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Evaluating the functional impairment of assault survivors in a judicial context – A retrospective study

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ABSTRACT

Background: The description of traumatic injuries and the outcome on functioning are major items of the evaluation of assault survivors. French law quantifies the seriousness of committed violence through the duration of the victims' inability to fulfil their usual daily activities, in days of 'Total incapacity to work' (TIW). Physicians are provided with a limited number of recommendations. In this study, we searched for determinants of TIW.

Methods: We reviewed 1145 consecutive files of victims evaluated between 10/01/2010 and 11/22/2010. People reporting repeated assaults, or assessed more than 30 days after the facts were excluded. Data collected were: gender, age, TIW, type of traumatic injuries, time to evaluation, patient category, type of assailant, and presence of aggravating factors. Univariate associations with TIW were assessed, while generalised linear models including relevant covariables were proposed.

Results: The population (718 men, 427 women, median age 29) included 236 detainees, 74 police officers, and 835 other individuals. Mean duration of TIW was 4.3 days. The time to evaluation was correlated to TIW. Patient category (police officers, detainees, or other individuals), presence of traumatic injuries, and type of assailant were associated with TIW. In patients presenting no evidence of bone fracture, duration of TIW (2.0 days vs. 2.6 and 3.8, $p < 0.001$) and time to evaluation (10.9 h vs. 21.2 and 58.5, $p < 0.001$) differed in detainees, police officers, and other individuals.

Conclusion: We suggest that the outcome of assaults should be evaluated in similar conditions in all victims, including time to evaluation.

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1. Introduction

Interpersonal violence has been identified as global public health issue.¹ Persons exposed to violence, such as victims of assaults, have to face different but intricate perspectives: one concerns their own health and another one involves the judicial system of their country. Only a minority of assaults are reported to the police and investigated by the criminal justice system.^{2,3} In most European countries, the outcome of violence needs to be assessed by physicians so that the appropriate court can base its sentence on factual pieces of evidence. Practices vary from one country to another, but similar data are collected when a victim is examined.⁴ The description of traumatic injuries, the potential

need for treatment, and the expected outcome on functioning are major items of the evaluation. Predictive evaluation of the outcome of an assault is a difficult challenge. Indeed, French law quantifies the seriousness of the committed violence through the duration of the victims' inability to fulfil their usual daily activities. Disability concerns both the somatic and psychological spheres and functional impairment is quantified in days of 'Total incapacity to work' (TIW).⁵ Physicians are provided with a limited number of recommendations, all originating from legal, not medical, sources such as judgements from the Criminal Division of the Court of Cassation or guidelines from the ministries of health and justice.^{6–8} A medical evidence-based tool to strengthen forensic assessments of assault survivors is still lacking⁹ and has been requested by non-governmental organisations such as Amnesty International.¹⁰ Since evaluations aim at the same goal – evaluating the victim impairment – we assumed that there should be some implicit and explicit factors on which physicians build their conclusions. Some authors searched for predictors of long-term incapacity and

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duration of sickness leave,¹¹ or the relation between injury severity and the type of offence.¹² In the present study, we screened data collected during forensic examinations of assault survivors and searched for potential determinants of TIW.

2. Methods

In this monocentric, retrospective study, we reviewed 1145 consecutive medical files of victims of assaults evaluated in the forensic medicine unit of Jean-Verdier hospital in Bondy (Seine-Saint-Denis), a suburban area in the Paris area, between 10/01/2010 and 11/22/2010.

2.1. Inclusion criteria

Patients having lodged a complaint to the police, reporting deliberate assault and battery, and aged over 10 were included.

2.2. Exclusion criteria

Patients reporting unintended or repeated situations of violence, or examined more than 30 days after the reported facts were excluded.

2.3. Data collection

Data were collected from a standardised questionnaire. Patient data included age and gender. We divided patients into three categories: detainees kept in custody, police officers, and other individuals. These categories seemed relevant since they corresponded to particular circumstances of medical examination. Police officers usually come in uniform, along with two or three colleagues. Detainees arrive at hospital with handcuffs, accompanied by police officers, and are examined in a room devoted to examinations of detainees.

