DIAGNOSTIC VALUE OF PHYSICAL EXAMINATION IN CHILDREN WITH MILD HEAD INJURY IN COMPARISON WITH COMPUTED TOMOGRAPHIC (CT) SCAN FINDINGS

By

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IV. ABBREVIATION

CT	Computer Tomography
GCS	Glasgow Coma Scale
CGCS	Child Glasgow Coma Scale
ICI	Intracranial Injury
ICH	Intracranial Haemorrhage
LOC	Loss of Consciousness
LR	Likelihood Ratio
LR+	Likelihood Ratio for a Positive Test Result
LR-	Likelihood Ratio for a Negative Test Result
MHI	Mild Head Injury
PV	Predictive Values
PPV	Positive Predictive Values
NPV	Negative Predictive Values
MVA	Motor Vehicles Accident
RTA	Road Traffics Accident

V. ABSTRAK

Objektif: Setiap tahun, di seluruh dunia ramai kanak-kanak yang mengalami kecederaan kepala yang ringan telah dimasukkan ke hospital dan menerima pemeriksaan radiografi. Walaupun tatacara dan cadangan telah dibuat, masih banyak lagi kontroversi berkenaan dengan pesakit yang mengalami hilang tahap kesedaran sementara dan "Glasgow Coma Scale"(GCS) antara 13 dan 15. Terdapat kajian terbaru yang mencadangkan bahawa ada keberangkalian imbasan CT tidak diperlukan untuk pesakit yang mengalami hilang tahap kesedaran sementara dan GCS penuh. Objektif utama kajian ini adalah untuk menentukan tahap keberkesanan pemeriksaan klinikal sebagai satu alat diagnosis apabila dibandingkan dengan imbasan CT skan yang positif bagi pesakit yang mengalami kecederaan kepala yang ringan dan hilang tahap kesedaran atau ingatan sementara. Daripada kajian ini,'sensitivity', 'specificity' dan 'predictive values' untuk pemeriksaan klinikal yang normal dan hilang tahap kesedaran selepas kecederaan kepala yang ringan akan dianalisa.

Metodologi: Ini adalah kajian secara retrospektif dimana rekod pesakit kanak-kanak yang berumur diantara 1 dan 12 tahun, dan yang telah diperiksa bagi kecederaan kepala yang ringan serta hilang tahap kesedaran atau ingatan telah dianalisa. Kajian ini telah dilakukan di Jabatan Kemalangan dan Kecemasan Hospital Besar Kuala Lumpur diantara bulan Januari 2007 dan Jun 2009. Pesakit yang termasuk didalam kriteria kajian telah dipilih dan data mereka direkodkan dalam borang khas. Antara data klinikal yang direkodkan adalah seperti berikut; umur, jantina, cara kemalangan berlaku, GCS sewaktu tiba dihospital, tanda kecederaan fizikal, imbasan CT dan rawatan yang diberikan. Anggaran kekerapan,

'sensitivity', 'specificity' dan 'predictive value' dikira bersama dengan 95 peratus konfiden interval menggunakan cara Wilson. Ujian Kappa telah digunakan bagi mengukur tahap persetujuan diaantara pemeriksaan clinical dan imbasan CT.

Keputusan: Sebanyak 225 pesakit terpilih untuk kajian ini (Januari 2007 higga Jun 2009). Enam puluh tiga peratus (63%) adalah lelaki dan 37% pula perempuan. Daripada 225 pesakit, 44 orang(19.56%) mempunyai positif imbasan CT dan 17 orang(7.56%) daripada mereka ini, pemeriksaan klinikal adalah normal. Lima belas kes (6.7%) telah menjalani pembedahan. Untuk kecederaan didalam otak, sensitivity and specificity adalah masing-masing 61.36% dan 60.22%. Persetujuan diantara pemeriksaan fizikal dan imbasan CT ditentukan oleh ujian Kappa dimana keputusannya adalah 0.147 ($p < 0.05$), 95% CI (0.035, 0.259).

Kesimpulan: Walaupun kajian ini telah menunjukkan bahawa terdapat kaitan diantara pemeriksaan fizikal dan imbasan CT, tetapi setelah ujian Kappa dibuat , ia membuktikan bahawa kaitan ini mempunyai persetujuan yang sedikit sahaja. Setelah analisa lanjutan dilakukan terhadap kebolehan jangkaan pemeriksaan fizikal yang normal dan keputusan sensitivity serta specificity yang rendah, satu kesimpulan telah dibuat bahawa kecederaan didalam otak bagi kanak-kanak yang mengalami kecederaan kepala ringan beserta hilang tahap kesedaran atau daya ingatan yang sementara, tidak dapat disangkalkan dengan hanya pemeriksaan klinikal yang normal sahaja. Imbasan CT adalah ujian terulung untuk mengesan kecederaan dalam otak bagi kecederaan kepala yang ringan.

VI. ABSTRACT

Objective: Mild head injury in children results in a large number of radiological evaluation and hospital admissions each year around the world. Although some guidelines and proposals have been made in this area, there is still a great deal of controversy surrounding patients with brief loss of consciousness (LOC) and Glasgow Coma Scale (GCS) scores of 13-15. Recent studies have indicated that avoiding head CT scans in patients with LOC and a GCS scores 15 may be possible. The objective of this study was to determine the diagnostic value of physical examination for positive CT scan findings in children with mild head injury (GCS score 13-15) and with loss of consciousness or amnesia. From the result, the sensitivity, specificity and predictive values of a normal physical examination after mild head injury and loss of consciousness would also be calculated and analysed.

Method: A retrospective medical record review of patients aged 1 to 12 years old who were evaluated for mild head injury with LOC or amnesia at the emergency department of Hospital Besar Kuala Lumpur between January 2007 and June 2009. Subjects who met the inclusion criteria were selected for the study and the data recorded into the proforma. Data collected included age, gender, mechanism of injury, GCS on arrival, presenting symptoms, physical sign findings, head computed tomography (CT) results and further management of the subjects. The estimations of prevalence, sensitivity, specificity, positive predictive value, and negative predictive value were calculated, along with 95% confidence interval limits, using the Wilson score method. The agreement between physical examination and CT brain

in children with mild head injury and with loss of consciousness or amnesia was calculated using Kappa test.

. **Results:** 225 patients were included into the study (January 2007 to June 2009). Sixty-three percent (63%) of these patients were male, and thirty-seven (37%) were female Out of 225 patients, 44(19.56%) patient had positive scan finding and 17 patients (7.56%) who had positive scan finding showed normal physical examination . Fifteen cases (6.7%) underwent neurosurgical intervention. For intracranial traumatic CT findings, sensitivity and specificity were 61.36% and 60.22% respectively. The agreement between physical examination and CT scan was found to be Kappa = 0.147 ($p < 0.05$), 95% CI (0.035, 0.259).

Conclusion: The present study showed that physical examination was significantly associated with positive CT scan finding ($p=0.01$). However on further assessment of its predictive ability of a normal physical examination, and the findings of unacceptably low sensitivity and specificity, 61.36% and 60.22% respectively, a conclusion was made that intracranial pathology in children with minor head injury and having loss of consciousness or amnesia cannot be excluded on the basis of physical examination alone. The kappa value calculated only showed a slight agreement between these two variables.