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ROLE OF MDCT IN EVALUATION OF SPONTANEOUS INTRACRANIAL HAEMORRHAGE

KEYWORDS: Intracerebral haemorrhage, subarachnoid haemorrhage, spontaneous intracranial haemorrhage, hypertension, Computed Tomography.

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ABSTRACT *Spontaneous intracranial haemorrhage – that is, mainly subarachnoid haemorrhage (SAH) and primary intracerebral haemorrhage (PICH) – constitutes an important part of all strokes. As previous epidemiological studies have demonstrated highly variable incidence rates, we conducted a large prospective investigation of all haemorrhage strokes during a one and half year period.*

INTRODUCTION

Intracranial haemorrhage is a common outcome of acute cerebrovascular accidents which may lead to neurological deterioration and is a frequent indication for the urgent neuro imaging. The aim of imaging is to identify the type of haemorrhage and thus select the patient who requires either surgical or medical management. Craniocerebral trauma and hypertension are the two most important causes of intracranial haemorrhage.

CT has got high sensitivity of detection of intracranial haemorrhage. With in a short time CT scan image soft tissues as well as cranial bones with significant degree of accuracy.

AIMS AND OBJECTIVES

1.Evaluation of the site and type of intracranial haemorrhage.
2.Evaluation of the volume of intracranial haemorrhage.
3.To detect the following associated features of intracranial haemorrhage
Site of intracranial haemorrhage,Intraventricular extension of haemorrhage, Mass effect in the form of midlineshift, Subarachanoid extension.

SPONTANEOUS INTRACRANIAL HAEMORRHAGE

Spontaneous intracranial haemorrhage is haemorrhage into the brain due to causes other than trauma.

Types of Spontaneous Intracranial Haemorrhageand ComputedTomography Features

Intracerebral haemorrhage is classified as either primary or secondary depending on the underlying possibility. Primary intracerebral haemorrhage (PICH) accounting for 78-88% of cases, originates from spontaneous structure of small vessels damaged by chronic hypertension or amyloid angiopathy. Secondary intracerebral haemorrhage occurs in minority of patient in association with vascular abnormalities such as (arteriovenous malformations and aneurysms), tumours, or impaired coagulation.

PICH was defined as spontaneous ICH in the absence of secondary cause such as vascular malformation, vasculitis, moyamoya disease, aneurysm, cortical vein/sinus thrombosis, neoplasm, trauma, postoperative event, hyperviscocity syndrome, hemorrhagic diathesis, or ischaemic stroke. ICH included patients with hypertension and with pathologically proven amyloid angiopathy[1].

A fresh haematoma on NCCT appears as a homogenously dense (55-90 HU) well defined lesion with a rounded to oval configuration. A thin well defined low density zone surrounding the haematoma can be observed as early as a few hours after the haemorrhage. This rim is caused by clotting of liquid haemorrhage with extrusion of low-density plasma at the periphery of haematoma.

HYPERTENSIVE HAEMATOMA

The location of hypertensive intraparenchymalhaemorrhage was seen in putaminal location (33%), lobar (23%), thalamic (20%), cerebellar (8%), pontine (7%) and miscellaneous in 9% of cases. CT appearance is hyperdnsity of attenuation in involved area .

IntraventricualrHaemorrhage

Primary intraventricualrhaemorrhage is a rare event, can sometimes be traced to a vascular malformation or neoplasm in the choroids plexus. More often such a haemorrhage is the result of paraventricualr bleeding, in which blood enters ventricles immediately without producing a large parenchymal clot. On CT Blood in the ventricles appears as hyperdense material, heavier than CSF and thus tends to pool dependently, best seen in the occipital horns.

Subarachnoid haemorrhage is the most common presenting symptom of a cerebral aneurysm, is the second most common cause of subarachnoid haemorrhage, after trauma. Eighty percent to 90% of nontraumatic subarachnoid haemorrhage are due to a ruptured cerebral aneurysm, a far more common cause than an arteriovenous malformation, which accounts for less than 5% of subarachnoid haemorrhages. On CT hyperattenuating material is seen filling the subarachnoid space.

VASCULAR MALFORMATIONS

Vascular malformations are divided into four pathologic conditions. Arteriovenous malformations. Venourangioma, cavernous angioma and capillarlyhaemagioma (capillary telangiectasis).

CT findings of patient AVMs include serpiginous isodense or slightly hyperdense vessels that enhance strongly following contrast administration. Calcification is identified in 25% to 30% of cases. Sometimes an AVM has a small nidus but very prominent enlarged draining veins. Occasionally even large AVMs are identified only after contrast administration. CT scans are useful for demonstrating acute haemorrhage from AVMs[2].

