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Research Article

**RADIOLOGICAL FACTORS HAVING ASSOCIATION WITH
THE RECURRING OF CHRONIC SUBDURAL HEMATOMA**¹Dr Sara Najam, ²Dr Masooma Rubab, ³Dr Ali Hassan¹WMO, Doctors Hospital and Medical Center Lahore, ²House Officer, Nishter Medical College Multan, ³House Officer, Jinnah Hospital Lahore.**Article Received:** October 2019 **Accepted:** November 2019 **Published:** December 2019**Abstract:**

Objective: CSDL (Chronic Subdural Hematoma) is very frequent entity faced in the routine practices of neurosurgeries. There are reports of considerable rates of recurrence rates for CSDL following the surgical intervention. Various research works have stated different radiological predictors that may have association with the recurring of chronic subdural hematoma. But, there is inconsistency in the outcomes of those research works. This research work aimed to determine the radiological factors accountable for the recurrence of the CSDL.

Methodology: In this study, we carried out a retrospective assessment of one hundred and thirteen patients detected with the CSDL who got surgical treatment from September 2017 to January 2019. We also analyzed the radiological factors to clarify the association between these factors and recurrence of the CSDL after surgical intervention.

Results: Total 17.70% (n: 27) patients experienced the recurring of the complication. There was association of the recurrence of CSDH with the before surgery hematoma thickness equal or greater than 20.0 millimeters. Density of hematoma, midline shift and bi-laterality were present with no association with the recurring of the complication. Drainage after surgery also significantly decreased the recurrence of the CSDH.

Conclusion: Hematoma thickness equal or greater than 20.0 millimeters before surgery is important predictor of the recurring of CSDH. Drainage after surgery also has the ability to reduce the recurrence of CSDH.

Keywords: CSDH, recurrence, drainage, retrospective, assessment, association, complication, methodology, surgery, intervention.

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INTRODUCTION:

CSDH is very frequent medical entity faced in the routine practices of neuro-surgeries [1-5]. The prevalence of the chronic subdural hematoma has been stated to be very high as 13.10 patients per 100000 people [6]. There are many surgical procedures to cater this problem as craniotomy, twist drill trephination and burr-hole trephination [7-10]. The most famous method among these procedures is burr-hole evacuation [1, 6, 7]. There are reports of considerable rates of recurrence with a range from 3.0 to 30.0% following the surgical intervention [7, 9, 11, 12].

Various radiological standard associated to the recurring of this complications are the matter of discussion in this very literature including hematoma width before surgery, pre-surgical midline shift, density of hematoma and bi-lateral CSDH [6, 7, 9, J]. Research works performed about the association of radiological features with the recurring have displayed conflicting outcomes and there is no existing consensus on subject [6, 10, 13-20]. This research work aimed to evaluate the association between various radiological factors with the recurring of CSDH.

METHODOLOGY:

In this research work, we retroactively reviewed the records of medical radiology reports of one hundred and thirteen patients who underwent chronic subdural hematoma surgery in Neurosurgery Department of Mayo Hospital Lahore from September 2017 to March 2019. CT (Computed Tomography) was in use for the confirmation of the diagnosis in all the patients. Treatment of all the patients of this research work carried out with 2 burr holes with or with no drainage. There was more than 3 months of follow-up period for every patient. Patients who underwent craniotomy of

single burr hole were not the participants of this research work. We removed the drain after forty eight hours if placed. We explained the chronic subdural hematoma as a tin capsule surrounding the SDH and containing the Dark reddish blood available at surgery time. CT scan after the surgery was carried out within seventy two hours after surgical intervention. Next requirement of the CT scan was present if there was recurrence of the symptoms. We defined the recurrence of chronic subdural hematoma as the blood's re-accumulation in hematoma activity after surgery diagnosed with CT scan within ninety days after surgical intervention.

We measured the hematoma thickness before surgery on computed tomography scan, which showed the maximal hematoma thickness. We measures the midline shift degree besides the level of 3rd ventricle. There were total five types of hematoma depending upon their density as discovered on computed tomography scan: Trabecular stage, hyper-dense, iso-dense, mixed density & hypo dense. We divided the patients into 2 groups in accordance with the recurring of the chronic subdural hematoma. We compared the clinical & radiological features among recurrence group & non-recurrence group. Chi square method was in use for the assessment of reoccurrence of chronic subdural hematoma. SPSS V. 20 was in use for the statistical analysis of the collected information. As this study was a retrospective research work, so there was no requirement of the approval from ethical committee.

