



Computed Tomography of Patients with Head Trauma following Road Traffic Accident in Benin City, Nigeria

Tomodensitométrie des patients souffrant de traumatismes crâniens de la circulation accidents de la route suivante dans la ville de Bénin, Nigeria

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ABSTRACT

BACKGROUND: The outcome of head trauma as a result of road accident rests with increased use of CT scan and other radiological imaging modalities for prompt diagnosis is important.

OBJECTIVE: To find out the time of presentation for CT scan, symptoms for referral for CT scan and pattern of injuries in patients with cranial CT scan following road traffic accidents.

METHODS: Retrospective analysis of cranial computed tomography (CT) films, request cards, duplicate copy of radiology reports, soft copy CT images and case notes of 61 patients who underwent cranial CT scan on account of road traffic accidents. The study CT scans were performed at the radiology department of University Teaching Hospital between 1st January 2002 and 31st December 2004.

RESULTS: 51 patients (83.6%) were male while 10 (16.4%) were female with male to female ratio of 5:1. Thirty-eight (62.3%) patients were aged 20–39 years. Forty two patients (68.9%) presented after one week of injury. No patient presented within the first six hours of injury. The symptoms needing referral for CT scan included head injury 30 (49.2%), seizures 10 (16.4%), skull fractures 8 (13.1%) and persistent headache 6 (5.6%). A total of 113 lesions were seen as some patients presented with more than one lesion. The findings on CT scan included 10 patients with normal findings, 21 (34.4%) skull fractures, 21 (34.4%) intra-cerebral haemorrhage, 19 (31.2%) brain contusion, 18 (29.5%) paranasal sinus collection, 11 (18.0%) cerebral oedema, 10 (16.4%) subdural haematoma and 5 (8.2%) epidural haematoma. Over 80% of the subdural and epidural haematomas were associated with skull fractures. The yield from plain radiography was poor being positive in only 8 (13.1%) while CT scan was positive in 51 (83.61%). Also 75 (about 66%) of the 113 lesions seen on CT scan were treatable surgically.

CONCLUSION: CT scan is an effective imaging modality of patient with road traffic accident and should be promptly requested in symptomatic patients who sustain trauma to the head toward identification of lesions that are amenable to surgical treatment. *WAJM 2011; 30(6): 404–407.*

Keywords: Cranial, Computed Tomography, Head, Trauma, Road Traffic, Accidents, Benin, Nigeria.

RÉSUMÉ

CONTEXTE: Le résultat d'un traumatisme crânien à la suite d'un accident de route repose sur une utilisation accrue de la tomographie assistée par ordinateur et d'autres modalités d'imagerie radiologiques pour le diagnostic rapide est important.

OBJECTIF: Pour connaître l'heure de présentation pour le scanner, les symptômes de la saisine pour scanner et le modèle de blessures chez les patients atteints crâniens CT scan suivants accidents de la route.

MÉTHODES: Analyse rétrospective de crâniens tomographie assistée par ordinateur (CT) des films, des cartes de demande, de dupliquer une copie des rapports de radiologie, deux copies des images CT et les notes de cas de 61 patients qui ont subi une tomographie assistée par ordinateur crânienne à cause des accidents de la route. Les analyses de l'étude CT ont été réalisées au service de radiologie de l'hôpital universitaire de l'Université entre le 1^{er} Janvier 2002 et le 31 Décembre 2004.

RÉSULTATS: 51 patients (83,6%) étaient de sexe masculin, tandis que 10 (16,4%) étaient de sexe féminin avec sexe ratio de 5:1. Trente-huit (62,3%) patients étaient âgés de 20-39 ans. Quarante-deux patients (68,9%) a présenté après une semaine de blessure. Aucun patient n'a présenté dans les six premières heures de blessures. Les symptômes qui doivent être référés pour CT scan inclus 30 blessures à la tête (49,2%), des convulsions 10 (16,4%), fractures du crâne 8 (13,1%) et maux de tête persistants 6 (5,6%). Un total de 113 lésions ont été considérées comme certains patients ont présenté plus d'une lésion. Les résultats sur la tomographie assistée par ordinateur ont porté sur 10 patients présentant des résultats normaux, 21 (34,4%) des fractures du crâne, 21 (34,4%) une hémorragie intra-cérébrale, 19 (31,2%) contusion cérébrale, 18 (29,5%) des sinus paranasaux collecte, 11 (18,0%) un œdème cérébral, 10 (16,4%) hématoxime sous-dural et 5 (8,2%) un hématoxime péridural. Plus de 80% des hématomes sous-duraux et épuraux ont été associées à une fracture du crâne. Le rendement de la radiographie standard était pauvre être positif dans seulement 8 (13,1%), tandis que le scanner était positif dans 51 (83,61%). En outre 75 (environ 66%) des 113 lésions observées sur le scanner étaient traitables chirurgicalement.

