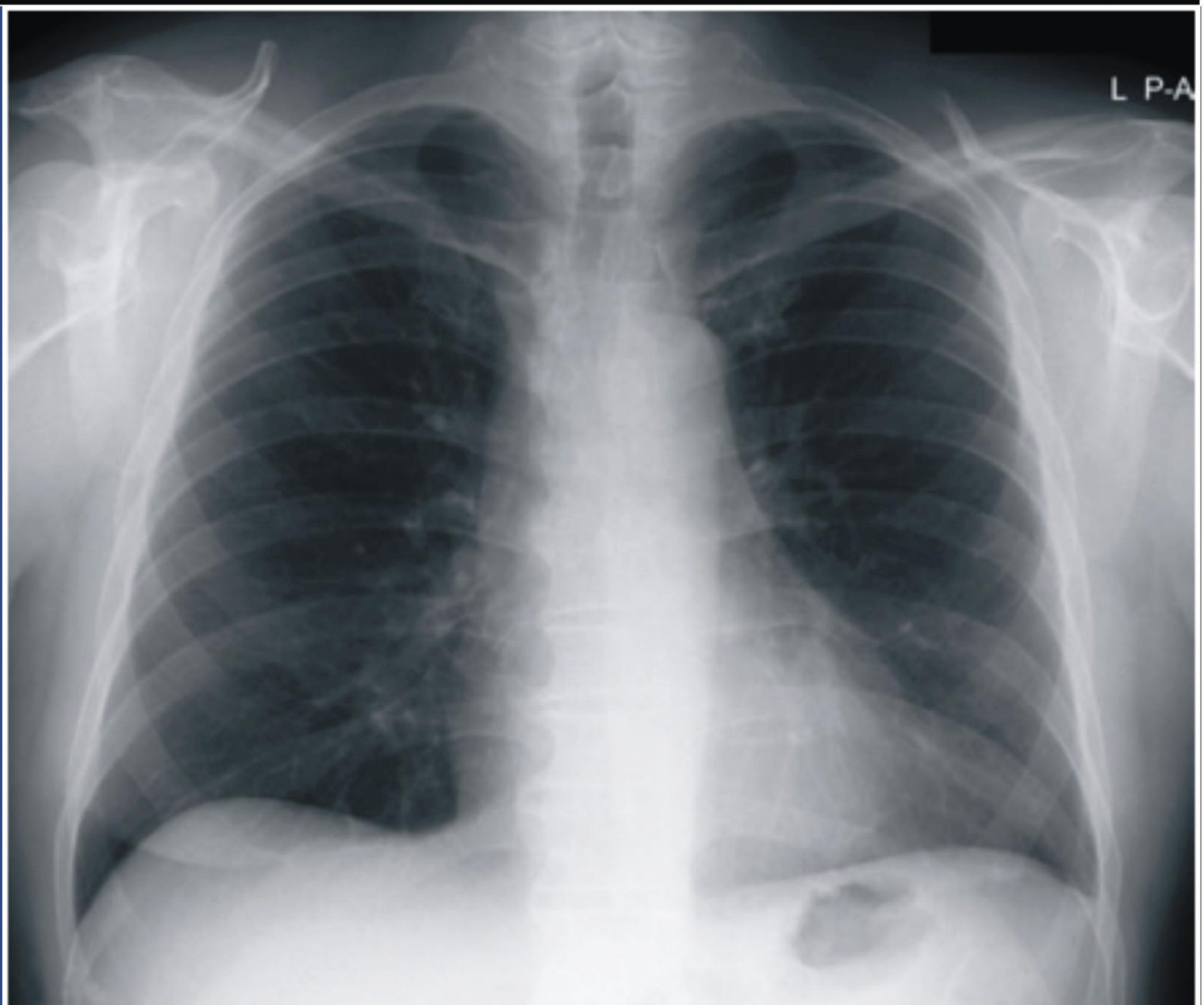
The Association Of Radiographers Of Nigeria
EYE OF MEDICINE

JOURNAL OF THE ASSOCIATION OF RADIOGRAPHERS OF NIGERIA

ISSN: 1115- 7976 Vol 31, Issue 1, November, 2017

The Official Journal of The Association of Radiographers of Nigeria

J A R N



Journal homepage: www.jarnigeria.com

Pattern of Head Computed Tomography Requests and Findings in a Specialist Hospital in Bauchi State, Nigeria

Onah Cletus Nnaemeka*, Joseph Dlama Zira, Ogenyi Prince Ameh

Radiology Department, Abubakar Tafawa Balewa University Teaching Hospital, Bauchi, Nigeria

***Correspondent author:** +234 7067445859; onah.cletus@gmail.com

Received: 2 April, 2017. Received in revised form:4 August, 2017. Accepted:16 October, 2017.

