Sexual satisfaction and prognostic factors at 4 years after severe traumatic brain injury

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Traumatic brain injury (TBI) is a major public health problem in Europe, with a high incidence of hospitalization, affecting around 262 people per 100,000 inhabitants per year (1). Around 10% of patients with TBI are severe, with early mortality estimated at 39%, and an unfavorable outcome in around 60% of cases in a predominantly young, male population, requiring long-term follow-up to assess all motor, cognitive and functional impairments in order to optimize their personal, family and societal quality of life (2). However, in addition to the impairments commonly assessed, brain damage can have direct and indirect consequences on patients' sexuality. These consequences include (i) physical sequelae such as motor and sensory disorders, spasticity, pain, fatigue or balance problems, (ii) hormonal sequelae linked to pituitary damage (3), and (iii) cognitive and behavioural impairments that alter affective functioning and social interactions (4). These consequences can lead to social isolation, changes in self-esteem and body image, and depression. However, it is important to note that sexuality and the presence of sexual disorders are rarely addressed in the management of these patients, with a lack of information and prevention regarding the possible impact on their quality of life.

Studies have shown that up to 68% of patients with TBI are dissatisfied with their sexual life (5). However, this dissatisfaction varies according to the severity of the TBI, time since injury, and gender. The question of sexuality remains particularly taboo in cases of severe disability, partly due to general beliefs that sexuality is not a priority in the face of disability (6,7). However, when the disability is due to an accident or illness, it becomes an important component of the patient's life and family life.

The sexual dysfunctions described in the literature vary according to the patient's gender. In men, they include reduced frequency of sexual activity, disturbances of desire, orgasm, erection and ejaculation, and reduced ability to satisfy their partner sexually (8). In women, dysfunction manifests itself mainly as reduced desire and sensation, arousal and orgasm disorders, combined with lowered self-esteem due to body image damage (9). In addition to the impact on the patient him/herself, sexual dysfunction can disrupt his/her partner's emotional life. The personality and behavioural changes associated with TBI make spouses feel as if they are in the presence of a stranger, which can lead to separation (10,11). The couple's emotional life may also be affected, with a reduction in both love and sexual satisfaction. To assess these matters, it seemed appropriate to use the ParisTBI study database, which contains a large number of variables concerning TBI outcome after 4 years. The "Paris-TBI" study was a prospective, observational, multicenter study carried out in the Paris region between 2005 and 2007, to monitor patients with severe TBI (12). Participants were included over a two-year period and followed for four years, with specific data collected during this period. The Quality of Life after Brain Injury (QOLIBRI) questionnaire was completed, and one of the items included the question of sexual satisfaction (13). Participants were required to rate their sexual satisfaction on a scale ranging from 1 to 5, higher scores corresponding to better satisfaction. The aim of this study was to evaluate sexual satisfaction in this sample, and to identify the factors that predict sexual satisfaction. It is an ancillary study to the "Paris-TBI" study. Among the data collected were (i) gender, (ii) age at time of injury, (iii) marital status at time of assessment, (iv) coma severity by the Glasgow Coma Scale (GCS) (14), (v) coma duration in days, (vi) handicap severity assessed by the Glasgow Outcome Scale Extended (GOSE) (15), (vii) mood disorders by the Hospital Anxiety and Depression Scale (HADS) (16), (viii) quality of life by the QOLIBRI (13), (ix) cognitive impairments by the Neurobehavioral Rating Scale-Revised (NRS-R) (17) and the Dysexecutive Questionnaires (DEX)

(18), (x) and autonomy by the Barthel index (19). The NRS-R assesses various aspects such as vigilance, hyperactivity, disorientation, attention, memory, language and mood disorders, irritability, etc. Each of these elements is rated on a scale of 1 to 5, ranging from "absent" to "not assessed". These items can be grouped into sub-items to detect (i) impaired memory and behavior, (ii) altered emotional state, (iii) emotional and behavioral hyperactivation, (iv) decreased arousal and attention, (v) as well as speech and language impairments. The NRS-R was assessed both globally and independently of each sub-item.

The results showed that of the 147 individuals evaluated at 4 years, 85 completed the quality of life questionnaire, and 67 completed all the questionnaires. The majority of participants were male (80%), with a mean age at the time of the trauma of 31.2 ± 13 years. Mean quality of life, assessed on a visual-analog scale of 0 to 100, where 0 represents the worst quality of life, was 70.6 ± 16.6. The median score at the Glasgow Outcome Scale-Extended (GOSE) was 6 [range: 5:7].

The median sexual satisfaction, integrated into the subcategory "social relationships", was 4, meaning that 50% of patients had a fairly or very satisfactory sexual quality of life, Table 1.

	n	%
Score 1: Not at all satisfied	17	20
Score 2: Not very satisfied	12	14,1
Score 3: Moderately satisfied	10	11,8
Score 4: Mostly satisfied	27	31,8
Score 5: Very satisfied	19	22,3
Total	85	100

Table 1: Quality of sexual life

We also examined Spearman rank order correlations between sexual satisfaction and various variables. It revealed positive significant correlations between sexual satisfaction and female gender, autonomy, overall quality of life and absence of physical disability. On the other hand, significant negative correlations were observed with older age, anxiety, depression, and the presence of cognitive disorders, particularly memory disorders and disinhibition. There was no significant correlation with injury severity, as assessed with GCS score or coma duration.

