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RATIONAL USE OF NON-CONTRAST CT IMAGING IN EMERGENCY NEURORADIOLOGY FOR A STANDALONE CT IMAGING SETUP FOR NON-TRAUMATIC CASES IN DEVELOPING AREAS.

Radiology

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ABSTRACT

Purpose: To prove that there is irrational use of non contrast CT (NCCT) head imaging in emergency department for non-traumatic cases and to discuss the encountered diagnostic dilemma. To form a more rational approach for discouraging such overuse and improve delivery of healthcare and reduce radiation hazard. **Methods and Materials:** This is a prospective observational study; Patients who were prescribed NCCT head and had no antecedent history of trauma are included. The studies with significant findings were labelled as positive. **Results:** A total of 469 scans were done during the time period of our study out of which 54% of the studies had a normal NCCT study and after including the patient with no specific and incidental findings 69% of patients did not receive any benefit from the study. Another aspect of the study was that about 15% of the studies needed a repeat scan. **Conclusions:** The study proved that there is irrational use of NCCT head imaging in emergency department specifically for cases with no history of sensorimotor deficit. Proper screening of the patients and imaging with better modality provided better patient care and reduced the overburdening of the imaging modality and also reduces the delay in imaging for other patients who were actually in need of the imaging in emergency hours. The stabilization of cases prior to imaging significantly reduced the number of repeat scans and improved the image quality. By using all these measures unnecessary radiation exposure to the patient can be avoided. **Clinical Relevance/Application:** Proper screening of the patient and imaging with better modality provided better patient care and reduced the overburdening and provided better outcome.

KEYWORDS

NCCT head, brain, CT head, atraumatic, Rational use, Medical Radiation Emergency NCCT head, non traumatic CT head imaging, NCCT head, CT head , CT brain, atraumatic, stroke CT imaging

BACKGROUND-

Non contrast CT (NCCT) head imaging is one of the most commonly requested investigation by the emergency department however there are no studies available which validate their extensive use in non traumatic cases. There is a special need for such studies for centres in developing areas where only NCCT imaging is feasible.

Purpose- To prove that there is irrational use of NCCT head in emergency department of a hospital for non traumatic cases. To form a more rational approach for discouraging such overuse and improve delivery of patient care and reduce radiation hazard.

METHODS & MATERIALS-

This is a prospective observational study which was conducted from 1st February 2023 to 26th March 2023. Patients of all age and gender who were prescribed NCCT head and had no antecedent history of trauma are included in this study. All other cases with history of trauma or undergoing a contrast study were excluded. Reporting was done using PACS and the results were analyzed.

Imaging protocol used was thin slice helical CT image acquisition with slice thickness 0.6-2mm. The scans with significant findings were labelled as positive. The normal scans and who did not have any significant imaging findings or were labelled as negative. The cases with inconclusive or vague findings were taken up for further imaging in routine hours if feasible.

Introduction & Clinical Relevance- Most of the cases belong to two sets traumatic and non traumatic. Non traumatic cases mostly present under the spectrum ranging from headache, blurring of vision, convulsions, altered sensorium and sensor motor deficits. However many times in non traumatic cases there is overuse of CT imaging and in a setup where most of the patients come from low socioeconomic strata. There is heavy reliance on non contrast CT head imaging in emergency situation as the availability and financial issues restrict use of contrast enhanced scans and MR imaging. In these situations the diagnostic efficiency of the non contrast CT head scans in non traumatic cases are many times questionable and raise issues to narrow down to an appropriate diagnosis in emergency hours and thus cause overburdening of the modality which leaves to delay in patient-care and hence questions arise if the scan was necessary for such cases during emergency hours and is scanning with better modalities like contrast enhanced CT and MR scans in non emergency hours are more imperative.

There are many obvious benefits to rational use of CT which removes the radiation hazard. Many times patient needed repeated imaging due to poor stabilization and later on was not proven to help the patient while adds up to the radiation dose which may have long term effects. The cases referred go through proper history taking and medical examination prior to the imaging. The objective of this study is to determine the efficacy of such imaging in emergency setups when no other modality is available or inaccessible and to discourage its unnecessary overuse.

RESULT-

Findings	Count	Findings	Count
Normal	254	Infective etiology	5
Incidental/ insignificant findings	76	Subacute infarcts	9
Acute infarcts	41	Space occupying lesions	13
Acute Intracranial hemorrhage	17	Venous infarcts/ cortical sinus thrombosis	5
Chronic hemorrhage	2	Chronic infarcts	47

Figure 1.

A total of 469 scan were done during the time period of our study out of which 254 studies (54%) were apparently normal and 74 number of studies (15%) had non specific findings which were not helpful in the treatment of patient in emergency department and needed further work up. 55 patients had recent acute or subacute infarct. 47 patients had chronic infarcts, 19 patients were having some form of intraparenchymal haemorrhage. 13 patients had some form of space occupying lesion and rest of them had miscellaneous findings. This study revealed that of all the cases 54 percent of the cases had normal NCCT study and after including the patient with no specific and incidental findings 69 percent of patient did not receive any benefit from the study don't in emergency period.

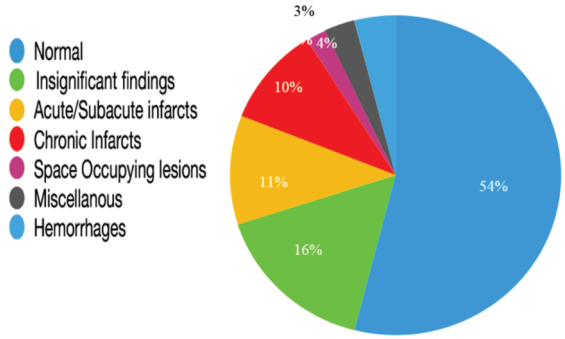

Figure 2.

Another aspect of the study was that about 15% studies needed a repeat study and 12% studies were suboptimal due to unstable or non co-operative patients, a significant number of these studies constituted patients with altered sensorium and patients from lesser age group. All these findings were adding up to the fact that a single repeat scan delivered a significant amount of dosage to the patients. The solution to this was that proper prior stabilization of the patient followed by imaging lead to a reduction in repetition of scans and provided better overall outcome for the patient as well as the reporting radiologist.

CONCLUSION-

The study proved that there is irrational use of NCCT head imaging in emergency department specifically for non traumatic cases who had no history of any type of sensor motor deficit . The stabilization of cases prior to imaging will reduce the number of repeat scans and improve the image quality. Proper screening of the patients and imaging with the better modality in appropriate and feasible conditions provides better patient care. By using all these measures unnecessary radiation to the patient can be avoided.

REFERENCES-

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