

Spontaneous Intracranial Haemorrhage (SIH): A Cross Sectional Study

Received: 18 February 2023, **Revised:** 22 March 2023, **Accepted:** 20 April 2023

Dr Kolluru A.B.Revanth

Department of Radiodiagnosis,
Krishna institute of medical sciences, Krishna Vishwa Vidya peeth, Karad.

Keywords

SIH, SAH, IPH, etiology, CT and MRI scans.

Abstract

Various past studies have shown interest & proved that, SIH is a haemorrhage into brain due to causes other than trauma. According to studies, just 10% of strokes result in IH. As a result, CT and MRI scans were used in our study to explore and analyze the etiology and pathology of SIH. We concluded that males in older age groups are more likely than women to have IH. IPH, for instance, is twice as frequent as SAH; the most common locations for IPH were the lobar, basal ganglia, and thalamus; and hypertension is the leading cause of non-traumatic spontaneous cerebral hemorrhage.

1. Introduction

Since ages, it is known that SIH is a haemorrhage into brain due to causes other than trauma. Furthermore, according to studies only 10% of strokes can lead to IH.¹ Therefore, studies have concluded that in the analysis of SIH, location of haematoma is very important, which is termed as IPH when bleeding is into the brain parenchyma, subarachnoid when haemorrhage is into subarachnoid space around brain and intraventricular when bleeding has occurred purely into ventricles of brain.² Therefore, in our study we have used CT & MRI scans to evaluate & assess SIH etiology/pathology

AIM

The goal of our study was to evaluate & assess the etiology of SIH.

INCLUSION CRITERIA

1. Patients with clinical sign of IH were included in the study.
2. Both male & females were included.

EXCLUSION CRITERIA

1. Patients with head injury.
2. Patients with intra-tumoral bleed.
3. Patients suffering from coagulation disorder.
4. Patients on thrombolytic therapy.

2. Material & Method

STUDY DESIGN : We have conducted an observational cross sectional type of study.

STUDY PLACE : We have conducted our study in the department of Radiodiagnosis at KIMS, Karad.

STUDY PERIOD & DURATION: We have conducted our study around 18 months in total which started from January 2021 & ended with June 2022.

SOURCE OF DATA: All those patients who were suspected for intracranial haemorrhage were referred for CT & MRI scans.

SAMPLE SIZE: Total of 108 patients were included for our study purpose.

ETHICAL CLEARANCE : Approval was obtained by ethical committee KIMS, Karad prior to commencement.

INFORMED CONSENT: All those patients who were fulfilling the inclusion criteria were explained about the study & asked for written informed consent for the same.

METHOD

Journal of Coastal Life Medicine

We have asked each & every patient included in our study to underwent with 2 different scans for diagnosis of the etiology of SIH i.e, CT (Seimens somatom emotion 16 slice CT) & MRI [Seimen Magnetom Avanto (TIM+DOT) 1.5 Tesla MRI] scans.

TECHNIQUE

A. CT: Patient was asked to remove metallic objects including earrings, necklaces & any metallic removable dental prosthesis. Followed by intravenous Lorazepam (0.5 cc. To 5cc.) injections were given to those who all were restless.

Standard Brain Protocol

Patient position : Head in supine position with arms by their side.

Tube Voltage: 130 KV

Scout: Lateral

Scan direction: Caudocrainal

Scan Extent: C2 to vertex

Slice thickness: 4.8 mm & later reconstructed to 1.2 mm

B. MRI: We have performed non-contrast MRI scan for almost all the cases, contrast study was also included wherever necessary.

Examination technique

1. Patient were asked to remove jewellery, watches, credit cards, mobiles , hearing aid, pins, hairpins, metal zipper, any mettalic objects that can distort the image were removed.
2. Patient was given disposable earplugs to avoid noise.
3. T1 weighted, T2 weighted was done.
4. FLAIR & GRE was done.
5. Diffusion weighted & ADC was done.

The volume of IH was also measured by rapid simplified method wherein , we the formula we have used is $(A \times B \times C) / 2$,where A is the greatest haemorrhage diameter on axial CT scans, B is the largest diameter 90° to A & C is the number of CT slices with haemorrhage multiplied by slice thickness. The volume of IH was further categorized by : 0-29cc , 30-59cc & >60cc.

STASTICAL ANALYSIS

The data that we obtained through our research was entered into microsoft excell worksheet & further divided into different categories from which different data like rates, ratio , percentage was calculated.

