Predictive Risk of Seizure- Related Injury in Epileptics

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Introduction

- Epilepsy is one of major public health problems, poor QOL
- Seizure-related injury (SRI) contribute to poor QOL
- SRI; minor trauma, traffic accident, ICH, burns, death
- 21% of epileptic reported SRI

Van den Broek, et al 2004

Seizure related injuries

- Relative risk for concussion 2.6
- Risk of trauma; seizure-type, frequency, sex, falling
- Overprotection result in social isolation, psychological dependency

Unglaub et al 2005, Lawn et al 2004

Objective

- Evaluate the risk and predictive factors from SRI
- Build up the predictive model for having SRI

Method

- 100 epileptics in UK
- 300 epileptics in NE, Thailand (KK,SR,NR)
- Cross sectional study
- Face-to face questionnaire
- Patient at least one seizure attack during last 12 month
- Demographics, age, type, cause, falling, time of attack, number of AEDs
- SRI event, type of SRI

Tiamkao 2006, Tiamkao and Shorvon 2006

Method

- Male patients, GTCs,number of attack, daytime of attack, falling,number of AEDs
- Chi-square,Fisher exact test
- P value less than 0.05
- Univaliate logistic analysis
- Predictive model was executed using a multivariate logistic regression model

Results

- 76 of 100 UK, 247 of 300 Thai had seizure attack in past 12 months

- 31/76 (40.79%) and 91/247(36.84%) had SRI

- There was no different between UK and Thai

- SRI group had more GTCs, frequency of attack, daytime seizures, falling

Table: Adjusted odds ratios for developing seizure – related injuries by multiple logistic regression analysis

Variable	Adjusted odds ratio	95% confidence interval	
Numbers of AEDs	1.429	1.017	2.006
Male gender	1.754	1.040	2.960
Seizure type; GTCs	2.342	1.364	4.019
Daytime seizure	4.000	1.620	9.876
History of falling	4.320	2.184	8.546

Results Predictive model

$$\frac{1}{[1+\exp(-z)]}$$

Z= - 4.1622 + (0.502xSEX) +
(0.3567 x no. AEDS) +
(0.8508 x GTSs) +
(1.3862 x daytime seizure) +
(0.4772 x frequency) +
(1.4632 x falling)

Sex : female = 0, male= 1

Number of ADEs: no ADE = 0, one AED = 1,
two AEDs= 2....,

GTCs=1 , Other type = 0

Daytime seizure = 1, night time = 0

Frequency: average 1 time/month = 1,
less than = 0

Falling=1, no falling= 0

Probability of SRI 0-1x100 = Percentage of SRI

Example

- Male, GTCs epileptic who takes 4 AEDs, daytimes, twice a month, and falling

Z=-4.1622 + 0.562 + (0.3567x4) + 0.8508 + 1.3862
+ 0.4772 + 1.4632
Z=2.004

Exponential value of -2.004= 0.135
Probability of SRI = 1/(1+0.135) = 0.8810 = 88%
website for exponential calculation
http://eri.qq.uwyo.edu/toobar/calculator/expons.htm

Predictive risk of SRI: Model

- **Sensitivity 92.6%**

- **Specificity 36.0%**

- **Probability of SRI 0.20**

Discussion and Conclusion

- Over awareness of SRI may overprotecting issue
- Predictive model for SRI might solve or lessen the imbalance between over awareness and overprotection
- Predictive model will be helpful tool for clinician to judge the chance of SRI in epileptics