Each forensic physician was identified by a number, coded from 1 to 19. We recorded the delay between the reported facts and the time of the examination, the type of assailant, and the existence of aggravating factors according to the French Penal Code.⁵ For instance, acts of violence committed against a minor under 15 years of age, against a person whose particular vulnerability is apparent or known to the perpetrator, against a natural or legitimate ascendant or the adoptive father or mother, by a person holding public authority, by two or more acting as perpetrators or accomplices are some of the 17 situations identified as aggravating factors in this code.¹³ Since penalties incurred increase according to the number of aggravating factors (0, 1, 2, and 3 or more), we coded each case as such: 0-1-2-3.

Somatic data were classified and coded in 3 categories: 0 for no visible, recent traumatic injury, 1 for visible injuries such as bruises with no evidence of fracture, and 2 in the case of bone fracture. The impairment was quantified and expressed in days of TIW, as requested by judicial authorities, following the French Penal Code. All data, except time to evaluation, were extracted from an Access[®] database. Time to evaluation was computed by getting back to paper medical files, which also allowed a quality assessment of extracted data.

2.4. Statistical analysis

Analyses were conducted on PAWS SPSS[®] 18, under Windows[®] 7 OS. Unless otherwise stated, results were considered significant for *p* values below 0.05.

For univariate associations to the duration of TIW, differences were searched for either by *t* tests in case of two categories such as

gender, or by one-way ANOVA tests in case of more than two but less than 4 categories, such as patient category or visible traumatic injuries. The assumption for variance equality was assessed when needed by Levene's test, and according to the respected assumption or not, we used Bonferroni's or Tamhane's tests for pair comparisons. For categorical variables with numerous categories, such as the type of assailant and the forensic physicians, statistical significance for each category was tested with a generalised linear model. In this case, a category associated with significant differences in TIW was not isolated from the others if it represented less than 20 cases. Correlation between the duration of TIW and continuous quantitative variables such as time to evaluation and the age of the victim was evaluated by Pearson's coefficient.

For multivariate analysis, we built and tested two generalised linear models with duration of TIW as outcome. They differed by the inclusion of two variables, namely the type of assailants and the forensic physician. As mentioned, these two variables consisted in 20 and 19 categories respectively, which led to a cautious use and interpretation. Concerning categorical outcomes, namely types of assailant and forensic physicians, we isolated in each variable the values significantly associated with differences in TIW in univariate analyses, and grouped as 'other types of assailants' and 'other physicians' all values which were not significantly associated with differences in TIW. In this particular case, statistical significance was considered for *p* < 0.1. We added an interaction term between the time to evaluation and the patient category, to search for differences in duration of TIW between patient categories as the time to evaluation increases. Most detainees and police officers were evaluated within 48 h, because the duration of custody cannot exceed 48 h in most cases and police officers are referred to the forensic medicine unit as soon as possible when they are victims of assaults.

We first analysed all 1145 files, which included 81 cases with bone fractures. Since fractures are nearly deterministic for TIW and distort results with outliers, we conducted analyses on a subset of 1064 files, fractures excluded.

3. Results

The whole population (718 men [63%] and 427 women [37%], median age, 29 years, range: 10–86) included 236 detainees, 74 police officers, and 835 other individuals. No traumatic injury was found in 196 cases (17%), injuries without any fracture accounted for 868 cases (76%), and bone fractures for 81 cases (7%). Fractures included nasal bone (22 of 81, 27%), dental (19 of 81, 23%), hand (19 of 81, 23%) and other fractures (21 of 81, 26%). When cases with fractures were excluded, the population consisted in 1064 persons (662 men [62%], 402 women [38%]), including 226 detainees (21%), 69 police officers (6%), and 769 other individuals (72%).

For the 1145 files sample, mean duration of TIW was 4.3 days (standard deviation [SD], 5.9; range 0–90 days). Mean TIW in the subgroup of 81 patients with fractures was 16.4 days (SD, 15.8; median, 10 days, range: 0 [dental fracture] - 90 [broken leg]). Mean duration of TIW, when fractures were excluded, was 3.4 days (SD, 2.5; median, 3 days; range 0–30 days). Their distribution was not found significantly asymmetric. In a minority of reports (298 of 1145, 26%), no aggravating factor could be identified. In 44% of cases, one aggravating factor was identified.

The most frequent types of assailants included an unknown person (491 cases, 46%), a police officer (124 cases, 12%), a husband/spouse or ex-husband/spouse (111 cases, 10%), or a neighbour (49 cases, 5%). No information was reported for 2 cases of 1145.

Of 19 physicians practising in the unit, the 6 more active physicians respectively evaluated 190 cases (18%), 171 cases (16%), 125 cases (12%), 115 cases (11%), 89 and 84 cases (8%), accounting for about 70% of the whole activity.

