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A RETROSPECTIVE STUDY IN PATIENTS WITH SPONTANEOUS NON TRAUMATIC INTRACEREBRAL HEMORRHAGE TO ASSESS PREDICTORS OF POOR OUTCOME USING COMPUTED TOMOGRAPHY.

Radiodiagnosis

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ABSTRACT

The primary purpose of this study is to document the location and volume of intracerebral haemorrhage, subarachnoid /ventricular extension, and various types of brain herniations and also to assess relation of the extent of damage to patient management and the outcome. Fifty patients who came to the hospital with a spontaneous intracerebral haemorrhage underwent non contrast CT evaluation. Results showed that SICH was higher among males (peak age between 41 to 60 years) with hypertension being the most critical risk factor. Many of the patients showed a volume of bleed less than 30mL and intraventricular extension was seen in 38%. The supratentorial location of haemorrhage (86%) was more common compared with the infratentorial location (14%) with the most common site being basal ganglia (26%). SICH volume of more than 60 mL, infratentorial location, and intraventricular extension were found to be independent predictors of poor outcome, while patients with ICH volume of less than 30 mL had a good prognosis. Hence ICH volume of more than 30 mL may be one of the criteria for surgery. Intra cerebral haemorrhage is the most devastating form of stroke, with high mortality and severe disability among survivors.

KEYWORDS

Spontaneous intracerebral haemorrhage, supratentorial.

INTRODUCTION:

Intracerebral hemorrhage (ICH) is spontaneous extravasation of blood into the brain parenchyma. Intra cerebral haemorrhage is the most devastating form of stroke, with high mortality and severe disability among survivors. It accounts for 4 to 14 % of all strokes, with a higher reported incidence in Asian countries than the west and is associated with increased mortality and morbidity. Approximately half of the deaths occur within the first 24 hours, highlighting the importance of early and influential treatment. An emergent NECT scan is generally the first-line imaging procedure of choice in patients with spontaneous intracerebral hemorrhage because of its widespread availability and speed. The main aim of imaging is to identify the type of bleed and thus categorize the patients under either surgical or medical management. Imaging plays a crucial role in the management of SICH, both in establishing the diagnosis and satisfying the patients for subsequent treatment. Earlier clinical expertise, plain skull radiographs, cerebral angiography, and isotope scans played a primary role in diagnosis. CT scans can image soft tissues and cranial bones with a significant degree of accuracy and speed. It also has a high sensitivity of detection of intracranial hemorrhage. Besides providing the definitive diagnosis, computed tomography also shows essential characteristics of the hematoma, such as location, volume, age, the extension to subarachnoid spaces and ventricular system, presence, and extent of surrounding edema and brain herniation. The purpose of the study is to evaluate the role of non-enhanced CT in spontaneous intracerebral hemorrhage (SICH) to determine the volume and location of the haemorrhage, associated complications and their impact on patient management.

OBJECTIVES:

1. To document the location, volume of intracerebral hemorrhage, and subarachnoid/ intraventricular extension.
2. To document various types of brain herniations, midline shift, and their relation to the patient's management and outcome.
3. To document the relationship between the extent of damage and outcome.

MATERALS AND METHODS:

The study was conducted at the Department of Radiodiagnosis, Alluri Sitarama Raju Academy of Medical Sciences, West Godavari District, for duration of 12 Months (March 2019 to March 2020). The data necessary for the study was collected from patients who presented with spontaneous intraparenchymal haemorrhage and were subjected to NCCT evaluation using a GE Revolution ACT 50 slice scanner. The study group had a sample size of 50 patients.

RESULTS:

Sites of Intracerebral haemorrhage -Basal ganglia are the commonest site for SICH and were seen in 13 cases (26%). Pontine and midbrain SICH were the least common

Table 1: Sites of intracranial heamorrhage

Sites	No. of Patients	Percentage
Basal Ganglia	13	26%
Thalamus	12	24%
Thalamo Ganglia	04	08%
Lobar	14	28%
Cerebellum	06	12%
Midbrain and Pons	01	02%
Total	**50**	**100%**

Location of spontaneous intracerebral haemorrhage- SICH was supratentorial in 43 patients (86%) and infratentorial in 7 patients (14%)