ABSTRACT

Background: Computed tomography (CT) has become a useful imaging modality in medical imaging and its role is increasing and diversifying in the past decades, most especially in the assessment of head pathologies.

Objective: The objective of this study is to assess the pattern of head computed tomography referrals, requests and findings among patients in State Specialist Hospital, Bauchi State.

Methodology: This study is a prospective cross-sectional study conducted from the month of May to August 2016. Thirty six (36) patients who presented for head CT scan were studied. Data collected include demographic information such as date of examination, age and gender of patients, referring clinic, indications for the examinations, and radiological diagnosis. Statistical analysis were done using SPSS version 21.0. Descriptive statistics were presented and Pearson's correlation was used to determine the relationship between the findings and referrals. Statistical significance was set at $p < 0.05$.

Results: There were 27 (75%) males and 9 (25%) females aged 18 to 94 years. A significant proportion of referrals (69.4 %; n = 25) were patients from Abubakar Tafawa Balewa University Teaching Hospital Bauchi, a neighbouring tertiary hospital. The highest indication for head CT was head injury due to RTAs (27.8%), with infarction (25%) being the commonest findings.

Conclusion: This study has shown that head injury due to road traffic accidents is the major indication for head CT in Bauchi with the commonest finding being infarction. Computed tomography is a useful modality for diagnosis of various pathologies.

Keywords: Pattern, head, computed tomography, findings, referral

Introduction

Computed tomography (CT) is a radiologic modality that utilizes ionizing radiation to obtain cross-sectional images (non-helical CT) or volumetric data sets (helical CT) [1, 2]. Since its introduction in the 1970s, computed tomography (CT) has been shown to have wide applications within all the radiological sub-specialties. New applications have emerged in the last few years including CT angiography, pulmonary embolism detection, the diagnosis of abdominal pain and appendicitis and the investigation of renal colic [1].

In acute clinical indications, CT is the modality of choice because it is fast, widely available, and highly accurate in the detection of skull fractures and intracranial haemorrhage [3]. Although computed tomography has been in use in the diagnosis of head trauma and some pathologies of other part of the body, it is only in the last 15-20 years that it became widely used [4]. Head CT is a non-invasive procedure and is usually suggested to investigate various neurological symptoms before turning to more invasive and pain procedures [5].

Despite its vast clinical applications, this modality is not readily available in developing countries like Nigeria, and awareness of its clinical applications based on anecdotal evidence is rather poor among general practice physicians and health-care providers. Nigeria is a country of over 120 million people with 36 states and a federal capital territory yet, less than 30 CT machines were in active use in Nigeria as at August 2009 [6]. Only a single CT machine is in active use in Bauchi State as at the time of this research. Abubakar Tafawa Balewa Teaching Hospital Bauchi, as a tertiary institution in the state has no CT scanner as at the time of this study.

Over time, studies have shown that, the most common clinical indications and diagnosis for CT examinations vary in different localities [6, 7]. Therefore, there is need to find out what is obtainable in our locality, and to the best of the researcher's knowledge, there are no documented research works on computed tomography referrals in our locality.

The study will help government and private individuals to see the need to establish more CT diagnostic centres in Bauchi state. It will also unveil the commonest requests and findings in our locality.

Material and methods

A prospective cross-sectional study involving 36 CT requests referred to the Radiology Department, State Specialist Hospital, Bauchi from May to August 2016. Consent was obtained from the Human Research Ethics Committee of the hospital. Data was collected from request forms and these included demographic information (date of examination, age and sex of patients), indications for the examinations, radiological diagnosis and referring unit. A simple descriptive statistical tool was used to analyse the data collected for this study. Descriptive statistics were presented and Pearson's correlation was used to determine the relationship between the findings and referrals. Statistical significance was set at $p < 0.05$.

