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► **To cite this version:**

Pierre-Jean Pages, Marie-Paule Boncoeur-Martel, François Dalmay, Henri Salle, François Caire, et al.. Relevance of emergency head CT scan for fall in the elderly person. *American Journal of Neuroradiology*, 2019, <10.1016/j.neurad.2019.03.004>. <hal-02395523>

HAL Id: hal-02395523

<https://hal.science/hal-02395523v1>

Submitted on 21 Jul 2022

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Relevance of emergency head CT scan for fall in the elderly person

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1 **Relevance of emergency head CT scan for fall in the elderly person**

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5 **ABSTRACT**

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7 **Objectives:** Fall of the elderly person is a public health problem. The objectives of our
8 study were to evaluate the relevance of systematically performing in emergency a
9 computed tomography (CT) scan for fall in the elderly person, to identify specific
10 criteria predicting the appearance of lesions.

11 **Material and methods:** We performed a retrospective analysis of 500 consecutive
12 patients aged 65 and over, who underwent an emergency head CT scan for fall from
13 their height. Outcome at the end of the acute care, clinico-biological data and delays
14 between trauma and CT were collected, and crossed with a detection of head lesion on
15 the CT scan.

16 **Results:** Of 500 patients, 38 (7.6%) had traumatic lesions depicted on the CT scan and
17 267 (53.4%) were hospitalized after the CT scan. Three (0.6%) had been operated for
18 urgent head surgery. Nine of the 38 (23.6%) patients with traumatic lesion returned
19 home. Presence of a lesion depicted on the CT scan was not correlated with the
20 orientation of the patient ($p < 0.0001$). Post-traumatic injury was significantly associated
21 with male sex ($RR = 2.19$, $p = 0.0217$), consciousness impairment ($RR = 1.56$, $p < 0.0001$),
22 focal neurological deficit ($RR = 6.36$, $p = 0.0362$) and past history of post-traumatic brain
23 injury ($RR = 7.17$, $p = 0.0027$). Anticoagulant therapy was not associated with increased
24 risk of traumatic lesions ($p = 0.3315$). ROC analysis determined that a 5-hours time-
25 interval between head trauma and CT allowed optimal detection of lesions.

26 **Conclusion:** The systematic indication of an emergency head CT scan for fall in elderly
27 patients presents a low diagnostic and therapeutic yield and is not relevant. Male sex,
28 consciousness impairment, focal neurological deficit, past history of post-traumatic

29 brain injury and time-interval between head trauma and CT are statistically related to
30 the presence of lesions and should therefore be taken into account.

31 **Keywords:** traumatic brain injury; x-ray computed tomography; emergency; geriatric; relevance

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54 **INTRODUCTION**

55 Medical imaging represents an increasingly important part of medical expenditure with
56 a large number of unwarranted exams.^{1,2} A priority action against irrelevant medical
57 acts is currently running in several countries.³ In parallel, the imperative need to
58 rationalize the care of patients in emergency departments is constantly reminded in
59 order to fight against the congestion of the dedicated departments.⁴

60 In this setting, the aging of the population is causing an incredible increase of requests
61 for medical imaging affecting the elderly.⁵ Furthermore; falls in the elderly population
62 is particularly a public health problem.⁶

63 Current guidelines recommend "In case of head trauma, the head CT scan is the first-
64 line examination and is recommended for any patient without loss of consciousness or
65 post-traumatic amnesia, if any of the following is present: neurological deficit,
66 vomiting, severe headache, age over 65 years, suspected skull-base fracture, Glasgow
67 score <15, coagulopathy, trauma with dangerous mechanism".^{7,8} Indeed, these current
68 guidelines recommend to scan anyone 65 years of age or older after a head trauma,
69 without distinction.

70 The main objective of this study was to evaluate the relevance of the current guidelines
71 by studying the relation between the result of the CT scan and the outcome of the
72 patient at the end of the acute care. To our knowledge, there is no study that takes into
73 account the patient's future in a similar population.

74 The secondary objectives of this study were to identify specific clinical, epidemiological
75 or biological criteria favoring the presence of post-traumatic lesions. Also, this study
76 aimed at identifying a time interval between the occurrence of the trauma and the CT
77 scan to optimize the detection of post-traumatic lesions.

78 **MATERIAL AND METHODS**

79 *Patient Population*

80 Following institutional review board approval, we retrospectively included 500
81 consecutive patients aged 65 and over who underwent a head CT scan for fall from their
82 own height, between October 2017 and February 2018 at the Limoges University
83 Hospital. Head CT scan were requested by the emergency department. Patients under 65
84 years old were excluded.