Bleeding into primary cerebral neoplasms are more commonly seen in pituitary adenoma followed by anaplastic astrocytoma, oligodendroglioma, ependymoma, primitive neuroectodermaltumour, epidermoid, metastases from lung, kidney, choriocarcinoma and melanoma are most likely to bleed. Bleeding into tumour occurs in 4 to 7 percent of all gliomas especially in glioblastomas, meduloblastomas and metastasis.

AMYLOID ANGIOPATHY

Cerebral amyloid angiopathy (CAA), also known as congophilicangiopathy, increases with advancing age and may

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be the most common cause of recurrent ICH in elderly normotensive patients[3]. On MDCT appear as cerebral haemorrhage, microhaemorrhages, onvexal subarachnoid haemorrhage

The volume of the intracranial haemorrhagewas categorized as 0 – 29 cc,30 – 59 cc,> 60 cc[4].

METHOD0LOGY
One hundred patients of intracranial haemorrhage were evaluated by non-contrast computed tomography in the ASRAM Medical College Hospital,Eluru.

Selection Criteria
Patients above 20 years of age of both sexes and Patients with clinical symptoms suggestive intracranial haemorrhage are included in our study..

Patients below 20 years of age,Patients with head injury, Patients with intra tumouralbleed, Patients suffering from coagulation disorder / on thrombolytic therapy are excluded in ourstudy.

Machine : Siemens Somatom Sensation 40

RESULTS
Results in our study correlated with previously done studies.

Sex Incidence
In our study 62% patients were male and remaining 38% werefemales.

Site Distribution
In our study 78% patients had intraparenchymal haemorrhage,21% patients had primary subarachnoid haemorrhage and remaining 1% had primary intraventricular haemorrhage.

Age Distribution
Age distribution for IPH is maximum between 60-69 age group.Agedistribution for SAH is maximum between 50-59 age group.And only one case of primary IVH which was seen in above 70 years age group.

Volume of Haematoma
55 out of 78 patients of intraparenchymalhaemorrhage had volume of bleed in the range of 0-29ml (71%).19 out of 78 patients of intraparenchymalhaemorrhage had volume of bleed in the range of 30-59ml (24%).4 out of 78 patients of intraparenchymalhaemorrhage had volume of bleed in the range of above 60ml (5%).

Intraventricular Extension of Intraparenchymal Bleed
Out of 78 patients of intraparenchymalhaemorrage 25 patients had intraventricular extension of the bleed (32%).

Subarachnoid Extension of Intraparenchymal Bleed
Out of 78 patients of intraparenchymalhaemorrage 15 patients had subarachnoid extension of the bleed (19%).

Distribution of IntraparenchymalHaemorrhage
Total number of patients with intraparenchymalhaemorrhage is 78.Supratentorial location of bleed is 68 (87%). Infratentorial location of bleed is 10 (13%).

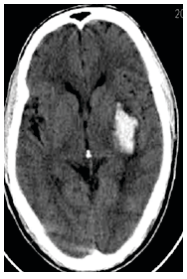
DISCUSSION
MDCT provides a useful means of diagnosing intracranial haemorrhage5. Most of the studies have been done to determine the radiological outcome of intracranial haemorrhage[6].

In this study an analysis done of 100 patients with intracranial haemorrhage, which includes only non-traumatic haemorrhage following radiological parameters of intracranial haemorrhage noted:

1.Site of intracranial haemorrhage.
2.Volume of intracranial haemorrhage.
3.Intraventricular extension of haemorrhage.
4.Subarachnoid extension of haemorrhage.

CONCLUSION
This study concludes following aspects of intracranial haemorrhage:Sex incidence of intracranial haemorrhage is high in male,Incidence of non traumatic spontaneous intracranial haemorrhage is high around 60 years of age,Thalamus and basal ganglia are the commonest sites of hypertensive intraparenchymalhaemorrhage.Intraparenchymalhaemorrhage twice the commonest than subarachnoid haemorrhage. Hypertension is the major causative factor for non-traumatic spontaneous intracranial haemorrhage. Peak age group for subarachnoid haemorrhage was 40-59 years, Peak age group of intraparenchymalhaemorrhage was 50-69 years.


RIGHT THALAMIC BLEED WITH INTRAVENTRICULAR EXTENSION


LEFT BASAL GANGLIAR BLEED


SUBARACHNOID HAEMORRAGE

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