

FOLLOWING THE CORRECT GUIDELINES, OR NOT? A REVIEW OF 87 SKULL RADIOGRAPHS IN HEAD TRAUMA PATIENTS

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Abstract

According to medical usues and rules, it is obvious that technology changes demand entirely new and modern approaches. Several criteria should be held in mind, so patient processing has to advance on a new qualitative level. We have to integrate new knowledge and equipment, as well as newly organized facilities to provide best diagnostics and treatment for people in need of medical care. Having in mind these general ideas and medical guidelines, results of this paper lead us forward to the accepting of the conclusion that sometimes emergency physicians are not following guidelines nor the old rule: „ May skull X ray help, but not totally replace your clinical judgement! ”.

Key words: *new technologies, X-ray, knowledge, clinical judgement*

Introduction

Head injury is defined as any trauma to the head other than superficial injuries to the face. Head injury is the most common cause of death and disability in people aged 1–40 years in the UK. Each year, 1.4 million people attend emergency departments in England and Wales with a recent head injury. Annually, about 200 000 people are admitted to hospital with head injury. Out of these, one-fifth have features suggesting skull fracture or have evidence of brain damage. Most patients recover without specific or specialist intervention, but others experience long-term disability or even die from the effects of complications that could potentially be minimised or avoided with early detection and appropriate treatment. The incidence of death from head injury is low, with as few as 0.2% of all patients attending emergency departments with a head injury. Despite the large number of publications refuting the clinical value of the skull radiography, it is widely requested, although thankfully common sense is beginning to be applied in many centres. The logical approach would be the following; if there has been sufficient injury to necessitate examination, CT should be performed. As whether a fracture is present or not, intracranial haemorrhage may have occurred. The 2007 (NICE clinical guideline 56) resulted in CT scanning replacing skull radiography as the primary imaging modality for assessing head injury.

Problem and aim

Although previous studies, according to the available literature, show a large number of research related to CT scanning should have long time replaced skull radiography as the primary imaging modality for assessing head injury it is still not the case in our hospital. Research aim is to discuss necessity of plain radiography of the skull in head trauma patients and to point out importance of following the correct diagnostic protocols in emergency departments.

Research hypothesis

Our research hypothesis is that MDCT of the skull has not yet replaced skull radiography in our hospital as a primary diagnostic imaging method, considering urgent head trauma patients

Methods

In our small survey we have included 87 patients with head trauma who were sent to radiology department to have plain radiograph of the skull. These were patients sent from emergency medical centre at University hospital in Mostar from August 1st to November 31st 2014th, after being examined and evaluated by attending physician. Mechanism of injury were various, ranging from home accidents, car accidents to sports injuries and open head wounds all in healthy individuals. The youngest patient was 2 years old and the oldest 93 years old, with average of 33 years of age. Male to female ratio was 45 (51.73%) of male patients and 42 (48.27%) of female patients. The radiograph images were observed, analyzed and reported by attending radiology physician.

Scientific contribution

Although there are various studies and results in his area of interest not a lot of studies had been conducted in the Balkans' region, and especially in our country. This reflects the ability of this study to contribute to science.

Professional contribution

Study can be useful to point out there is no necessity for plain radiography of the skull in head trauma patients that have no clinical signs of severe head trauma, to point out the importance of MDCT of the cranium as primary diagnostic imaging modality in patients with signs of severe head trauma and to point out the importance of following the correct diagnostic protocols in emergency departments.

Respondents

The youngest patient was 2 years old and the oldest 93 years old, with average of 33 years of age. Male to female ratio was 45 (51.7%) of male patients and 42 (48.3%) of female patients.

Statistical data processing

Because of simplicity, descriptive statistic methods had been used for this study.

Results

Male to female ratio had been 45 (51.7%) of male patients and 42 (48.3%) of female patients.

Table 1.

Male patients (M)	Female patients (F)
45 (51.7%)	42 (48.3)

The youngest patient had been 2 years old and the oldest 93 years old, with average of 33 years of age. In 87 skull X rays examined, only 5 (4.4 %) of them had been suspicious for fractures.

Table 2.

Total number of radiographs	Radiographs with no suspicion on skull fractures	Radiographs suspicious on skull fractures
87 (100%)	82 (95,6%)	5 (4,4%)

Out of 5 suspicious radiographs there had been 3 skull fractures confirmed on cranium MDCT examination, meaning 2.6% of all patients examined actually had skull fracture.

Table 3.

Total number of cranium MDCT examinations	Total number of cranium MDCT negative for fractures	Total number of cranium MDCT positive for fractures
5 (100%)	2 (40%)	3 (60%)

Table 4.

Total number of patients examined	Total number of cranium MDCT positive for fractures
87 (100%)	3 (2.6%)

Conclusion

Having in mind the guidelines, these results speak for themselves. It is obvious that emergency physicians are not following guidelines nor the old rule: „ May skull X ray help, but not totally replace your clinical judgement! “.