CONCLUSION: La tomographie assistée par ordinateur est une modalité d'imagerie efficace des patients avec accident de la route et doit être rapidement demandé chez les patients symptomatiques qui ont subi un traumatisme à la tête vers l'identification des lésions qui se prêtent à un traitement chirurgical. *WAJM 2011; 30 (6): 404–407.*

Mots-clés: crânienne, la tomographie assistée par ordinateur, chef, Trauma, la circulation routière, les accidents, le Bénin, le Nigeria.

INTRODUCTION

In 2000, the World Health Organisation (WHO) reported that road traffic injury resulting from road traffic accidents (RTA) the second leading cause of death in children and adults of working age in low and middle income countries after childhood cluster diseases and human immune deficiency virus/acquired immune deficiency syndrome (HIV/AIDS) in each of the two groups respectively.^{1,2} Nigeria is classified as a low income country, with a population of about 140 million and over 50% of Nigeria's population are in the dependent age group.³ Nigeria's transport system relies heavily on road transport as the rail and water transport systems are underdeveloped and air transport is rather expensive for majority of the citizens and uncondusive for movement of large quantity of goods to the large expanse of the country's land mass.^{3,4}

Nigeria had a road network covering 193,198 Km in 1996 of which 36,300Km was surfaced out of which 2,044 Km was motorway or dual carriage way.^{4,5} In 2004 alone, there were 19,611 reported road traffic accidents to the police in Nigeria, 6,362 (32.44%) were fatal while 7,849 were serious, resulting in 8,161 deaths, 20,925 injuries and fatality index of 41.61%.² Hospital and operative management significantly improves the outcome of road traffic injuries.⁶⁻¹¹ The prevention of road traffic accidents rests on drivers with disciplined driving habits, police (and Federal Road Safety Agency in Nigeria) ensuring adequate enforcement of the road safety rules and ethics including the use of seat belts and crash helmets, effective maintenance of roads, vehicles and improve care of pedestrians while using the road.¹⁰⁻¹⁴ The outcome of head trauma as a result of road accident rests with increased use of CT scan and other radiological imaging modalities for prompt diagnosis. Other determinants are pre-hospital care, transport adequate reception and care at accident and emergency room, improved traumatology unit, neurosurgery for management as well as improved intensive care facilities.^{1,2,9-16}

SUBJECTS, MATERIALS, AND METHODS

Sixty-one patients with traffic injury

who had computerised tomography scan of the head done by the authors were retrospectively analysed. The CT scans were done over a 36-month period (between 1st January, 2002 and 31st December, 2004) at the Department of Radiology, University of Benin Teaching Hospital, Benin City.

The age, time of presentation,

Table 1: Characteristics of Study Patients

Variable	Number (%)
Age (Years) (Male/Female)	
10 – 19 (7/1)	7 (13.1)
20 – 29 (22/4)	26 (42.6)
30 – 44 (16/3)	19 (31.2)
45 – 59 (6/2)	8 (12.9)
Total	61 (100.0)
Time before Precentation (Days)	
0.3 – 0.5	4 (6.6)
>0.5 – 1.0	4 (6.6)
2 – 3	5 (8.2)
4 – 7	6 (9.2)
8 – 14	10 (16.4)
15 – 28	10 (16.4)
29 – 56	10 (16.4)
>60	12 (19.7)
Total	61 (100.0)
Clinical Features	
Head injury	30 (49.2)
Seizure	10 (16.4)
Skull fracture	8 (13.1)
Headache	5 (8.2)
Irrational talk	4 (6.56)
Facial palsy	2 (3.3)
Unilateral proptosis	2 (3.3)
Total	61 (100.0)

Table 2: Cranial CT Scan Findings in Study Patients

CT Scan Finding	Number (%)
Normal CT scan	10 (16.4)
Skull fracture	21 (34.4)
Brain contusion/laceration	19 (31.2)
Intracerebral haemorrhage	21 (34.4)
Subdural haemorrhage	10 (16.4)
Cerebral oedema	11 (18.0)
Epidural haematoma	5 (8.2)
Carotico-carvenous fistula	2 (3.3)
Aerocoele (pneumocephalus)	4 (6.6)
Intraventricular haemorrhage	2 (3.3)
Paranasal sinus fluid collection	18 (29.5)

presenting complaint and radiological finding in the CT scans were analysed. All the scan were axial CT scan but 22 (36.07) patients who had symptoms and were well enough to tolerate coronal CT scans, had this done which also involved the facial bones.