3. Result

1. GENDER

Sex	No. of Patients	Percentage
Male	66	61%
Female	42	39%
Total	108	100%

TABLE 1: Gender Distribution

In our study , total of 108 patients participated , out of which 61% were male & remaining 39% were female.

2. SITE OF SIH

Site	No. of Patients	Percentage
Intraparenchymal haemorrhage	88	82%
Subarachnoid haemorrhage	20	18%
Total	108	100%

TABLE 2: Site Distribution

In our study we found that , 82% patients showed intraparenchymal haemorrhage on other hand 18% showed primary subarachnoid haemorrhage.

3. Age

Age	Non-Traumatic Spontaneous Intracranial Haemorrhage	
	IPH	SAH
20-29	2	2
30-39	8	1
40-49	10	2
50-59	19	6
60-69	20	7
> 70	29	2
Total	88	20

TABLE 3: Age Distribution.

In our study we found that , age distribution for IPH was maximum at >70 years age group whereas for SAH it is maximum between 40-59 age group.

4. Volume of bleed in 88 patients of IPH

Volume (ml)	No. of Patients	Percentage
0-29	55	63
30-59	19	21
> 60	14	16
Total	88	100

Journal of Coastal Life Medicine

TABLE 4 : Volume Of Bleed (Iph)

In our study we have found that , 55 out of 88 patients showed 0-29 ml of IPH , 19 showed 30-59ml of blood & rest 14 showed >60 ml of bleed.

5. IVE in 88 patients of IPH

	No. of Patients	Percentage
With Intraventricular Extension	34	39
Without Intraventricular Extension	54	61
Total	88	100

TABLE 5 : Ive For Iph

In our study we have found that , 34 patients showed IVE with around 39% in total.

6. IPH with mass effect in form of midline shift

Intraparenchymal Haemorrhage	No. of Patients	Percentage
With midline shift	23	26%
Without midline shift	65	74%
Total	88	100

TABLE 6 : Iph With Mass Effect

In our study we have found that , 23 patients were found to have IPH with approximately 26%.

7. Distribution of IPH

Location	No. of Patients	Percentage
Supratentorial	75	85
Infratentorial	13	15
Total	88	100

TABLE 7: Distribution Of Iph

Journal of Coastal Life Medicine

In our study we have found that , 75 patients showed supratentorial location of bleed which was approx 85% whereas 13 patients showed infratentorial bleed with 15 %.

8. Site of IPH

Sites	No. of Patients	Percentage
Lobar	35	40
Basal Ganglia	25	28
Thalamus	13	15
Cerebellum	11	12
Brain Stem	4	5
Total	88	100

TABLE 8: Site Of Iph

In our study we have found that , 35 patients showed IPH on lobar site , 25 showed on basal ganglia site, 13 showed on Thalamus site , 11 showed on cerebellum site & remaining 4 patients showed on Brain stem site respectively.

9. Patients underwent CT & MRI

Modality	Non-Traumatic Spontaneous Intracranial Haemorrhage	
	IPH	SAH
CT	25	6
CT & MRI	43	11
MRI	20	3
Total	88	20

TABLE 9: Patient With Ct & Mri

In our study we have found that , 25 patients showed IPH whereas 6 showed SAH in CT scan. For CT & MRI scans 43 showed IPH & 11 showed SAH . Furthermore, in MRI 20 patients showed IPH whereas 3 patients showed SAH respectively.

10. Stages of IPH on MRI

Stage	No. of Patients	Percentage
Hyperacute	27	43
Acute	19	31
Early Subacute	10	15
Late Subacute	6	9
Chronic	1	2
Total	63	100

TABLE 10: Stages of Iph

In our study we have found that , 27 patients showed hyperacute stage ,19 showed acute stage, 10 showed early subacute , 6 showed late subacute & remaining 1 patient showed chronic stage.

11. Cause of NTISCH

CAUSE	No. of Patients
Hypertensive	83
Venous Thrombosis	9
Aneurysmal	8
Cerebral Vascular Malformations	3
Vasculitis	1

TABLE 11: Causes

In our study we have found that,83 patients showed hypertensive , 9 patients showed venous thrombosis , 8 showed aneurysmal , 3 showed cerebral vascular malformations & remaining 1 patient showed vasculities.

12. Patients underwent surgery

	Operated	Not operated
Midline shift (23)	17	6
Volume > 30)- (33)	22	11

TABLE 12: Surgery patient

In our study we have found that , 17 patients were operated with midline shift whereas 6 were not operated with midline shift .