Having all of this in consideration it is concluded that head CT had not yet replaced skull radiography in patients with clinical indication of severe head trauma. Next steps would be finding the reasons for this situation and full follow-up of these patients.

It would also be interesting to explore how many patients with negative skull radiography were found with skull fracture or brain damage and haemorrhage later, during their hospital treatment.

References

Carrière, B., Clément, K., & Gravel, J. (2014). Variation in the use of skull radiographs by emergency physicians in young children with minor head trauma. *CJEM*, 16(4), 281-287.

Eastman, G.W., Wald, C., & Crossin, J. (2003). *Getting Started in Clinical Radiology*. Amazon books.

Erskine, J., Holmes, A., Forest-Hay, A., & Rakesh, R.A.M. (2008). *Interpretation of Emergency Head CT. A practical handbook*. 68-70. Amazon books.

Fonseca, R., Barber, H.D., Powers, M., & Frost, D.E. (2012). *Oral and Maxillofacial Trauma, 4th Edition*. Elsevier.

Frankowski, R.F., Annegers, J.F., & Whitman, S. (1985). *Epidemiological and descriptive studies. Part I: The descriptive epidemiology of head trauma in the United States*. In: Becker D.P., Polishock J. (eds.) *Central Nervous System Trauma Status Report*. Bethesda: National Institute of Health. 33-51.

French, B.N., & Dublin, A.B. (1977). The value of computerized tomography in the management of 1000 consecutive head injuries. *Surg Neurol*, 7, 171-183.

Grumme, T., Kluge, W., Kretzschmar, K., et al. (1998). *Head Trauma. In: Cerebral and spinal computed tomography*. Berlin: Blackwell Science. 49-69.

Marincek B., & Dondelinger, R.F. (2007). *Emergency radiology – Imaging and Intervention*. Springer. 99-102.

Lanksch, W., Grumme, T., & Kazner, E. (1979). *Computed tomography in head injuries*. Berlin: Springe.

- Lee, T.T., Aldana, P.R., Kirton, O.C., et al. (1997). Follow-up computerized tomography (CT) scans in moderate and severe head injuries: correlation with Glasgow Coma Scores (GCS), and complication rate. *Acta Neurochir Wien*, 139(11), 1042-1048.
- Leidner, B., Adiels, M., Aspelin, P., et al. (1998). *Standardized CT examination of the multitraumatized patient. Eur Radiol*, 8(9), 1630-1638.
- Macpherson, B.C.M., Macpherson P., & Jennett, B. (1990). CT incidence of intracranial contusion and hematoma in relation to the presence, site and type of skull fracture. *Clin Radiology*, 42, 321-326.
- Miloro, M., Ghali, G.E., Larsen, P., & Waite, P. (2004). *Peterson's principles of oral and maxillofacial surgery*.
- Mohanty, S.K., Thompson, W., & Rakower, S. (1991). Are CT scan for head injury patients always necessary? *J Trauma*, 31, 801- 805.
- Nagy, K.K., Joseph, K.T., Krosner, S.M., et al. (1999). The utility of head computed tomography after minimal head injury. *J Traum*, 46(2), 268-270.
- Stein, S.C., & Ross, S.E. (1990). The value of computed tomographic scans in patients with low-risk head injuries. *Neurosurgery*, 26, 638-640.
- Sutton, S. (2003). *Textbook of Radiology and Imaging*, 7th edition. Lincoln: Anybook Ltd. 1641-1642.
- Wysoki, M.G., Nassar, C.J., Koenigsberg, R.A. et al. (1998). Head trauma: CT scan interpretation by radiology residents versus taff radiologists. *Radiology*, 208, 125-128.

PRAĆENJE TOČNIH SMJERNICA, ILI NE? PREGLED 87 RADIOGRAFOVA LUBANJE KOD PACIJENATA S TRAUMOM GLAVE

Sažetak

Prema medicinskim uzusima i pravilima, očito je da promjene tehnologije zahtijevaju potpuno nove i moderne pristupe. Nekoliko kriterija se treba imati na umu, tako da obrada pacijenata mora napredovati na novu kvalitativnu razinu. Moramo integrirati novo znanje i opremu, kao i novoorganizirana postrojenja u svrhu pružanja najbolje dijagnostike i tretmana za ljude kojima je potrebna medicinska srkb. Imajući na umu ove općenite ideje i medicinske smjernice, rezultati ovog rada vode nas naprijed do prihvaćanja zaključka da ponekad osoblje hitne pomoći ne prati smjernice niti staro pravilo: "Neka rendgen lubanje pomogne, ali ne i potpuno zamijeni vašu kliničku prosudbu!"

Ključne riječi: nove tehnologije, rendgenska zdraka, klinička prosudba

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