Table 1

Comparisons between patients with evidence of bone fracture and patients with no evidence of fracture.

		No fracture	Fracture	p value
		N (%)	N (%)	
Gender	Men	662 (62.2)	56 (69.1)	0.235
	Women	402 (37.8)	25 (30.9)	
Presence of aggravating factors	3 or more	68 (6.4)	2 (2.5)	0.289
	2	251 (23.6)	21 (25.9)	
	1	464 (43.6)	41 (50.6)	
	0	281 (26.4)	17 (21.0)	
Patient category	Detainees	226 (21.2)	10 (12.3)	0.151
	Police officers	69 (6.5)	5 (6.2)	
	Other individuals	769 (72.3)	66 (81.5)	
Type of assailant	20 categories			0.460
Forensic physicians	19 categories			0.004
		Mean (SD)	Mean (SD)	
TIW duration (days)		3.40 (2.51)	16.43 (15.79)	<0.001
Time to evaluation (hours)		46.11 (51.79)	69.07 (87.02)	0.021
Age (years)		31.31 (14.27)	34.40 (14.77)	0.061

N: number of patients.

The duration of TIW (3.4 days versus 16.4, $p < 0.001$) and the time to evaluation (46.1 h versus 69.1, $p = 0.02$) differed significantly in patients presenting no evidence of fracture and in those with fractures. Patients with fracture were not homogeneously distributed among the different forensic physicians (Table 1). In patients presenting no evidence of fracture, the duration of TIW (2.0 days versus 2.6 and 3.8, $p < 0.001$) and the time to evaluation (10.9 h versus 21.2 and 58.5, $p < 0.001$) differed significantly in detainees, police officers, and other individuals.

3.1. Univariate analysis

Gender was not found associated with differences in TIW. As announced, presence of fracture was associated with significant differences in TIW: people presenting fractures corresponded to a specific, distinct group in terms of TIW, which had to be isolated, so that the main analyses could remain meaningful.

The time to evaluation, whether fractures were excluded or not, was correlated to TIW (Pearson's coefficient 0.255 and 0.247, respectively, $p < 0.001$). Age was found correlated as well, but only when fractures were not taken into account (Pearson's coefficient

0.132, $p < 0.001$). The presence of aggravating factors was not associated with differences in TIW when explored with one-way ANOVA.

The presence of traumatic injuries was significantly related to the duration of TIW: 16.4 days (mean; SD, 15.8) in patients presenting fractures vs. 3.7 (SD, 2.6) in patients with traumatic injuries without fracture and 2.2 (SD, 1.9) in patients without any traumatic injury ($p < 0.001$). Three categories of assailants were associated with a lower duration of TIW, but only two (schoolmates and police officers) were considered relevant since the other one represented only 2 cases. Concerning physicians, 3 of them were associated with differences in TIW attribution.

3.2. Multivariate analysis

We tested 2 models accounting for days of TIW. The first one included patient data (gender, age, and patient category), examination data (forensic physician), circumstances of violence (type of assailant), somatic data (presence of absence of traumatic injury, fractures excluded) and an interaction term between patient category and time to evaluation. The second model included the same covariates except the type of assailants and the forensic physicians. Results from the second model are presented Table 2.

Whatever the model considered, results did not substantially differ from univariate analyses.

Factors with the most important impact, i.e. with a difference of more than a day, were the presence of traumatic injuries, the patient category (lower duration of TIW in police officers and detainees), and the type of assailants (lower duration in schoolmates, Beta = -1.2 day, 95% confidence interval (CI) = [-1.6; -0.6], $p = 0.008$). Two of 19 physicians delivered lower values of TIW (Beta = -1.1 day, 95%CI = [-1.6; -0.6], $p < 0.001$ and Beta = -0.7 day, 95%CI = [-1.2; -0.2], $p = 0.005$). Factors with a mild impact were the time to evaluation, the age of the victim, and the interaction between the category of police officers and the time to evaluation. Aggravating factors, when there were 3 or more, were associated with a significant change in TIW in this model.

4. Discussion

In the present study, we found that the time to evaluation, the presence of bone fractures or of traumatic injuries, the age of the victim (when cases of fractures were excluded), the patient

Table 2

Duration of TIW (in days) as outcome of a generalised linear model adjusted on gender, age, patient category, presence of aggravating factors, traumatic injuries, time to evaluation and interaction between time to evaluation and patient category. Patients with bone fracture excluded ($n = 1064$).

