An Instrument for Assessment of Depression among Spinal Cord Injury Patients : Comparison between the CES-D and TDI

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Abstract

Objective : To search for a simple, practical and appropriate instrument for the assessment of depression among Thai SCI patients: comparison between two self-rating instruments.

Material and Method : Eighty-three SCI patients were asked to complete a questionnaire composed of the Thai depression inventory (TDI) and the Center for Epidemiological Studies Depression Scale (CES-D), Thai version. All subjects were interviewed by a psychiatrist and were diagnosed according to the categories of depression of the Diagnostic and Statistical Manual of Mental Disorders, fourth edition, (DSM-IV).

Statistics : Receiver Operating Characteristic (ROC) curve and Logistic regression analysis.

Results : Twenty patients were confirmed to have a depressed mood or adjustment disorder. The area under the ROC curve for the CES-D and TDI was 0.826 and 0.827. The sensitivities and specificities of the CES-D and TDI were 80.0, 69.8 per cent and 70.0, 79.4 per cent respectively. The positive predictive value and negative predictive value of the two tests were 45.7, 91.7 per cent and 51.9, 89.3 per cent. Using Logistic regression analysis, the CES-D produces a better model than the TDI (Chi-square value = 23.196 and 4.578).

Conclusion : The CES-D is more appropriate for screening for depression in SCI patients than the TDI.

Key word : Depression, Assessment, SCI, CES-D, TDI

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Spinal cord injury (SCI) causes disability which changes a patient's lifestyle. Apart from immobility and loss of sensation, there may be other unpleasant effects including impaired sexual function, incontinence and severe pain[1]. In addition to physical incapacity, vocational and social losses also have a great impact on their lives. Psychological disruption following SCI is another important health problem. Depression is an almost inevitable consequence of SCI.

The relevance of the psychological consequences is demonstrated by the increasing rates of suicide and divorce among SCI patients[2]. Tate et al have reported that depressed SCI patients need more assistance and nursing than non-depressed SCI patients[3].

Depression is probably the most frequently studied psychological variable among persons with SCI[4]. The rate of major depressive episodes among those with SCI ranges from 20 per cent[5] to over 30 per cent[6-8]. The early detection of depression will lead to appropriate management. The patient will be able to have greater physical activity and a better social life. The use of self-report depression scales is common in rehabilitation settings[9]. They are convenient, and easily administered to people with impairment in their mobility.

The objective of this study was to search for a simple, practical and appropriate instrument for assessment of depression in Thai SCI patients.

MATERIAL AND METHOD

The Thai depression inventory (TDI)[10] is a self rating instrument for assessing depression. It is modified from different popular Western scales used to measure the severity of depression, such as the Beck Depression Inventory[11], the Zung Self-Rating Depression Scale[12], the Structured Interview Version of the Hamilton Depression Rating Scale[13], the Montgomery-Asberg Depression Rating Scale[14] and the Hospital Anxiety and Depression Scale[15]. It has 20 items which are considered culturally appropriate for Thai patients. The scores range from 0-60 and a person scoring more than 20 is considered depressed. It's internal consistency using the alpha coefficient is 0.858.

The Thai version of the Center for Epidemiological Studies Depression scale (CES-D)[16] which is modified from the Center for Epidemiological Studies Depression Scale[17] is another self rating instrument for screening for depression. It is a 20-item questionnaire investigating perceived mood and level of functioning within the past seven days. Scores range from 0-60, with higher scores indica-

Table 1.   The 2X2 table of CES-D.

CES-D	Gold Standard (DSM-IV)	
	Positive	Negative
Positive	16	19
Negative	4	44
Total	20	63

Table 3.   The 2X2 table of TDI.

TDI	Gold Standard (DSM-IV)	
	Positive	Negative
Positive	14	13
Negative	6	50
Total	20	63

Table 2.   The properties of the CES-D.

Properties	CES-D	
	Per cent	95% CI
Sensitivity	80.0	55.7, 93.4
Specificity	69.8	56.8, 80.4
PPV[a]	45.7	29.2, 63.1
NPV[b]	91.7	79.1, 97.3

[a] PPV = positive predictive value
[b] NPV = negative predictive value

Table 4.   The properties of the TDI.

Properties	TDI	
	Per cent	95% CI
Sensitivity	70.0	45.7, 87.2
Specificity	79.4	67.0, 88.1
PPV[a]	51.9	32.4, 70.8
NPV[b]	89.3	77.4, 95.6