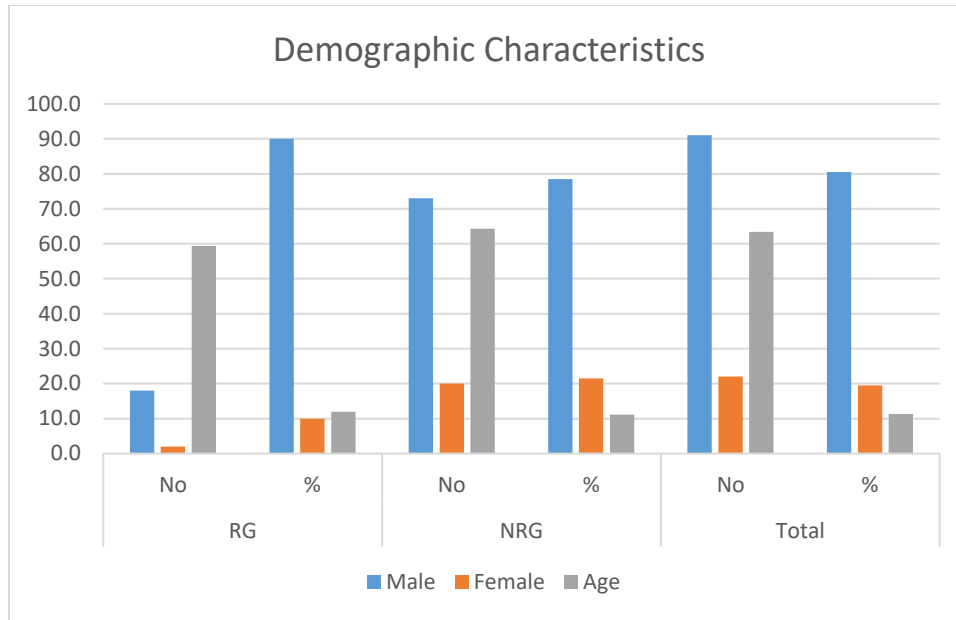
RESULTS:

Total one hundred and thirteen patients were the part of this research work. The baseline traits of the patients with the area of chronic subdural hematoma are present in Table-1.

Table-I: Demographic characteristics of patients

Characteristics	RAG		NRG		Total		p-value
	No	%	No	%	No	%	
Male	18.0	90.00	73.0	78.50	91.0	80.50	0.2380
Female	2.0	10.00	20.0	21.50	22.0	19.50	
Age	59.4	11.95	64.3	11.11	63.5	11.37	0.0750