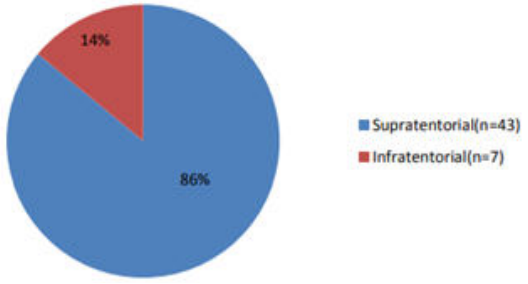


Figure 1: Supratentorial / infratentorial

The volume of haemorrhage-Intracerebral haemorrhage with the volume of bleed in the range of 0-29 mL was seen in 30 patients (60%), 30-59 mL was seen in six patients (12%) and greater than 60mL was seen in 14 patients (28%)

Presence of Midline Shift- Midline shift was seen in 27 patients (54%), while the rest did not have significant midline shift. Intraventricular Extension of haemorrhage- Out of 50 patients studied, 23 patients (46%) had an intraventricular extension of the bleed

Table 2: Intraventricular extension and outcome

Outcome	Intraventricular Extension	
	Absent	Present
Live	20(84%)	11(57%)
Dead	04 (16%)	08 (42%)
	Uncorrected chi-square P = 0.0126	

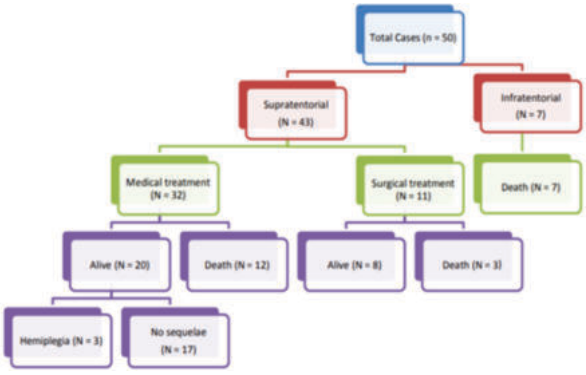
Causes for Spontaneous Intracerebral Hemorrhage- The most typical cause for SICH was hypertension seen in 41cases (82%), and there were 2 cases of aneurysmal bleed and only one case of AV Malformation

Subarachnoid Extension of SICH- Subarachnoid extension of bleed is seen in only one patient (4%), attributed to aneurysmal rupture.

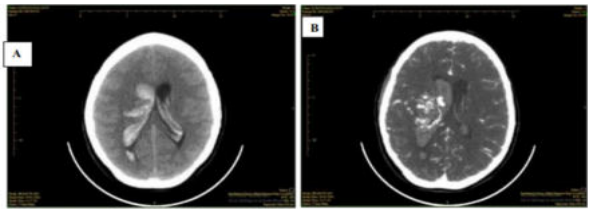
Intraventricular Extension and Mortality- Intraventricular extension of Supratentorial SICH was seen in 19 patients of whom 08 patients died (42%), which was statistically significant compared to mortality in patients who did not have an intraventricular extension (P=0 .0126).

The volume of haemorrhage and mortality- Out of 45 patients with supratentorial bleed, 26 patients had bleed volume less than 30cc, of which 22 are alive—these values are statistically significant (P< 0.0011).

Prognostic outcome



REPRESENTATIVE CASES



(A) 22-year-old G1P0 women at 11.5 weeks gestation, right thalamic bleed with intraventricular extension.(B) CT angiography was done and showed an AVM in the right lentiform nucleus and right thalamus. The patient was operated by evacuation of hematoma and repair of the AVM, following which the patient recovered.

A 65-year-old male patient with haemorrhage in the cerebellum with the volume of 8mL and with no intraventricular extension, he was treated medically, but the patient did not survive.

DISCUSSION:

Intra cerebral haemorrhage (ICH) is defined as the extravasation of blood into the brain parenchyma. Intra cerebral haemorrhage is the most devastating form of stroke, with high mortality and severe disability among survivors; it is considered a potentially life-threatening neurologic event. Approximately half of the deaths occur within the first 24 hours, highlighting the importance of early and effective treatment. Spontaneous variety of intracerebral haemorrhage (SICH) primarily indicates a brain parenchymal bleeding in the absence of a preceding traumatic event. Although most commonly due to hypertension, SICH can result from underlying pathologic lesions or other medical conditions, and identification or exclusion of these secondary causes is critical in determining management. Furthermore, the immediate complications of SICH, many of which may be identified with imaging, dramatically influence the prognosis. Therefore, imaging plays a significant role in the care of patients with SICH.

Non-contrast Computer tomography provides a useful means of diagnosing intracerebral bleed as it is the most rapidly and commonly available tool. Besides providing the definitive diagnosis, computed tomography also shows essential characteristics of the hematoma, such as location, volume, age, an extension to subarachnoid spaces and ventricular system, presence and extent of surrounding oedema and brain herniation. Most of the studies have been done to determine the radiological outcome of intracranial haemorrhage.