4. Discussion

According to many studies,most significant risk factors for nontraumatic spontaneous cerebral haemorrhage is

Journal of Coastal Life Medicine

hypertension.³ Another study showed that cerebral amyloid angiopathy & hypertension showed 2 main risk factors for primary IH.⁴

GENDER DISTRIBUTION

In our study we have found that , 66 males showed higher rate of non-traumatic spontaneous cerebral haemorrhage than females 42 . Studies have shown that , males are more commonly seen affected by this disease than females.⁵ Furthermore, its prevalence increases as age increases. In another study , males showed higher prevalence of cerebral haemorrhage.⁶ Additionally, another study included male with (61.55%) at high rate of cerebral haemorrhage than females with (38.46%) which is consistent with our research.⁷

AGE DISTRIBUTION

According to studies age is a significant prognostic factor in patients with non-traumatic spontaneous cerebral haemorrhage. Studies have revealed that, men are more likely to affect with this problem than females with increase in age.⁸ Furthermore, similar studies have shown that, mean age of IH patients was 68 years or above.⁶ Whereas in our study we have found that , 63% patients had IH between 0 to 29ml , 21% had volume between 30-50ml & remaining 16% had volume over 60 ml.

IPH VS SAH

In our study we found that , IPH more frequently occur than SAH . Further, studies also had similar conclusions wherein they revealed more frequency of IPH than SAH.³

NONTRAUMATIC

Studies have shown that more changes of Spontaneous cerebral haemorrhage were IPH than SAH.⁹ Hence , SAH showed more frequently IPH than SAH.

SITE

In our study supratentorial bleeding is 85% more frequent than infratentorial bleeding upto 15%. On other hand non-lobar bleeding was upto 60% more frequent than lobar bleeding upto 40%. Furthermore, out of 88 patients who experienced IPH in our study , 35 had lobar bleed upto 40 % followed by basal ganglia with 28% , thalamic cases with 15% ,

cerebellar case with around 12% & remaining brainstem with 5% cases.

MIDLINE SHIFT & VOLUME

In our study , we followed up patients of midline shift & volume of >30cc. Here, out of 23 patients of midline shift , 17 were operated & 6 were not operated & managed conservatively.

5. Conclusion

Early cerebral haemorrhage detection with CT is an effective imaging modality that greatly improves patient care. However, MRI is more specific than CT in determining the age of haemorrhage & hence useful in multiple bleed at different places & times. Thus through our research we have come to a conclusion that, males are more likely to suffer with IH than females with older age group precisely, IPH is twice more common than SAH, most frequent locations for IPH were lobar , basal ganglia & thalamus and the main contributing factor for non-traumatic spontaneous cerebral haemorrhage is hypertension.

Reference

- [1] Hill MD, Silver FL, Austin PC, Tu JV. Rate of stroke recurrence in patients with primary intracerebral hemorrhage. *Stroke*. 2000 Jan;31(1):123-7.
- [2] Fernandes H. Spontaneous intracranial haemorrhage. *Surgery (Oxford)*. 2004;3(22):66-8.
- [3] Broderick JP, Brott T, Tomsick T, Miller R, Huster G. Intracerebral hemorrhage more than twice as common as subarachnoid hemorrhage. *Journal of neurosurgery*. 1993 Feb 1;78(2):188-91.
- [4] Adnan I, Oureshi M, Tuhim S. Spontaneous intracranial haemorrhage. *New England Medicine Journal*. 2001;344:19-30.
- [5] da Rocha AJ, da Silva CJ, Gama HP, Baccin CE, Braga FT, de Araújo Cesare F, Veiga JC. Comparison of magnetic resonance imaging sequences with computed tomography to detect low-grade subarachnoid hemorrhage: role of fluid-attenuated inversion recovery sequence. *Journal of computer assisted tomography*. 2006 Mar 1;30(2):295-303.
- [6] Franke CL, Van Swieten JC, Algra A, Van Gijn J. Prognostic factors in patients with intracerebral

Journal of Coastal Life Medicine

- haematoma. *Journal of Neurology, Neurosurgery & Psychiatry*. 1992 Aug 1;55(8):653-7.
- [7] Juvela S. Risk factors for multiple intracranial aneurysms. *Stroke*. 2000 Feb;31(2):392-7.
- [8] Fewell ME, Thompson GB. Spontaneous intracranial haemorrhage. A review of *Neurosurgery*. 2002;15:1-8.
- [9] Obajimi MO, Nyame PK, Jumah KB, Wiredu EK. Spontaneous intracranial haemorrhage: computed tomographic patterns in Accra. *West African Journal of Medicine*. 2002 Jan 1;21(1):60-2.