

Computed Tomography Pattern of Non-Traumatic Intracranial Hemorrhage in Tertiary Hospital of Nepal-A Cross Sectional Study

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ABSTRACT

Objective: We aimed to study the pattern of non-traumatic intracranial hemorrhage on Computed Tomography in tertiary hospital of Nepal.

Methodology: 180 cases of intracranial hemorrhage (108 male and 72 female), diagnosed on computed tomography and aged >18 years were enrolled in the study. Cases with known history of trauma and previous intracranial hemorrhage were excluded. CT scan of head was performed in 128 slice Multidetector Philips CT scan Machine using 120 kV and auto mA with multiplanar reconstruction on dedicated workstation. Size and site of hematoma was noted. Intracranial hemorrhage was classified into different types- intraparenchymal, intraventricular, subarachnoid, subdural and epidural. Presence or absence of perilesional oedema was noted separately. SPSS 20 was used for the entry and analysis of the collected data.

Result: Mean age of the study population was 64.6 years ranging from 19 years to 92 years. 60% were male and 40% were female. The most common type of non-traumatic intracranial hemorrhage was intraparenchymal (91.1%) followed by intraventricular (5.6%), subarachnoid (2.2%) and subdural (1.1%). Perilesional oedema was seen in 69.4 % of intracranial hemorrhage. The age group with maximum cases (53.3%) of intracranial hemorrhage was >60 years followed by 50-60 years.

Conclusion: Intraparenchymal type was the most common type of non-traumatic intracranial hemorrhage as seen on computed tomography. Male gender and older age were significantly associated with intracranial hemorrhage.

KEYWORDS: Intracranial hemorrhage, Computed Tomography, Perilesional oedema.

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INTRODUCTION

Intracranial hemorrhage is an important and common clinical condition in which there occurs bleeding inside brain. Etiology of intracranial hemorrhage could be traumatic or non-traumatic. Whatever might be the cause, morbidity and mortality rates due to intracranial hemorrhage are high because of damage of vital areas inside the brain [1] [2]. Cerebrovascular accident that occurs because of sudden bleeding in the brain is called a hemorrhagic stroke which accounts for around 10-15 % of total stroke cases. Hemorrhagic stroke is caused by hypertension, vascular malformation, ruptured aneurysm, bleeding disorders etc.[3] [4]. Patients suffering from intracranial hemorrhage usually present at emergency with sudden loss of consciousness,

sudden headache, vomiting or seizure. Intracranial hemorrhage must be diagnosed as soon as possible for prompt subsequent management.

Computed tomography is the most preferred modality for the diagnosis of intracranial hemorrhage [5]. Computed tomography can diagnose intracranial hemorrhage with high sensitivity and rule out intracranial hemorrhage in the patients presenting with symptoms of acute ischemic stroke. Computed tomography gives detail information about site of involvement, size of hematoma, associated finding and complications. These information are vital for deciding the further modality and course of patient management. Furthermore, certain pattern of intracranial hemorrhage on computed tomography is associated with specific cause [6],

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which might be useful in unconscious patients with unknown history.

Non-traumatic intracranial hemorrhage can be classified into intra-parenchymal, intraventricular, sub-arachnoid, subdural and epidural on the basis of bleeding sites. Computed tomography possesses high sensitivity as well as high specificity for the diagnosis of all the types of intracranial hemorrhage. We conducted this study to estimate the proportion of different types of non-traumatic intracranial hemorrhage in patients presenting at emergency who were referred for computed tomography of head. The findings and conclusion of this study will be helpful to estimate the causes and risk factors of non-traumatic intracranial hemorrhage so that proper measures can be taken to reduce its occurrence throughout the country.

METHODOLOGY

We conducted this descriptive cross sectional study at National Academy of Medical Sciences, Bir Hospital, Kathmandu, Nepal from October 1, 2023 to December 31, 2023. Total 180 cases of non-traumatic intracranial hemorrhage diagnosed on Computed Tomography (CT) of head were selected for the study. Cases with intracranial hemorrhage on CT and age more than 18 years were included in the study. Exclusion criteria were any known history of trauma and recent history of intracranial hemorrhage. CT scan was performed in 128 slice Multidetector Philips CT scan Machine using 120 kV and auto mA from base of skull to the vertex in a plane parallel to orbitomeatal line at 5 mm axial slice thickness and 5 mm interval. Multiplanar reconstruction was done using thin sections in dedicated workstation.

On CT head, a well defined hyperattenuating focus or area with attenuation coefficient measuring +50 to +90 Hounsfield Unit (HU) was considered as intracranial hemorrhage.

According to the site involved, intracranial hemorrhage was classified into intra-parenchymal, intraventricular, sub-arachnoid, subdural and extradural type. Intraparenchymal hemorrhage was further classified into subtypes- basal ganglia, pontine, cerebellar, supratentorial and infratentorial. Perilesional oedema was defined as hypoattenuating area surrounding the area of hemorrhage and its presence or absence was noted in each case.

SPSS 20 was used for the entry and tabulation of the collected data. Frequency distribution was calculated according to age group and gender. Data was analyzed to calculate the proportion of different type of intracranial hemorrhage. Frequency of occurrence of specific sub-types of intra-parenchymal hemorrhage (basal ganglia, pontine or cerebellar) was also calculated.