In this study, fifty patients of spontaneous non-traumatic intracerebral 56 haemorrhage were evaluated by non-contrast computed tomography. Patients were selected based on Clinical examination suggestive of intracerebral haemorrhage. All the patients above 18 years of age with clinical symptoms suggestive of intracerebral haemorrhage were included in the study. Those with a history of trauma, suffering from a coagulation disorder, on thrombolytic therapy were excluded.

SEX INCIDENCE: In this study, non-traumatic spontaneous intracerebral haemorrhage was higher among males (n=30;60%) than females (n=20;40%).

AGE INCIDENCE: In our study of 50 patients with non-traumatic spontaneous intracerebral haemorrhage, the incidence of occurrence has gradually increased with age.

ETIOLOGY: In our study of fifty patients, hypertension was present in 41 patients (i.e. 82%) and was determined as the primary cause for spontaneous intracerebral haemorrhage in them.

VOLUME OF BLEED: In our study, we have categorized the patients with intraparenchymal haemorrhage according to the volume of bleed.60%(n=30) of the patients had the volume of hematoma in the range of 0-29 ml,12%(n=6) of patients in 30-59 ml and 28% of patients(n=14) in above 60 ml. The volume of hematoma in our study ranged from 0.5 mL to 118 mL.

LOCATION OF BLEED (supratentorial vs infra-tentorial): In our study, spontaneous intraparenchymal haemorrhage was supratentorial in 43 patients (86%) and infratentorial in 7 patients (14%). Studies have shown that infratentorial haemorrhage tends to have a poorer prognosis compared with supratentorial haemorrhage. The incidence of 30-day mortality has been reported in one study to be about 53% with infratentorial bleed 23. These study results correlated with that of our research.

INTRAVENTRICLAR EXTENSION: In our study, the intraventricular extension of haemorrhage was seen in 19 patients of whom 11 patients (57.9%) died, this is statistically significant (*P* = .0126)

SITE OF INTRACEREBRAL HEMORRHAGE: Of all patients in our study,13 patients had basal ganglia haemorrhage(26%), followed by 14 patients with lobar bleed (28%),12 patients with thalamic bleed (24%), four patients with thalamoganglionic haemorrhage (8%), six patients with cerebellar haemorrhage (12%), one patient with midbrain

and pontine bleed (2%).The location and distribution pattern of intraparenchymal haemorrhage in the studies conducted by Kase CS et al. 37 and Tatu L. et al.44.matched with our research.

CONCLUSION:

Evaluating the CT findings in spontaneous intracerebral haemorrhage it was seen that CT provides an excellent imaging modality for detecting intracerebral haemorrhage, quantifying the bleed, and managing further. Various factors influence clinical outcome in SICH, including volume of ICH, intraventricular extension, and supratentorial versus infra-tentorial location. The study aimed to document the location and volume of intracerebral haemorrhage, subarachnoid /ventricular extension, and various types of brain herniations. The relation of the extent of damage to patient management and the outcome was analyzed. This prospective study was carried out on 50 patients with a spontaneous intracerebral haemorrhage for a period of 18 months. They were evaluated with non-contrast computed tomography of the brain. Results showed that SICH was higher among males with a maximum number of patients older than 41years with hypertension as the most critical risk factor. Many of the patients showed a volume of bleed less than 30mL. The intraventricular extension was seen in 19 patients out of 50 patients (38%). The supratentorial location of haemorrhage (86%) was more common compared with the infratentorial location (14%) with the most common site being basal ganglia (26%). Of the total of 54 patients, seven patients had an infratentorial bleed.

Based on our findings, we conclude that:

1. Sex incidence of intracerebral haemorrhage is high in males.
2. The peak age group of intraparenchymal haemorrhage was 41-60years.
3. Hypertension is the major causative factor for non-traumatic spontaneous intracerbralhaemorrhage.
4. Thalamus and basal ganglia are the most typical sites of hypertensive intraparenchymal haemorrhage.
5. SICH volume involving more than 60 mL, infratentorial location, and intraventricular extension are independent predictors for poor outcome.
6. Patients with ICH volume of less than 30 mL have a good prognosis, and patients with ICH volume more than 30 mL may be considered suitable for surgery.
7. The management options in these patients depend on various clinical and CT findings. Further studies will help to develop a management algorithm for better patient outcomes

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