Data	Gender	Age	Current marital status	GCS score	Coma duration	Barthel index	QoL score	NSR-R score	DEX score	GOSE score	Score A (HAD)	Score D (HAD)
N	85	85	83	83	81	83	84	67	85	84	85	85
Rho	**0.23**	**-0.35**	0.03	0.17	-0.12	**0.29**	**0.42**	**-0.52**	**-0.26**	**0.51**	**-0.3**	**-0.43**
p	0.03	0.001	0.78	0.14	0.28	0.0078	0.0001	0.0001	0.02	0.0001	0.006	>0.0001

Table 2: Spearman correlations between sexual satisfaction and the different factors (on the total population n=85)

In a second step, a logistic regression analysis was run with a sexual satisfaction score of 4 or more as dependent variable. Results are shown on Table 3. Univariate analysis identified several factors predictive of satisfactory sexual satisfaction (score ≥4), including age at TBI, autonomy, quality of life, presence of cognitive impairment and severity of disability. In contrast, multivariate analysis showed that higher functional independence as assessed with the GOS-E, was the most significant factor predicting high sexual satisfaction, with an odds ratio of OR = 3.5, $CI_{95\%}$ [1.60 - 7.70] (<0.001). On the other hand, advanced age and cognitive hyperactivity and disinhibition were associated with a significant decrease in sexual satisfaction respectively with an odds ratio OR = 0.92, $CI_{95\%}$ [0.87 - 0.98] and OR=0.65, $CI_{95\%}$ [0.43 - 0.98].

	Univariate				Multivariate			
Data	**N**	**OR**	**[CI95%]**	**p**	**N**	**OR**	**[CI95%]**	**p**
Gender	85	2.6	0.87 - 7.9	0.088				
Age	85	**0.94**	0.90 - 0.98	**0.003**	67	**0.93**	0.87 - 0.98	**0.011**
Barthel score	83	**1.33**	1.03 - 1.7	**0.025**	67	1.15	0.88 - 1.50	0.31
QoL score	84	**1.44**	1.15 - 1.82	**0.002**	67	1.16	0.80 - 1.67	0.44
NSR-R score	67	**0.90**	0.82 - 0.98	**0.014**	67	1.13	0.97 - 1.32	0.11
DEX score	85	0.97	0.94 - 1.01	0.13				
GOSE score	84	**2.5**	1.59 - 3.94	**0.0001**	67	**3.37**	1.51 - 7.52	**0.003**
Score A (HAD)	85	0.92	0.84 - 1.02	0.12				
Score D (HAD)	85	**0.82**	0.73 - 0.93	**0.003**	67	0.95	0.78 - 1.15	0.6

Table 3: Logistic regressions between quality of sexual life score ≥4 and the different factors (on the total population)

Lastly, men and women were analyzed independently to search for gender-specific predictors of sexual satisfaction. In men, the correlations observed were similar to those for the sample as a whole. In multivariate logistic regression, a higher GOS-E score (indicating better functional independence) was significantly associated with ≥4 sexual satisfaction (OR = 2.77, $CI_{95\%}$ [1.41 - 5.43]), while older age was significantly associated with a lower sexual satisfaction (OR = 0.94, $CI_{95\%}$ [0.89 - 0.99], ($p<0.05$)).

Whereas in women, only two variables were significantly correlated with sexual satisfaction, namely overall quality of life (Rho = 0.6, p = 0.04), and depression score (Rho = -0.68, p = 0.0025). In the univariate logistic regression model, only quality of life was a factor significantly related with ≥4 sexual satisfaction: OR = 2.8 ($CI_{95\%}$ [1.11 - 7.14], p = 0.030). Severity of disability was not significantly related to sexual satisfaction.

The results showed relatively good sexual satisfaction in this population, with over half of patients reporting good or very good sexual satisfaction, although this would still be lower than in the general population (20). However, the definition of sexual satisfaction was broad and subjective, making it difficult to determine the presence of pre-accident sexual disorders. The representativeness of the sample may be questioned, even though the participants were representative of the general TBI population in terms of age and gender (1). Although a significant number of patients were lost to follow-up [5-7], there were only marginal differences between patients included in the present study and the whole sample. The results highlighted interesting findings about the relationship between sexual satisfaction, disability and overall quality of life, , with different patterns according to gender.

Age has been identified as a factor influencing sexual satisfaction, with a decrease in sexual satisfaction as with older age, particularly in men. This decrease in sexual satisfaction may be linked to the past experience of older patients, who may live with regret about their past sexuality. This makes it necessary to assess and inform different patients about the complications brought on by TBI.

Sexual satisfaction was influenced by patient gender, with women having a better sexual satisfaction than men. More than gender-based satisfaction, the factors associated with satisfaction differed between men and women. Physical and cognitive impairments were identified as important factors in men, associated with lower sexual satisfaction, suggesting the importance of the link between sexuality and the physical ability to perform the penetrative act. For women, however, sexual satisfaction was directly correlated with overall quality of life, with no significant relationship with overall disability.

In conclusion, this study highlighted the importance of sexual satisfaction in patients with TBI and identified several factors predictive of this satisfaction, such as gender, age, autonomy, overall quality of life and the presence of cognitive disorders, differently according to the patient's gender. It is essential to recognize the impact of TBI on sexuality, and to adopt a holistic approach to improving the quality of life of these patients, providing them with appropriate explanations and taking into account gender-specificities. Health professionals need to be made aware of this issue and integrate sexuality into the overall care of patients. But we also need to make the general public more aware of the sexuality of people with disabilities, combat preconceived ideas and promote a respectful, inclusive approach to the sexuality of these patients.

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In accordance with French legislation, patients and their relatives were informed about the inclusion in the database and informed consent was obtained before each assessment. Approval from Commissions that enforce research database legislation in France and approval from the Ethical Committee (Comité de Protection des Personnes, CPP XI) was obtained before each assessment. The study was registered in ClinicalTrials.gov in August 2011 (identifier: NCT01437683).

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