85

86 *Head CT scan*

87 All images were acquired using an Optima CT660 CT scanner (GE Healthcare,
88 Milwaukee, WI). CT scans were performed without injection of contrast medium.
89 It was interpreted by an experienced radiologist (5 years experience). The results were
90 prospectively collected via the Xplore software giving access to the reports validated by
91 the on-duty radiologist on the day of the examination.

92

93 *Data Collection*

94 The diagnosis of presence or absence of post-traumatic head lesions was determined
95 according to the reports of head CT performed in the emergency setting by board-
96 certified radiologists. Post-traumatic head lesions included edematous and/or
97 hemorrhagic parenchymal contusions, parenchymal hematomas, subdural, subarachnoid
98 or extra-dural hematoma and cranial vault fractures. Time interval between the
99 occurrence of the head trauma and the CT scan was also recorded if known.

100 The following outcomes were considered:

101 - "Return home" with educational surveillance sheet given by the emergency physician
102 for the patient's entourage.

103 - "Hospitalization", mostly in the geriatric care department.
104 - "Surgical management" defined by an immediate intervention at the end of the CT
105 scan, or delayed in case of clinical worsening
106 - "Death" occurred before any referral
107 In addition, we collected the following baseline data: age and sex, Glasgow admission
108 score, existence of a focal neurological deficit, previous CT scan performed for the
109 same indication, previous antiplatelet or anticoagulant medication use. The hemostasis
110 report (prothrombin rate, activated partial thromboplastin time and INR) was also
111 collected in order to isolate any spontaneous disruption or overdose in anticoagulant
112 treatment, as opposed to a hemostasis assessment within the limits of normal or
113 respecting the target values of the anticoagulant treatment taken by the patient.

114

115 *Statistical Analysis*

116 The results of the quantitative variables are reported with mean \pm standard deviation,
117 minimum, maximum and median, those of the qualitative variables are reported with
118 frequencies and percentages.

119 Comparisons of qualitative variables between two groups (presence versus absence of
120 post-traumatic lesion) were performed by Chi2 tests or Fisher exact tests according to
121 the theoretical numbers and conditions of use of the tests used.

122 The distributions of the quantitative variables were compared with unpaired Student t-
123 tests for the age variable and non-parametric Man and Whitney tests for unmatched
124 series for the scores and delays variables.

125 A logistic regression analysis was applied in a simple way and then combined with the
126 variables "sex", "Glasgow", "previous CT scan for the same indication" and
127 "neurological deficit" crossed to the "presence of post-traumatic head lesion".

128 A ROC curve analysis was performed in order to determine a threshold of scanner delay
129 corresponding to the appearance of a lesion.
130 The significance threshold for all the statistical analyzes was 0.05.
131 All analyses have been performed with SAS 9.1.3 software (SAS Institute, Cary, USA).
132

133 **RESULTS**

134 *Descriptive analysis*

135 Baseline characteristics are presented in **Table 1**.

136 500 consecutive patients have been included with a mean age of 85 years (\pm 8 years).

137 The head CT scan revealed no post-traumatic lesion for 462 of the 500 patients (92.4%).

138 The 38 patients with brain damage mainly presented subdural and sub-arachnoid
139 hematomas.

140 Patients' outcomes analysis revealed that 267 of the 500 patients (53.4%) have been
141 hospitalized after the head CT scan, the majority because of a loss of autonomy and an
142 impossible home maintenance. Only 3 (0.6%) had indication for urgent surgical
143 management. Both of them presented subdural hematomas. The two deaths observed in
144 the study were due to multiple-organ failure.

145

146 *Principal multivariate analysis*

147 Results are presented in **Table 2**.

148 Of the 38 patients with post-traumatic lesions, 25 (65.79%) have been hospitalized after
149 the CT. Nine of them (23,6%) were returned home. Only 3 (7.89%) received surgical
150 treatment (all in emergency).

151 Among the 462 patients who were free of any post-traumatic lesion, 242 patients
152 (52,37%) patients were also hospitalized. Conversely, 242 out of 247 hospitalized
153 patients (90,6%) did not present any post-traumatic head lesion.

154 The influence of the CT scan on the patient's outcome was studied by the Relative Risk
155 linking the presence of injury and hospitalization. It is calculated at $RR = 1.25 [0.9829;$
156 $1.6050]$. No statistical link exists between these two variables (**Table 3**).

