Volume : 4 | Issue : 6 | June 2015 • ISSN No 2277 - 8179

Research Paper

Estimating the Clinical Diagnosis and Radiological Diagnosis in Brain Computed Tomography

Healthcare

KEYWORDS : Computed Tomography, Clinical diagnosis, Radiological diagnosis, Correlation.

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ABSTRACT

Background:

Aims: Estimating the Clinical diagnosis and Radiological diagnosis in Brain Computed Tomography.Materials and Methods:Sampling was done by convenience sampling method considering inclusion and exclusion criteria and a sample of 270 was taken and clinical diagnosis and radiological diagnosis was found bystatistically analysing the data. Results: The number of cases which agree both clinical diagnosis and radiological diagnosis were 55.56% which is greater compared to the cases which do not agree clinical and radiological diagnosis which was 44.44%

Introduction:

CT is the remarkable advancement in the field of Radio diagnosis and imaging. The principle behind CT is that "The internal structure of an object can be reconstructed from multiple projections derived of the object"(1) and it plays a most significant role in diagnosing intra-cranial abnormalities. It is vital in diagnosis of an acute stroke. Subarachnoid haemorrhages may be evident if the scan is performed within 48-72 hours. (2) Despite the considerable radiation exposure delivered from CT scanning, it still takes a stand in being one of the most effective methods in diagnostic algorithms primarily due to its great diagnostic accuracy. In addition to that, demonstrate good anatomical orientation due to their commendable spatial resolution which can also further be enhanced of administration of contrast agents. Due to the more dependence on the CT scanning for diagnosis there is a considerable increase in the radiation dose delivered to the patient.

Objective:

The purpose of the study is to estimate the agreement of cases agreeing the clinical diagnosis and radiological diagnosis.

Materials and Methods:

Sampling was done by convenience sampling method considering inclusion and exclusion criteria and a sample of 270 was taken .The patient's referred for brain scan to the Department of Radiology at Kasturba Hospital are included in the study. The brain scan was performed on 64 slice MDCT (Philips Brilliance) and 16 slice MDCT (Philips Big bore). The patient's indication was also recorded from the Ct requisition form prescribed by the physician and scan reported by an experienced Radiologist with minimum of 1 year experience. Then the radiological reports were collected to estimate the clinical diagnosis and radiological diagnosis in brain computed tomography.

Results:

The study was conducted with 270 samples. The frequency of the positive cases was 150 which correlate with the clinical diagnosis. The frequency of negative cases was 120 which do not correlate with the clinical diagnosis. The percentage of cases which correlated to clinical diagnosis was found to be 55.56 and the percentage of cases which do not correlate was found to be 44.44.

The frequency of cases correlated with clinical diagnosis (Positive cases) and the cases which did not correlate with clinical diagnosis (Negative cases) is plotted in the Pie chart to show the relation between the positive and negative cases.

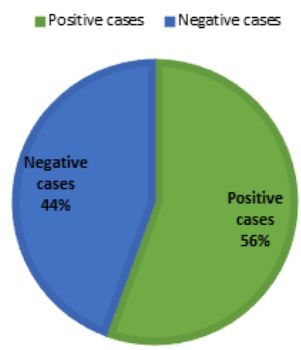

Fig. 1: Pie chart showing the number of cases that agree clinical and radiological diagnosis (positive) and which do not agree clinical and radiological diagnosis (negative)

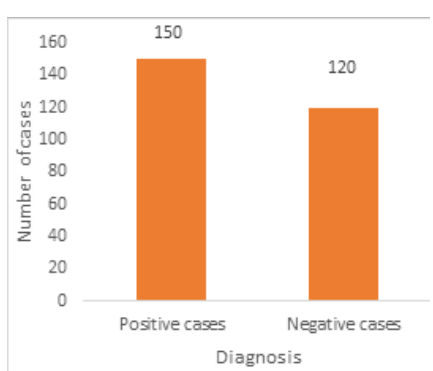

Fig 2: Bar chart showing the total number of cases with positive and negative diagnosis

Discussion:

There are limited studies reported on the accuracy of clinical and radiological diagnosis for CT brain.

Ali Arhami Dolatabadi et al performed a studyto find the accuracy of emergency physician's interpretation of CT brain cases. Images of 544 Non Contrast CT head scans were kept in a DVD along with clinical information of patient was sent to 6 emer-

gency medicine physicians and 14 senior emergency medicine (EM) residents and a radiologist for interpretation. Radiologist's report is considered as gold standard and was compared to interpretation by emergency medicine physicians and senior emergency medicine residents. Authors reported that out of 544 brain scans EM physicians had reported, 35 was false negative and 53 was false positive and EM residents had 74 false negative and 12 false positive cases. Author concluded that the EM physicians and EM residents either missed or falsely called a significant number of pathologies in their interpretation. (3)

Richard B. Ruchman et al performed study to determine the rate of inconsistencies between the interpretations of the preliminary radiology resident and attending radiologist. Total of 11,908 CT cases from a 3-year period were reported by the radiology resident and reviewed by the attending radiologist for final interpretation. Overall major discrepancy rate was found to be 2.6% and the RADPEER data misinterpretation rate was 2.1%. Author concluded by saying that the reliance on the preliminary interpretation by the resident radiologist showed no detrimental effect on the patient care. (4)

William K.Erly et al conducted a study to evaluate the accuracy of interpretation of emergency head CT scans by a general radiologist through teleradiology. The head CT scans of 716 emergency cases were sent through teleradiology and primary interpretations were made by one of the 15 board-certified radiologists practicing in the community. Furthermore, each scan was then interpreted by one of five neuroradiologist the day after the initial interpretation. The reports indicating disagreement were reviewed and reclassified by three university based neuroradiologist and the data was furtheranalysed. Authors concluded that the rate of significant discordance between general radiologist and neuroradiologist was 2% in the interpretation of emergency CT scans. (5)

Jonathan H. Chung et al performed a study to know the accuracy of postgraduate radiology resident's interpretation and attending radiologist. In this study 4768 chest, abdomen, and pelvis cases were studied and discrepancies were collected. A total of 112 major discrepancies were found .Thus the author concluded saying that there was 2% discrepancy rate between resident's preliminary interpretation and attending radiologist and in discrepant cases there was 15% disagreement rate between attending radiologists, suggesting some degree of inter-reader variance in interpretation.(6)

In the present study the accuracy between clinical and radiological diagnosis was found and the study showed some limitation in some of the clinical indications like headache, migraine because it was not easy to correlate between clinical indications and radiological reports. Out of 270 samples most of the cases had a clinical indication of headache and migraine. But most of their radiological reports were normal and correlation was difficult. This also may be one of the factors which have caused the frequency of positive and negative cases to be almost the same. The chiefconstraint of the present study also lies in the correlation of clinical indications like headache and migraine cases with radiological reports. A method needs to be devised to find the exact cause and correlation of such clinical indications with radiological findings.

We found 56% of the positive cases which agree clinical diagnosis and radiological diagnosis and 44% of the negative cases which do not agree clinical diagnosis and radiological diagnosis.

Conclusion:

The study shows 55.56% of the cases agree the clinical diagnosis given by the physician and radiological diagnosis by radiologist. Hence the accuracy of the clinical indications which agree the radiological diagnosis is greater than the cases which do not agree.

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