RAG: Recurrence Group, NRG: Non-Recurrence Group



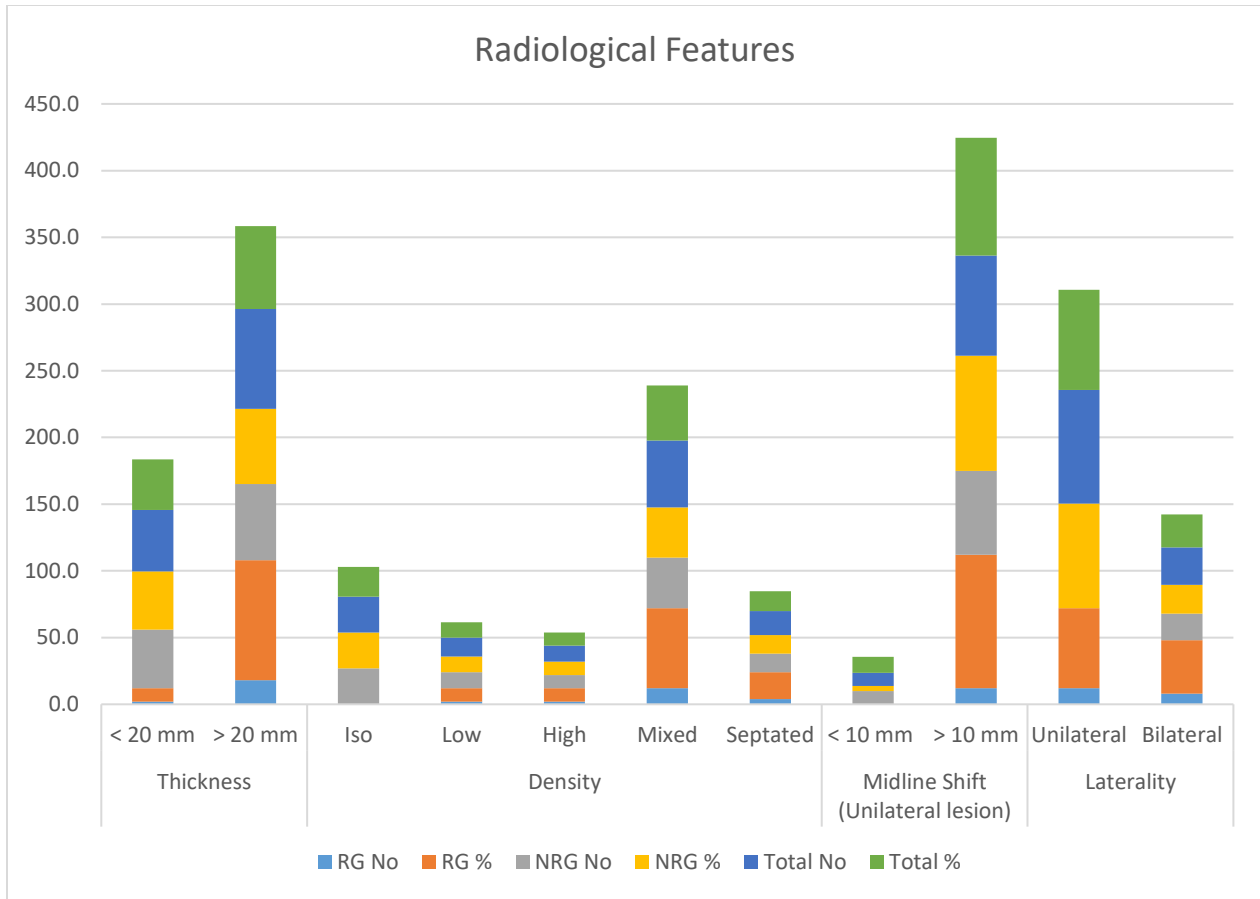
There were total 80.50% (n: 91) males and 19.50% (n: 22) females in this research work. The average age of the patients was 63.45 years with a range from 40 years to 90 years. The reoccurrence was present in 17.70% (n: 20) patients. There were total 90.0% (n: 18) males and 10.0% (n: 2) females in the group of reoccurrence having the average age of 59.35 years with a range of age from 41 years to 81 years. The average age of the patients suffering from reoccurrence was not much different from the patients

without reoccurrence. Bilateral hematoma was present in 28 patients. Surgery of both sides carried out in 8 out of these total twenty eight patients. We operated total 121 sides in total 113 patients for chronic SDH.

Table-2 displays the association between reoccurrence of the issue & various pre-operative radiological factors. Pre-operative thickness of hematoma was present significant association with the recurrence of the disease.

Table-II: Preoperative radiologic features of chronic subdural hematoma on brain computed tomography.

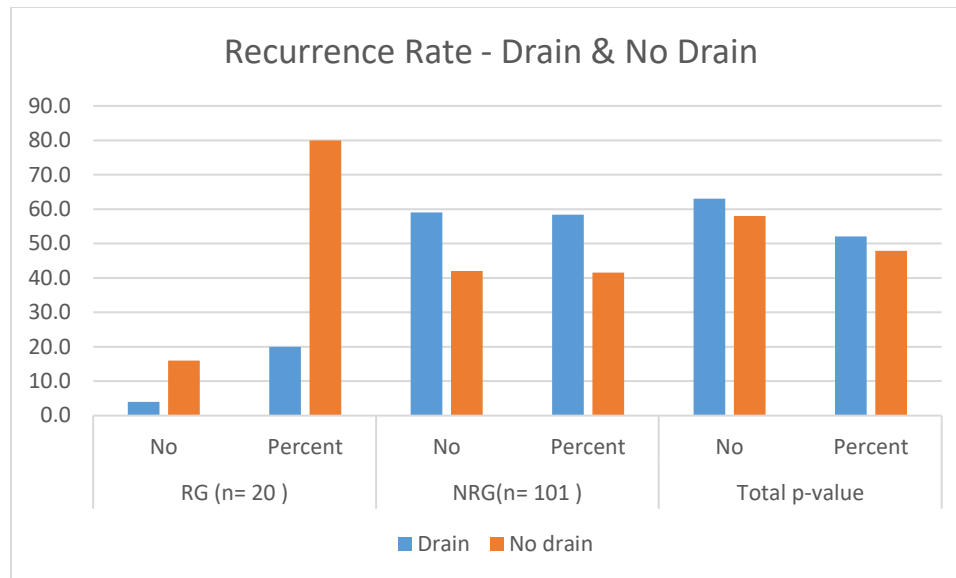
Radiological features		RAG		NRG		Total		p-value
		No	%	No	%	No	%	
Thickness	< 20 mm	2.0	10.00	44.0	43.60	46.0	38.00	0.0050
	> 20 mm	18.0	90.00	57.0	56.40	75.0	62.00	
Density	Iso	0.0	0.00	27.0	26.70	27.0	22.30	0.0970
	Low	2.0	10.00	12.0	11.90	14.0	11.60	
	High	2.0	10.00	10.0	9.90	12.0	9.90	
	Mixed	12.0	60.00	38.0	37.60	50.0	41.30	
	Septated	4.0	20.00	14.0	13.90	18.0	14.90	
Midline Shift (Unilateral lesion)	< 10 mm	0.0	0.00	10.0	3.70	10.0	11.80	0.1720
	> 10 mm	12.0	100.00	63.0	86.30	75.0	88.20	
Laterality	Unilateral	12.0	60.00	73.0	78.50	85.0	75.20	0.0820
	Bilateral	8.0	40.00	20.0	21.50	28.0	24.80	