157

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160 *Secondary multivariate analysis and Logistic Regression*

161 Results are presented in **Table 4**.

162 A statistically significant relationship ($p = 0.0217$) was found between the presence of
163 post-traumatic lesion and the male sex with 22 men (57.89%) identified among the 38
164 patients with post-traumatic lesions (RR=2.16).

165 A statistically significant relationship ($p < 0.0001$) was also established between the
166 presence of post-traumatic lesions and a consciousness impairment defined as a
167 decrease in Glasgow score (RR=1.56). The average Glasgow score in the no lesion
168 group was 14.88 (± 0.69) versus 13.61 (± 3.04) in patients with lesions.

169 There was a statistically significant relationship ($p = 0.0362$) between post-traumatic
170 lesions in case of existence of a focal neurological deficit at admission (RR=6.36).

171 Finally, there was a statistically significant association between a past history of post-
172 traumatic brain lesion and the detection of new post-traumatic lesions on the head CT
173 scan performed in this study (RR=7.17 $p = 0.0027$).

174 Conversely, no relation could be established between the use of anticoagulant treatment
175 or the existence of a disturbance of hemostasis and the occurrence of post-traumatic
176 lesions.

177 A significant association ($p < 0.001$) was found between the presence of post-traumatic
178 lesions and the presence of at least one of the four criteria among male sex, past history
179 of post-traumatic head lesion, focal neurological deficit and consciousness impairment.
180 Indeed, 76.32% of people with lesions had at least one of the previously stated criteria
181 (29/38 patients) **Table 5**.

182 The statistical association between the combined four criteria (male sex, past history of
183 post-traumatic head lesion, focal neurological deficit and consciousness impairment)
184 and the presence of post-traumatic lesions was significantly confirmed with an odds-
185 ratio of 4.45 ($p < 0.001$).

186

187 *ROC Curves*

188 The ROC curve established from the time interval between the trauma and the CT scan,
189 and the presence or absence of post-traumatic injury isolated a threshold of 5 hours from
190 which the detection of lesions would be optimal.

191 The same method was applied considering only the 24 hours and shorter delays, then 12
192 hours and shorter. Here again, the threshold of 5 hours was released (**Figure 1**).

193

194

195 **DISCUSSION**

196 In our series, only 7.6% of the scanned patients actually presented post-traumatic
197 lesions. These results are consistent with previous studies which observed a prevalence
198 of 5 and 2.1% of post-traumatic lesions in the context of mild head trauma in the
199 general population.^{9,10} In parallel in our study, the majority of patients (53.4%) were
200 hospitalized after the CT scan, even incase of normal CT, which suggests that the result
201 of the CT scan did not condition the patient's future.

202 The multivariate study conducted to cross the patient's future and head CT scan results
203 revealed that in almost half of cases, patients were hospitalized after the head CT scan
204 even in the group of patients without post-traumatic lesions. This result supports the
205 previous statement that the result of the CT scan did not condition the patient's future. In
206 addition, a return home was observed in 9 patients (23.6%) for whom the CT scan
207 identified post traumatic lesions. In contrast, 90.6% of hospitalized patients were
208 without any post-traumatic lesions. All of these results suggest that the clinical
209 condition of the patient, and particularly the problem of home care, takes precedence
210 over the result of the CT scan when guiding the orientation of elderly patients. To our
211 knowledge, no other study in the literature previously considered the patients' future in
212 a similar population. However, our present results are in accordance with the previous
213 study by Turedi et al. which concluded to the futility of a systematic head CT scan in
214 low risk patients.¹¹

215 Many studies have sought to identify predictive criteria for the development of post-
216 traumatic lesions in mild head injuries in the general population.^{12,13,14} This research
217 reflects a need to specify the indications of the head CT scan in this context.

218 The therapeutic performance of the indication of systematic head CT scan for head
219 trauma in this population could be evaluated by raising the proportion of patients who

220 received emergency surgical treatment. In the present study, only 3 of the 500 scanned
221 patients were concerned which represents 0.6% of the total population. Those results are
222 consistent with the study by Borg et al⁹ which concluded at a therapeutic yield of about
223 1.0%.

224 The multivariate analysis identified that the proportion of patients with post-traumatic
225 lesions who underwent surgical operation did not exceed 8.0%. This result suggests a
226 low immediate therapeutic benefit. This can be explained by a precarious state of the
227 studied population (average age at 85 years), even more in the subpopulation presenting
228 post-traumatic lesions which are often contra-indicated for surgery.