Results

Age and gender distribution of subjects as well as referring facilities are presented in Tables 1 and 2. As shown in Table 3, the most prevailing clinical indication for Head CT scan was head injury due to road traffic accident, 27.8 % (n=10). The commonest finding was infarction, 25% (n=9) amongst these study subjects (Table 4). In comparison with other similar local works some indications and pathological findings were seen to reflect throughout the compared works while few were seen to be either present or absent in compared works and vice versa (Tables 5 & 6).

Computed tomography has become an invaluable imaging modality in modern medicine and its utilization has increased exponentially over the past decades [8]. Physicians are often required to make decisions regarding referrals for CT. This decision is based on multiple factors such as medical history, physical examination, patient request and other medical consideration [9].

A total of 36 brain CT scans were studied. The low number of subjects for study is attributed to the fact that the CT machine is new within the area and the referral rate for scans is steadily growing and not comparable to established centres or hospitals in other parts of the country. This might also be due to inadequate awareness of the superior capabilities of CT scan in comparison with x-ray and perhaps, financial incapability of patients. Of these numbers of study subjects, 75% were males while 25% were females, having a ratio of 3:1. This is accordance with earlier works from this locality [6,8] . This can be due to the fact that men are more involved in all types of rigorous physical activities like travelling, motorcycle riding, fighting and therefore are more prone to trauma and RTA than females [8].

Our findings is in tandem with previous works which identified head injury due to road traffic accident was a major indication for brain CT [6,10,11,12].

Table 1: Age and gender distribution

Age (year)	Females (%)	Males (%)	Total (%)
18 – 28	2	10	12 (33.3)
29 – 39	1	2	3 (8.3)
40 – 50	4	5	9 (25)
51 – 61	1	2	3 (8.3)
62 – 72	0	5	5 (13.9)
73 – 83	1	2	3 (8.3)
84 – 94	0	1	1 (2.8)
Total	9 (25)	27 (75)	36 (100)

Table 2: Referring institutions

Institutions	Frequency
SSHB, Bauchi	5 (14.0)
ATBUTH, Bauchi	25 (69.4)
Others	6 (16.6)
Total	36 (100)

Table 3: Clinical indications by referring physicians

Indications	Frequency	%
Seizures	6	16.7
Injury 2^0 RTA	10	27.8
Brain Tumour	4	11.1
Hemiplegia	2	5.6
Embolic Stroke	6	16.7
Persistent Headache	1	2.8
CVA	2	5.6
Septicaemia	1	2.8
Dementia	1	2.8
Hypertensive Encephalopathy	1	2.8
Swelling	1	2.8
Post Craniotomy	1	2.8
Total	36	100

Table 4: Pathological findings by radiologists

Findings	Frequency	%
Normal CT Scan	2	5.6
Brain Atrophy	1	2.8
Infarction	9	25
Fractures	7	19.4
Haemorrhage	8	22.2
Mass	6	16.7
Hydrocephalus	1	2.8
Degenerative disease	2	5.6
Total	36	100

Table 5: Comparison of clinical indications from current work with similar local works

Indications	Present Study	Erondu *et al*, 2011) [6]	(Ugwu) [8]
Seizures	6	28	40
Injury 2^0 RTA	10	-	94
Brain Tumour	4	15	-
Hemiplegia	2	-	-
Embolic Stroke	6	3	-
Persistent Headache	1	17	28
CVA	2	24	58
Septicaemia	1	-	-
Dementia	1	-	-
Hypertensive encephalopathy	1	8	48
Head Swelling	1	-	-
Post Craniotomy	1	-	-
CSOM	-	5	20
Multifocal contusion	-	42	-
? SOL	-	43	46
Hydrocephalus	-	12	27
Hematoma	-	47	-
Brain metastasis	-	6	11
Meningitis	-	5	-
Intracranial abscess	-	5	-
#Base of skull	-	7	41

Table 6: Comparison of pathological findings with a similar work in Nigeria

Findings	Present Study	(Ugwu) [8]
Normal CT Scan	2	163
Brain Atrophy	1	69
Infarction	9	63
Fractures	7	-
Haemorrhage	8	-
Mass	6	23
Hydrocephalus	1	37
Degenerative Disease	2	-
Meningitis	-	7
Intracranial Abscess	-	11
Brain Metastases	-	22
Encephalopathy	-	62
Foreign Body	-	1
Multifocal contusion and oedema	-	25
CSOM	-	5
Cyst	-	19

From literature, the high occurrence of head injury due to RTA was attributed to poor car maintenance, bad roads, the use of alcohol and illicit drugs [12]. However, this does not agree with a study from Israel [13] which stated that headache was the main clinical indication for brain CT. This difference may be attributed to different level of development between Israel and Nigeria. Nigeria is more prone to RTA due increased numbers of bad roads and high level of indiscipline [8].