RESULTS

Fifty-one (83.6%) patients were male while 10 (16.4%) patients were females with male to female ration of 5:1 (Table 1). The age range was 25–29 years with a median of 26 years. Thirty-eight (62.29%) of the patients were aged between twenty and thirty-nine (20–39) years. Forty-two (68.8%) of the patients presented after one week of the injuries. No patient presented between 0–7 hours. Only eight (13.1%) patients presented between 8–24 hours of the injuries. Twelve (19.7%) patients presented after over two months. The presenting symptoms are summarised in Table 1. In the CT scan findings (Table 2), 10 (16.39%) patients had normal CT scan. Some patients had more than one lesion. Most of the subdural and epidural haematomas were associated with skull fractures (Figures 1–3). Skull fractures are better shown in bone window of CT scan (Figure 3).

The appearance of the haemorrhage and haematomas (Table 3) showed that 12 (13.33%) patients presented early at the acute stage (Figure 1), 7 (19.44%) at the subacute stage (Figure 2) while 17 (47.22%) patient out of the 36 patients with these lesion presented late with chronic changes. Plain radiography was done in all the patients. It was abnormal

Table 3: Types of Haemorrhage or Haematoma on CT Scan

Lesion	Number (%)			
	Hyperdense	Insodence	Hypodence	Total (%)
Intracerebral	9 (25.0)	2 (5.6)	10 (27.8)	21 (58.4)
Subdural	1 (2.8)	4 (11.1)	3 (8.3)	8 (22.2)
Epidural	0.0	2 (5.6)	3 (8.3)	5 (13.9)
Intraventricular	2(5.6)	0.0	0.0	2 (5.6)
Total	12 (33.3)	8 (22.2)	16 (44.4)	36 (100.0)

in only 8 (13.11%) patients. A total of 113 abnormal findings were recorded.

DISCUSSION

Among the 61 patients studied, only 13% had positive findings on plain radiography in contrast to over 80% on CT scan. The above observation agrees with the reports of previous authors that

all patients with head trauma who are symptomatic should have CT scan done on them due to the poor yield of plain radiography.¹⁶⁻¹⁸ More males were affected in head trauma due to RTA in this study. This also agrees with studies by other researchers that more males are involved in road traffic accidents, sustain more injuries and more fatalities because

they are more adventurous and also engage in motorcycle driving as a business with increased fatal injuries.^{1,2,5-18} The high rate of abnormal findings (83.6%) in this study, compared to several other studies may mean that the studied population was a highly selective group with severe presenting symptoms since not all the patients with head trauma as a result of road traffic accident had CT scan.^{1,2,9-20}

The fact that about 50% of patients had CT scan changes of chronic haemorrhage/haematoma (Figure 3), confirm the late presentation of patient in virtually all the diseases seen in developing countries.^{1,2,9-18} High cost of CT scan may also be partly responsible for this. Seventy-five of the 113 abnormal findings (66.37%) could be treated surgically with almost immediate relief of

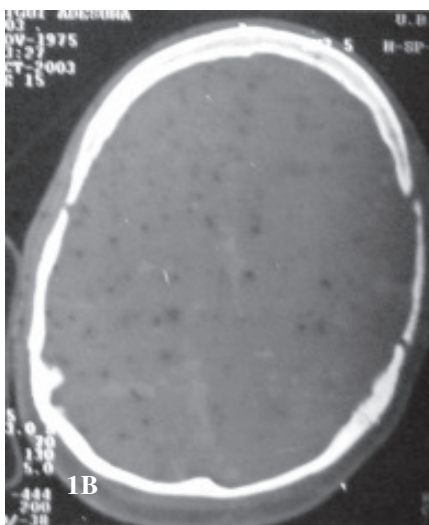
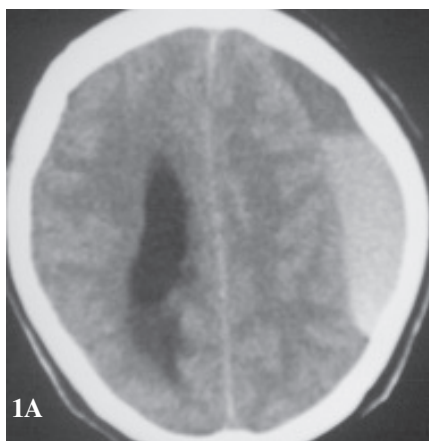