229 In parallel, this study aimed to isolate specific clinical, epidemiological and biological
230 criteria correlated with the presence of post-traumatic lesions. The present results
231 identified that male sex, consciousness impairment, and previous history of post-
232 traumatic brain injury were significantly related to the presence of lesions. Previous
233 history of post-traumatic brain injury testifies to a fragility of the individual. Also, there
234 was a tendency for a correlation between the existence of a focal neurological deficit
235 and the presence of objectified post-traumatic lesions. The predictive value of the
236 consciousness impairment and the presence of a neurological deficit has already been
237 proven in the general population but never in the elderly population.^{15,16}

238 The results also identified a statistically significant link between the combined four
239 criteria (male sex, history of post-traumatic lesions, focal neurological deficit and
240 consciousness impairment) and the presence of post-traumatic lesions. Indeed, in more
241 than 75.0% of patients with lesions, at least one of the 4 criteria listed above was
242 identified. The application of a logistic regression model to these variables identified
243 that a patient with at least one of these 4 criteria had a 4.45 times increased risk to
244 present post-traumatic lesions.

245 Furthermore in the present study, no link was observed between the use of antiplatelet
246 or anticoagulant treatment with the presence of post-traumatic lesions. This result is in
247 accordance with the study conducted by Uccella et al.¹⁶ which similarly concluded that
248 there was no link between anticoagulant treatment and post-traumatic lesions in mild
249 head injuries. However, they conclude that patients on antiplatelet therapy seem to be
250 more prone to develop intracranial bleeding than the general population. This result
251 could be explained by the older age of patients under antiplatelet treatment and
252 therefore their higher fragility. In parallel, Ivascu et al. concluded that there was no
253 influence of long-term aspirin treatment on mild head injuries.¹⁸

254 Finally, the last objective was to determine a threshold for time delay between the
255 occurrence of the trauma and the CT scan, from which the detection of post-traumatic
256 lesions was optimized. According to the ROC curves analyzes, a five-hours delay was
257 identified to be the most appropriate. This time interval is similar to that of the study
258 conducted by Rosen et al. which concluded that the lesions were at risk of worsening by
259 6 hours and that the surgical decision was no longer modified¹⁵. The observed trend is
260 therefore that a CT scan performed in a period of time that is too short after the trauma,
261 misdiagnosis the appearance of certain lesions.

262 The exact cost of the cerebral scanner in the fall of the elderly person is difficult to
263 evaluate. However, the total cost of imaging in France is 6 billion Euros, and the cost of
264 external imaging including emergencies is 1.2 billion Euros per year.¹⁹ The medico-
265 economic issues are therefore major.

266 The protein S-100B assay could be interesting in some indications; however this
267 presents a low specificity and low positive predictive value. Therefore, this biological
268 testing would not add much to better target the patients requiring a CT-scan.

269

270

271 *Limitations*

272 The present study is limited by its retrospective nature. We could not exclude a potential
273 selection bias considering that some patients might not had a CT scan, based on the
274 emergency room physician's decision. Furthermore, we were not able to identify
275 associated lesions (ie osteoporotic hip or spine fractures, ...) which could have modified
276 the patient's orientation. However, only few patients (< 5%) were hospitalized because
277 of associated traumatic injury (hip or wrist fractures) but the majority because of a loss
278 of autonomy and an impossible home care. We were not able to evaluate the violence
279 of impact on the head. Furthermore, the reliability of delay between the onset of the
280 trauma and the head CT is uncertain since in most cases this delay was approximate.
281 Finally, patients hospitalized at the time of the trauma, were not included. This choice
282 was made to facilitate the collection of data, centralized by the observation of the
283 emergency physician. In addition, this excluded subpopulation is a minority and its
284 profile seems superimposable to the population studied here (as evidenced by the
285 majority of our patients). We can therefore consider extending our conclusions to
286 patients whose trauma occurs during hospitalization.

287

288 **CONCLUSION**

289 The systematic indication of an emergency head CT scan for trauma in elderly patients
290 presents a low diagnostic and therapeutic yield and is not relevant. Male sex,
291 consciousness impairment, focal neurological deficit, past history of post-traumatic
292 brain injury and time-interval between head trauma and CT are statistically related to
293 the presence of lesions and should therefore be taken into account.