Out of the 36 scans, only 5.6% were diagnosed as being normal, a finding corroborated by other similar works in the locality [6, 7, 8] Ugwu [8]. Brain infarction had the highest rate of diagnosis followed by haemorrhage, fractures and masses. This can be attributed to lifestyle patterns which includes little or no physical activity, poor diet, high blood pressure and smoking. This however, varies with some works which identified cerebral atrophy was highest in diagnosis [8], or cerebral contusions and oedema as the highest diagnoses made [7].

Conclusion

This study has shown that head injury due to road traffic accidents is the major indication for head CT in Bauchi with the commonest finding being infarction. Computed tomography is a useful modality for diagnosis of various pathologies.

Recommendations

Proper sensitization among health care providers should be made on the importance of brain CT and also to the government to help procure CT machines for even distribution

References

1. Hoffer M. CT Teaching Manual. A Systematic Approach to CT Reading. 2nd ed. Germany: Thieme. 6-9, 2006

2. Head CT scan. (2016). MedlinePlus. US National Library of Medicine. https://www.nlm.nih.gov/medlineplus/ency/article/003786.htm. Accessed 12th April 2016.

3. Tuong HL, Gean AD. Imaging of Head Trauma. Seminars in Roentgenology 2006, 41 (3): 177-89.

4. Teasdale E. Multidetector CT: New Horizons in Neurological Imaging. Imaging 2007, 19: 153-172.

5. Cranial CT scan. Healthline. https://www.healthline.com/health/cranial-ct-scan#overview1. Accessed 1st May 2016.

6. Erondu OF, Okoro CR, Aniemeka JI. Pattern of CT Referrals among Physicians in the South-South Region of Nigeria. American Journal of Scientific and Industrial Research 2011, 2 (4):482 - 487.

7. Ohaegbulam SC, Mezue WC, Ndubuisi CA, Erechukwu UA, Ani CO. Cranial Computed Tomography Scan Findings in Head Trauma Patients in Enugu, Nigeria. Surg Neurol Int 2011, 2(1):182. doi: 10.4103/2152-7806.91137. Epub 2011 Dec 26.

8. Ugwu IK. Assessment Of Computed Tomography Referrals. A Case Study Of University Of Nigeria Teaching Hospital Ituku-ozalla, Enugu.Afribary.com. Retrieved 07, 2014, fromhttps://afribary.com/read/2233/assessment-of-computed-tomography-referrals-a-case-study-of-university-of-nigeria-teaching-hospital-ituku-ozalla-enugu-711.

9. Shrimpton PC, Wall BF. The increasing importance of x-ray computed tomography as a source of medical exposure. Journal of Radiation Protection and Dosimetry 1995, 57:413-419.

10. Obajimi MO, Jumah KB, Brakohuapa WO, Idrisu WW. Computed tomography features of head injury in Ghanaian children. Nigerian J Surg. Res 2002, 4(3-4):84-88.

11. Akanji AO, Akinola RA, Balogun BO, Akano OA, Atalabi MO, Akinkunmi MAN., Awosanya GOG. Computerized tomography scan and head injury: The experience in a tertiary hospital in Nigeria: A cross sectional study. Academic journals 2015, 6(2): 1-15.

12. Chalya LP, Kanumba SE, Mabula BJ, Giiti G, Gilyoma MJ. Aetiology spectrum, Injury characteristics and treatment outcome of head injury patients at Bugando Medical Centre in North-Western Tanzania. Tanzania J. Health Res 2011, 13(1):93-102.

13. Shvartzman P, Sherf M, Friger M, Tabenkin H, Anat Neville. Brain computerized tomography utilization by primary care physician. Family medicine on-line 2010. Accessed on 10th June 2016.

How to cite: Onah CN, Joseph DZ, Ogenyi PA. Pattern of Head Computed Tomography Requests and Findings in a Specialist Hospital in Bauchi State, Nigeria. J Assoc Rad Niger, 2017; 31 (1): 24 – 28