		Beta (estimate) [95%CI]	Standard Error	p value
Constant		3.242 [2.020; 4.465]	0.624	<0.001
Gender	Women	0.092 [-0.22; 0.40]	0.157	0.557
	Men	Ref	Ref	Ref
Age (years)		0.017 [0.007; 0.027]	0.005	0.001
Patient category	Detainees	-1.531 [-2.130; -0.931]	0.306	<0.001
	Police officers	-1.572 [-2.269; -0.931]	0.356	<0.001
	Other individuals	Ref	Ref	Ref
Presence of aggravating factors	3 or more	0.813 [0.153; 1.472]	0.336	0.016
	2	0.306 [-0.104; 0.715]	0.209	0.143
	1	0.133 [-0.207; 0.474]	0.174	0.442
	0	Ref	Ref	Ref
Traumatic injuries	Presence, with no fracture	1.611 [1.259; 1.962]	0.179	<0.001
	Absence	Ref	Ref	Ref
Time to evaluation (hours)		0.008 [0.005; 0.011]	0.001	<0.001
Interaction time-to-evaluation*patient category (hours)	Time*detainees	-0.014 [-0.036; 0.007]	0.011	0.191
	Time*police officers	0.023 [0.005; 0.042]	0.009	0.014
	Time*other individuals	Ref	Ref	Ref

95%CI: 95% confidence interval, Ref: reference level.

category, examining physicians, and the type of assailant were associated with the duration of TIW.

A multivariate model, accounting for relative contributions of such factors, showed both stability in results of univariate analyses and statistical significance. All determinants had not the same relative intensity and they were qualitatively different from each other. Some were related to the victim and the circumstances of the assault, such as the age of the victim, the presence of traumatic injuries, the type of assailant, and the patient category (police officer or detainee). Some other determinants were related to the circumstances of the evaluation itself: the physician who examined the victim and the time between the reported facts and the evaluation.

The TIW appeared to be time-dependent. It reflects a key point in the estimation of duration of TIW. Indeed, evaluation of somatic and psychological functional impairment has to be based both on how the victims felt between the facts and the evaluation, and on what they may experience for the following days or weeks. The time of evaluation is not stated by the physician. It depends on what the magistrates or police officers consider as urgent at the time when victims report the assault to the police. For instance, when the assailant has been arrested, the victim needs to be examined during the time of police custody, within 24 h. Magistrates usually consider that the sooner, the better.¹⁴ Doctors think differently. When urgent somatic care is needed, victims of assaults should be referred to the accident and emergency unit. However, evaluation of functional impairment, which includes psychological evaluation, can be more easily trusted when some time has passed.

The determination of TIW needs to be evaluative and predictive, based on reported subjective and objective data. Fractures have a special place and are associated with an almost constant pattern of TIW, which is related to the therapeutic duration needed for immobilisation. For instance, a broken hand usually corresponds to 45 days of TIW.

Some assaults are not followed by detectable traumatic injuries or somatic functional impairment. In such cases, allegations and psychological symptoms have a major role and the duration of TIW may vary according to the time of evaluation and from one physician to another.¹⁵

In most cases, police officers are examined a short time after the facts, so that the predictive part of the TIW dominates. An interaction was found between the time to evaluation and the category of police officers, when they were victims of assaults. In other words, the increase of duration of TIW as time to evaluation increased was higher in police officers than in other victim categories. The way victims report an assault to the police vary according to the category of victims. A special attention is given to police officers when they present to their colleagues after being assaulted, as the assault is an occupational injury in most cases. National and local police authorities are used to informing the media on the numbers of assaulted police officers, who are urged to lodge a complaint.¹⁶ When detainees report an assault to a police officer, the assailant is either another police officer or a person who brought a complaint leading to the arrest. Both

situations can be associated with conflicts of interest for the police officer.

The type of assailant was not a major determining factor in this study, since children fighting with each other at school were the only type associated with different durations of TIW. A complaint to the police is uncommon in such assaults, which was reflected in our study by a limited number of cases (29).

In conclusion, we suggest that the outcome of assaults should be evaluated in similar conditions in all victims, including time to evaluation of TIW. Further information could come from controlled studies based on repeated examinations of victims.

Conflicts of interest

None declared.

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Ethical approval

None.

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