294

295 **AUTHORS DISCLOSURE STATEMENT**

296 No competing financial interest exists.

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302 **BIBLIOGRAPHIE**

303

304 1. Hendee WR1, Becker GJ, Borgstede JP et al. Addressing overutilization in medical imaging.

305 Radiology. 2010 Oct;257(1):240-5.

306

307 2. Beinfeld MT, Gazelle GS. Diagnostic imaging costs: are they driving up the costs of hospital

308 care? Radiology. 2005 Jun;235(3):934-9.

309

310 3. Siström CL. The appropriateness of imaging: a comprehensive conceptual framework.

311 Radiology 2009;251(3):637-49.

312

313 4. Pines JM, Hilton JA, Weber EJ et al. International perspectives on emergency department

314 crowding. Acad. Emerg. Med. 2011; 18: 1358–70.

315

316 5. Fawcett R1, McCoubrie P. Pitfalls in imaging the frail elderly. Br J Radiol. 2015

317 Jan;88(1045):20140699.

318

319 6. Peel NM. Epidemiology of falls in older age, Can J Aging;30(1):7-19,2011.

320

321 7. Guide de bon usage des examens d'imagerie [online, consulted the 04/02/19]

322 [http://www.sfrnet.org/sfr/professionnels/5-referentiels-bonnes-pratiques/guides/guide-bon-](http://www.sfrnet.org/sfr/professionnels/5-referentiels-bonnes-pratiques/guides/guide-bon-usage-examens-imagerie-medicale/index.phtml)

323 [usage-examens-imagerie-medicale/index.phtml](http://www.sfrnet.org/sfr/professionnels/5-referentiels-bonnes-pratiques/guides/guide-bon-usage-examens-imagerie-medicale/index.phtml)

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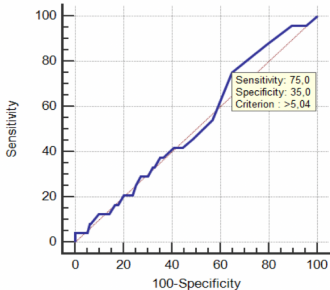
325 8. Marion Smits, MD; Diederik W. J. Dippel, MD, PhD, et al. External Validation of the

326 Canadian CT Head Rule and the New Orleans Criteria for CT Scanning in Patients With Minor

327 Head Injury. JAMA. 2005;294(12):1511-1518

- 328 9. Borg JI, Holm L, Cassidy JD, Diagnostic procedures in mild traumatic brain injury: results of
329 the WHO Collaborating Centre Task Force on Mild Traumatic Brain Injury. *J Rehabil Med.*
330 2004 Feb;(43 Suppl):61-75.
331
- 332 10. Campiglio L, Bianchi F, Cattalini C, et al. Mild brain injury and anticoagulants: Less is
333 enough. *Neurol Clin Pract.* 2017 Aug;7(4):296-305.
334
- 335 11. Türedi S¹, Hasanbasoglu A, Gunduz A et al. Clinical decision instruments for CT scan in
336 minor head trauma. *J Emerg Med.* 2008 Apr;34(3):253-9.
337
- 338 12. Haydel MJ, Preston CA, Mills TJ, Luber S, Blaudeau E, DeBlieux PM. Indications for
339 computed tomography in patients with minor head injury. *N Engl J Med.* 2000;343(2):100–105.
340
- 341 13. Ibanez L, Chan S, Silva J, et al. Reliability of clinical guidelines in the detection of patients
342 at risk following mild head injury: results of a prospective study. *J*
343 *Neurosurg.* 2004;100(5):825–834.
344
- 345 14. Smits M, Diederik W, Dippel W, et al. Predicting intracranial traumatic findings on
346 computed tomography in patients with minor head injury: the CHIP prediction rule. *Ann Intern*
347 *Med.* 2007;14(6):397–405.
348
- 349 15. Rosen CB, Luy DD, Deane MR, et al. Routine repeat head CT may not be necessary for
350 patients with mild TBI. *Trauma Surgery & Acute Care*
351 *Open* 2018;3:e000129. doi: 10.1136/tsaco-2017-000129
352