Fig. 1: CT Scans showing Hyperdense (A) and Hypodense Lesions (B).

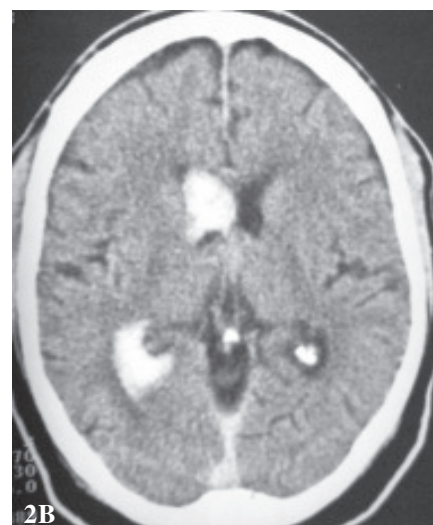
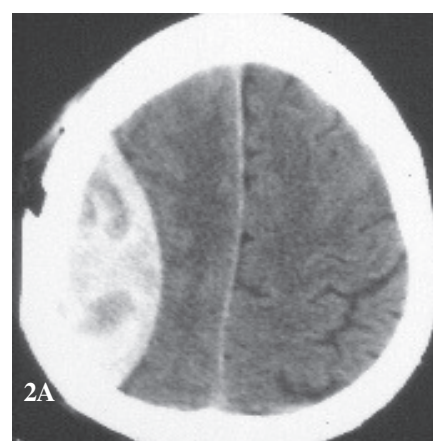


Fig. 2: Brain CT Scan showing Hyperdense Lesions

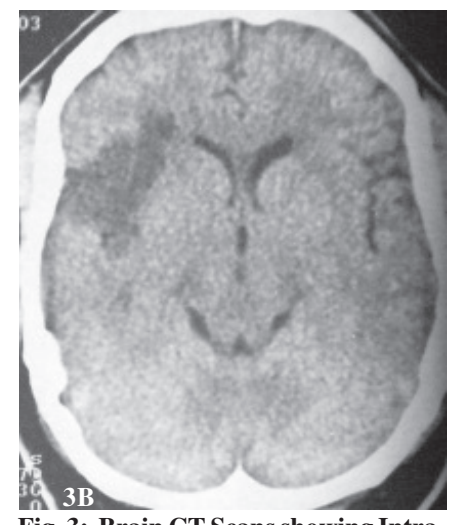


Fig. 3: Brain CT Scans showing Intracerebral Haemorrhage (A) and Cerebral Infarction (B).

symptoms. These included skull fractures, intracerebral haemorrhage, subdural haemorrhage/haematoma and epidural collection. Categorisation and regionalisation of hospitals as done in USA are preferred to dumping patients at the nearest hospital to the scene of trauma without regard for capacity in rendering efficient care, appropriate facilities and manpower for adequate treatment of such lesion.^{14,15,21}

Conclusion

This study provides information on the pattern of intracranial injuries recorded by CT scan of the head in patients with road traffic accidents, the time of presentation of the patients for CT scan, the duration of lesions of haemorrhages/haematoma at the time of CT scan as well as the presenting complaint that compelled the physicians and patients to undertake the CT scan. Since most of the lesions are treatable surgically, reduction in the cost of CT scan, adequate implementation of health insurance scheme to eliminate cash payment on demand and adequate education of patients to seek medical attention when they notice any symptom after road traffic accident as well as prompt referral for CT scan by the physicians will help early identifications of lesions amenable to surgical treatment before they cause residual sequelae to patients. Prevention of road traffic accident by effective laws, effective policing of road users, fair punishment for offender and maintenance of roads and vehicle will go a long way in reducing the morbidity, mortality as well as economic cost of road traffic accident on our nation.

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