RESULTS

We included total 180 cases in our study, among which 108 were male (60%) and 72 were female (40%). Mean age of the participants was 64.6 years ranging from 19 years (minimum) to 92 years (maximum). The age group in which maximum cases of intracranial hemorrhage was noted (53.3%) was more than 60 years which was followed by 50-60 years as shown in Table 1. Only one case was seen below the age of 20 years. Intra-parenchymal was the most common type of intracranial hemorrhage seen in 91.1 % of the cases. Intraventricular type was seen in 5.6 %, subarachnoid type was seen in 2.2 % and subdural type was seen in 1.1 % cases (Figure 1). Not even a single case of extradural type was seen in our study. Among the sub-types of intra-parenchymal type, basal ganglia hemorrhage was found to be the commonest one and seen in 55.1 % of the cases. Majority of the cases of intracranial hemorrhage showed surrounding perilesional oedema (69.4%).

Table 1: Distribution of study population according to age group

Age (years)	Male	Female	Total
<20	1	0	1
20-30	3	3	6
30-40	7	5	12
40-50	9	6	15
50-60	28	22	50
>60	60	36	96
Total	108	72	180

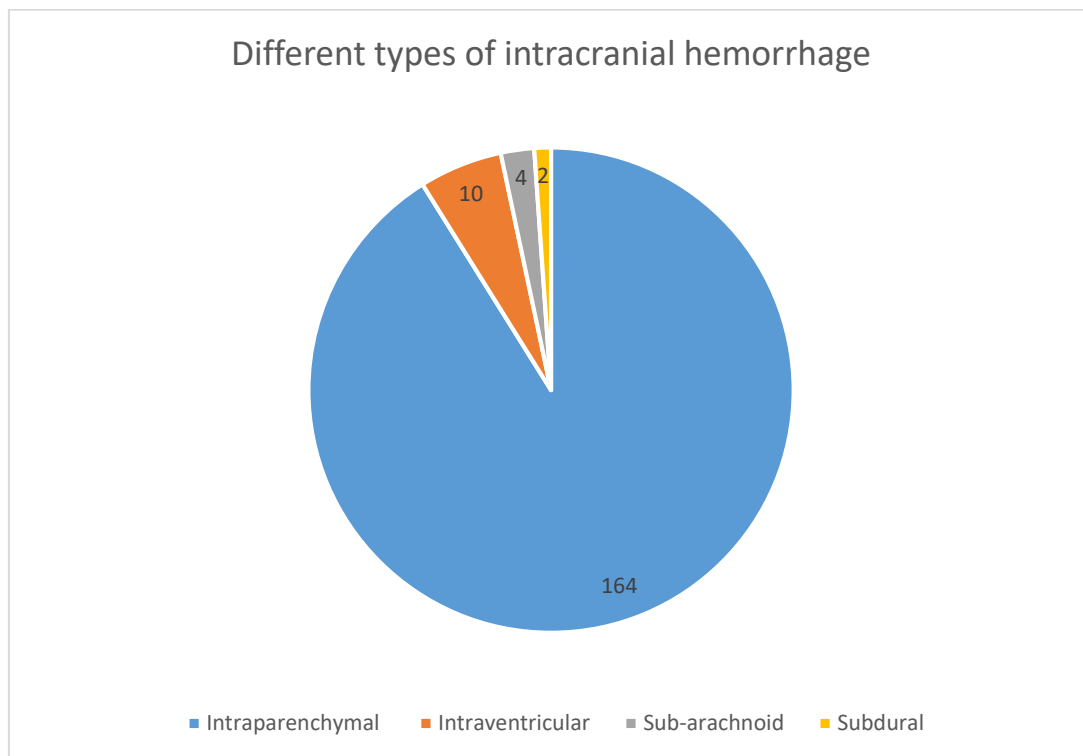


Figure 1: Distribution of different types of intracranial hemorrhage (Pie chart)

DISCUSSION

Our study showed that older age was a common risk factor for intracranial hemorrhage. It was clearly seen in our study that more than half (53.3%) of the cases were of age more than 60 years. Among the remaining cases, it was also seen that the occurrence of intracranial hemorrhage was significantly increasing from younger age group to older age group. Intracranial hemorrhage was more commonly seen in male (60%) than in female (40%) patients. Previous study conducted by Galati et.al. had also showed similar findings[7]. Similarly, another study done by Forti et.al. in Italy also showed that older age was found to significantly associated with intracranial hemorrhage[8].

The most common type of intracranial hemorrhage seen in our study was intra-parenchymal in 91.1% cases. Extradural hemorrhage was not observed in even a single case in our study which might be due to very less occurrence in non-traumatic cases or relatively small sample size. Previous studies conducted by Emmanuel Kobina Mesi Edzie et.al. [9] and Obajimi et.al. [10] had also reported the similar findings. Hence, findings of our study matched to that of previous studies.

CONCLUSION

The most common type of non-traumatic intracranial hemorrhage was intra-parenchymal (91.1%) and it was typically seen on Computed Tomography as hyperattenuating area surrounded by hypoattenuating perilesional oedema. Male gender and older age were found to be significantly associated with occurrence of intracranial hemorrhage.

CONFLICT OF INTEREST

No conflict of interest. No external funding.

LIMITATION

This is primarily hospital based study, so the results might not truly reflect that of general population.

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