There was no association between the recurrence and bilaterally, density of hematoma & midline shift. The relationship of the drainage after surgery with the recurrence of the problem is present in Table-3.

Table-III: Comparison of recurrence rates with and without drainage.

Status	RAG (n= 20)		NRG(n= 101)		Total p-value		P Value
	No	Percent	No	Percent	No	Percent	
Drain	4.0	20.00	59.0	58.40	63.0	52.10	0.0020
No drain	16.0	80.00	42.0	41.60	58.0	47.90	



DISCUSSION:

There is an increase in the prevalence of CSDH [6]. The range of its occurrence is from 3.0% to 30.0% where this research work showed a rate of recurrence as 17.70%. There are reports about different radiological factors of risk for recurrence of CSDH as thickness of hematoma, density of hematoma, bilateral CSDH and pre-operative midline shift. But the results discovering the consistent risk factors have been hard to reproduce [6, 7, 9, 10, 13-20].

Various research work discovered the thickness of hematoma as a factor of risk for recurrence of CSDH [12, 18, 20]. Yamamoto [21] stated that there is tendency of recurrence with the hematomas of larger size. Various authors also discovered the large hematomas of equal or greater than 20 millimeter to be significantly associated with the high rate of recurrence. Midline displacement before surgery as predictor for this issue of recurrence is debatable, with research works present with conflicting outcomes. Jung Lee [6] & Dae Song [15] discovered midline displacement before surgery to be as predictor of the recurrence of CSDH, while Ecosa M [10] & Yoon Jung [17] found that there was no association with the recurrence of CSDH with the midline displacement before surgery. In this current research work, the association between these two factors was no significant.

Many professionals cited the density of the hematoma as a factor of risk for the recurrence [12, 20, 22, 23]. In this current research work, we discovered no significant association between the density of hematoma and recurrence of problem. So the results of

this research work are much consistent with the outcome of research works conducted by Jung Min Lee [6] & Yoon-Gyo Jung [17] who did not discover any relationship between density of hematoma as well as recurrence of CSDH.

There is possibility of having past brain atrophy among the patients suffering from bilateral chronic subdural hematoma, which can be the reason of adverse re-expansion of brain [18]. Some research works conducted in past propose very high rates of recurrence in bilateral CSDH [6, 14, 15]. This association was no significant in this current research work. But even with no statistical significance, bilateral chronic subdural hematoma could present fast & progressive intensification with enhanced intracranial pressure, thus there is need of surgical intervention just after its indication [12].

The discussion about the effectiveness of the post-operative drainage of CSDH is controversial matter. Some research works stated that there was no beneficial impact, while some other research works report very low rates of recurrence with the utilization of post-operative drainage due to the brain expansion [3, 8, 22, 24, 25]. A recent analysis found that drainage after surgery is very effective in CSDH treatment and it should be strongly recommended [2]. The results of this research work also confirmed this finding as drainage after surgery reduced the rate of recurrence of chronic subdural hematoma in this research work.

There are some restriction of this research work as small amount of the samples, retrospective nature and a non-randomized research work. There is requirement

of further research works with large size of samples to consolidate the particular risk factors of radiology for the reoccurring of the CSDH.

CONCLUSION:

Hematoma thickness ≥ 20.0 millimeters before surgery is very important predictor for the recurring of CSDH. Post-surgical drainage also has the ability for the reduction of the recurrence of CSDH.

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