	13	0.50	0.619
Bilateral	2	3		

*Calculated by binary logistic regression, ^calculated by Student T test.

Table 3: Operative Analysis.

Variables	General	Numbers Case (Traumatic)	Control (Spontaneous)	P-value	Odd Ratio
Mean Pre - operative	10.46	12.56	8.37	0.002*	1.417^
Management					
Burr hole	29 (90.6)	15	14		
Craniotomy	1 (3.1)	1	0	0.219	<0.001[x]
Conservative	2 (6.3)	0	2		
Mean post-Operative GCS	11.22	12.81	9.62	0.058*	1.196^

*Mann Whitney test, ^binary logistic regression, [M]ultinomial logistic regression

Outcome Analysis: At discharge, the Glasgow coma outcome extended scale was used to see the outcome. 40% of patients expired in the spontaneous group. There is a 3.07% higher chance of death in the spontaneous group as compared to the traumatic group. 31.3% of patients had an upper good recovery in the traumatic group. There was a 0.45% chance that traumatic CSDH resulted in upper good recovery as compared to the spontaneous group (Table-4).

Table 4: Glasgow coma outcome extended scale on discharge.

Variables	General	Case (Traumatic)	Control (Spontaneous)	P-value	Odd Ratio^
Dead	13 (40.6)	4	9		3.07*
Vegetative State	-	-	-		-
Lower severe disability	2 (6.3)	2	0		0.03*
Upper severe disability	1 (3.1)	1	0	0.051	0.526
Lower moderate disability	1 (3.1)	0	1		0.526
Upper moderate disability	3 (9.4)	0	3		18.32*
Lower good recovery	2 (6.3)	1	1		N/A
Upper good recovery	10 (31.3)	8	2		0.447

^Calculated via ordinal logistic regression and generalized linear model, * level of significance in odd ratio

For controlling the cofounding bias, the ordinal regression was performed and it was found that co-morbidities don't have any significant effect on the outcome.

DISCUSSION

One of the most prevalent neurosurgical conditions is chronic subdural hematoma, which primarily affects elderly people and gets worse with age.[12] Mostly, it results due to trauma (61.7%), and rupturing of bridging veins in subdural space is a common pathogenesis however the non-traumatic causes i.e. spontaneous are relatively rare with an incidence rate of 3% to 5%.[4,13]

As in this study, the total number of patients was 32 with a mean age of 59.90, and most Genders were male 65.6%. It is already documented in literature that age is usually distributed concerning geographical locations and men are more commonly involved than females.[14] The most common presentation was altered loss of consciousness (75%) although disturbed cognition was recognized to be the presenting symptom in 45% of cases and one-sided weakness (59.4%) in literature, however, it may be due to pressure effect of hematoma.[15,16]

In this study, there was a 21.9% association of hypertension with chronic subdural hematoma and the literature does justify the presence of Hypertension with borderline effect.[13] There was a 15.6% association between tumor elsewhere and infection with CSDH in this study respectively, however, the association of tumor and CSDH has been seen with a prevalence of 16.1% and there is an association of CSDH with a low-grade infection in literature.[6,17] Regarding the laterality, unilateral CSDH is more common than Bilateral and this has been validated in this study with 84.4% presented with unilateral CSDH.[18]

The mean presentation of age between two groups i.e. one with head trauma and the other without head trauma literature showed contradicting results with male preponderance, one study pointed out those nontraumatic patients have higher age means, and another result contradicted.[5,9] However in our study the mean age of the traumatic group was 61.25 as compared to the spontaneous group 58.56 with the male population dominant. Regarding the clinical presentation sided weakness was more common in the traumatic group, which is consistent with the literature.[9] The presence of tumors elsewhere is significant and infection is not significantly associated with the occurrence of spontaneous CSDH with an odd ratio of 2.45 and 5 respectively, however in literature Stroke and Uremia were significantly associated, besides the 16.1% prevalence of CSDH with tumor elsewhere is defined but it is defined without grouping in literature and further cohort trials are required to

validate the facts.[5,17]

In this study, the mean pre-operative GCS was 10.42 ± 3.94 which is usually low as compared with the literature which is 13.4 ± 2.9, however, there was no group differences were found previously but in our study, we found a significant group difference, and 1.42% more chances that traumatic CSDH hematoma will present with good pre-operative GCS and vice versa.[5,18] Burr hole drainage was usually performed as a preferred surgical approach, which is associated with good outcomes.[19] The mean post-operative GCS was 11.22 ± 4.45 which is also low as compared to the literature. i.e. 13.8 ± 2.5, however, there was a moderately significant group difference between the two groups and there is a 1.196% chance that surgery will result from good post-operative GCS in traumatic CSDH, besides correlation with mean pre-operative and post-operative GCS were made, it is not significant.[18]

The outcome GCOSE, the spontaneous CSDH is associated with more deaths (4.31%) as compared to another group (1.10%) in literature, which is consistent with this study's findings and there are 3.07 more chances of deaths in spontaneous CSDH and vice versa, on contrary the traumatic group is associated with the good outcome on GCOSE which is also consistent with this study findings that is 0.45% more chances of upper good recovery in traumatic CSDH on GCOSE.[5]

CONCLUSION

Spontaneous CSDH presented with low GCS and also had less improvement on GCOSE as compared to traumatic CSDH. The identification of underlying pathologies is not that crucial because its effect on the outcome is insignificant.

Limitations

However, this study is case-control in nature, large prospective cohort studies are required to see the temporal sequence of cause and effect because of the weak stratification of data in this study, however, it is adjusted by statistical analysis. Some factors were not discussed, that are radiological classification, complications, and recurrence rate.

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Additional information

Disclosures: Authors report no conflict of interest and all the data can be provided if needed.
Ethical Review Board Approval: The study conformed to the ethical review board requirements.
Human Subjects: Consent was obtained by all patients/participants in this study.
Conflicts of Interest: In compliance with the ICMJE uniform disclosure form, all authors declare the following:
Financial Relationships: All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work.
Other Relationships: All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.
Availability of Data: The data is available on request after obtaining consent from the patient or family.

AUTHOR'S CONTRIBUTION TABLE

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Sanaullah Pathan	Study design and methodology.
Abdul Rauf Memon	Paper writing.
Peer Asad Aziz	Data collection and calculation.
Muzafar Ali Bhand	Analysis of Data and interpretation of results.
Suhail Ahmed Aghani	Literature review and referencing.
Hameedullah Khan	Editing and quality insurer.
Zeeshan Nasir	Results analysis.