- 353 16. Smits M, Dippel DW, de Haan GG, et al. External validation of the Canadian CT Head Rule
354 and the New Orleans Criteria for CT scanning in patients with minor head
355 injury. JAMA. 2005;294(12):1519–1525.
- 356
- 357 17. Uccella L, Zoia C, Bongetta D, et al. Are Antiplatelet and Anticoagulants Drugs A Risk
358 Factor for Bleeding in Mild Traumatic Brain Injury?. World Neurosurgery. 110.
359 10.1016/j.wneu.2017.10.173.
- 360
- 361 18. Ivascu FA, Howells GA, Junn FS, et al.: Predictors of mortality in trauma patients with
362 intracranial hemorrhage on preinjury aspirin or clopidogrel. J Trauma 2008; 65: 785-788.
- 363
- 364 19. Rapport de la cours des comptes [online, consulted the 04/02/19]
365 <https://www.ccomptes.fr/sites/default/files/EzPublish/20160511-imagerie-medicale.pdf>



Sample size	298
Positive group : Lésions post traumatiques = 1	24
Negative group : Lésions post traumatiques = 0	274

Disease prevalence (%)	unknown
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Area under the ROC curve (AUC)

Area under the ROC curve (AUC)	0,524
Standard Error ^a	0,0585
95% Confidence interval ^b	0,466 to 0,582
z statistic	0,410
Significance level P (Area=0.5)	0,6821

^a DeLong et al, 1988

^b Binomial exact

Youden index

Youden index J	0,1004
Associated criterion	>5,04

Table 1. Descriptive of the population baseline characteristics and outcomes

Population Baseline Characteristics	N= 500
Mean age (yr) (SD)	84.9 (7.68)
Sex	
Male n (%)	200 (40 %)
Female n (%)	300 (60 %)
Mean Glasgow Coma Scale score (range)	14.8 (3-15)
Focal neurological deficit at admission n (%)	6 (1.2)
Use of treatment altering hemostasis	
No n (%)	164 (32.8 %)
Antiplatelet medication n (%)	178 (35.6 %)
Anticoagulant medication n (%)	151 (30.2 %)
Unknown status n (%)	7 (1.4 %)
Previous imaging for head trauma	
No imaging n (%)	366 (73.2 %)
No previous traumatic lesion n (%)	123 (24.6 %)
Previous traumatic lesion n (%)	11 (2.2 %)
General Population Outcomes	
Return home n (%)	227 (45.4 %)
Hospitalization n (%)	267(53.4 %)
Urgent surgical management n (%)	3 (0.6 %)
Death n (%)	3(0.6 %)

Table 2. Outcome according the presence or absence of traumatic lesion detected on head CT scan

	No Traumatic lesion	Traumatic lesion	p
	N = 462	N = 38	
Return home	218 (47.2 %)	9 (23.7 %)	-
Hospitalization	242 (52.4 %)	25 (65.8 %)	-
Urgent surgical management n (%)	0 (0 %)	3 (7.9 %)	< 0.0001
Death n (%)	2 (0.4 %)	1 (2.6 %)	-

Table 3. Statistical multivariate analysis: presence of traumatic lesion detected on head CT scan according to hospitalization of patients

CONFIDENCE INTERVAL FOR THE COMPARISON OF TWO PROPORTIONS:		
Number of "hospitalization" in the "no lesion" group:	242	The estimated proportion in the Group 1 is: 95% CI for proportion in Group 1:
Sample size of the "no lesion" group:	462	
Number of "Hospitalization" in the "lesion" group:	25	The estimated proportion in the Group 2 is: 95% CI for proportion in Group 1:
Sample size of the "lesion" group:	38	
Enter the required confidence interval (eg, 95%) here:	95	
RESULT:		
Relative Risk:	1,2560	CI: 0,9829 to 1,6050

Table 4. Statistical multivariate analysis: presence of traumatic lesion detected on head CT scan according the presence of one of the following criteria: male sex, past history of post-traumatic head lesion, focal neurological deficit, consciousness impairment

	RR	IC95% du RR	p
Consciousness impairment	1,56	1,28-1,97	<0,0001
Sexe (M)	2,19	1,12-4,29	0,0217
Past history of post-traumatic brain injury	7,17	1,98-26,05	0,0027
Focal neurological deficit	6,36	1,13-35,92	0,0362

Table 5. Presence of traumatic lesion detected on head CT scan according the presence of at least one of the following criteria: male sex, past history of post-traumatic head lesion, focal neurological deficit, consciousness impairment

	N	No Traumatic lesion	Traumatic lesion	p
General Population				
None of the 4 criteria n (%)	277 (55.4 %)	268 (58.0 %)	9 (23.7 %)	
At least 1 of the 4 criteria n (%)	223 (44.6 %)	194 (42.0 %)	29 (76.3 %)	P<0.0001
Total	500 (100 %)	462	38 (100 %)	