[a] PPV = positive predictive value
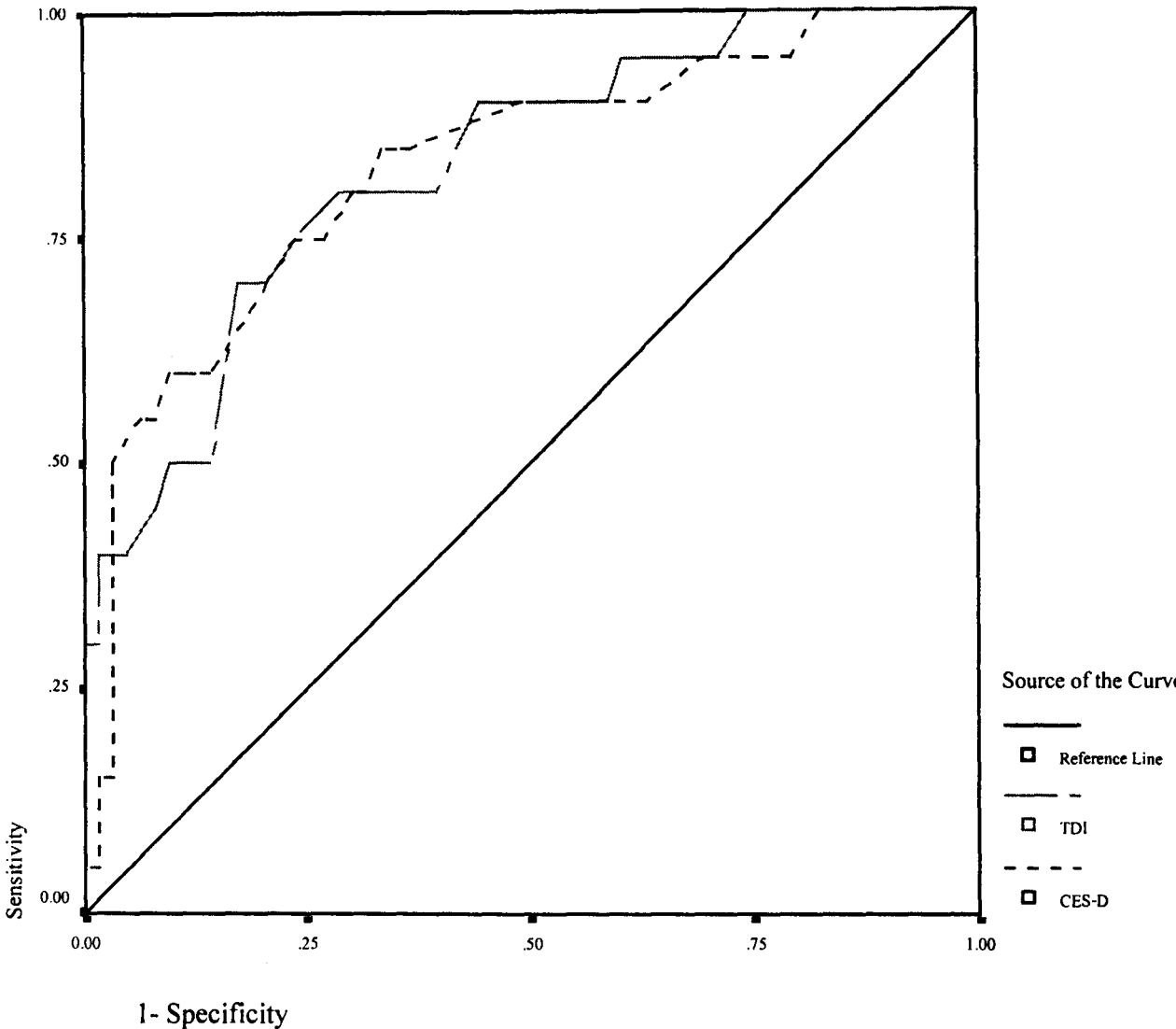[b] NPV = negative predictive value

ROC Curve

Fig. 1.   The Receiver Operating Characteristic (ROC) curve of CES-D and TDI.

ting increased severity of depression. Scores of 19 or higher are considered indicative of depression with 93.33 per cent sensitivity, 94.2 per cent specificity and 0.9154 reliability[18].

Eighty-three SCI patients were included in the study. All subjects gave written consent to participate. After this, they were interviewed by a psychiatrist and were diagnosed according to the categories of depression in the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV)[19]. Additionally, all subjects were asked to complete the questionnaires of both the CES-D and the TDI.

Statistical analysis

The Receiver Operating Characteristic (ROC) curve was used to compare the properties between the two diagnostic tests and Logistic regression analysis was used to determine which test (CES-D or TDI) was a better model.

RESULT

Eighty-three patients were included in this study. Their mean age was 33 ± 11.7 years old (min, max = 10, 68). Subjects were predominantly male (79.5%) which is typical of a traumatic SCI population[20]. Twenty-five per cent were diagnosed with complete quadriplegia, 33.7 per cent with complete paraplegia and 41.0 per cent with an incomplete lesion (Frankel grade D; incompletely preserved motor function below the level of injury)[21]. Twenty patients were confirmed to have a depressed mood or adjustment disorder according to DSM-IV criteria. The sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of the CES-D and TDI instruments are shown in Table 1-4. In addition, the area under the ROC curves for the CES-D and TDI were 0.826 and 0.827 respectively (Fig. 1).

DISCUSSION

Depression is the most common psychological problem among SCI patients. It causes significant impairment in social, occupational, and other roles[9]. Depressive behavior has been associated with increased hospital stay, fewer functional improvements in rehabilitation[22], occurrence of secondary complications[23] and poor self-assessed health status[24]. Early detection of depression will lead to appropriate management.

The objective of this study was to search for a simple, practical and appropriate instrument for assessing depression in Thai SCI patients. The authors compared the CES-D and TDI instruments, and found that the area under the ROC curves for the CES-D and TDI were 0.826 and 0.827 respectively, which means that these two tests were effective in detecting depression.

When considering the sensitivity and specificity of these two tests as shown in Table 2 and 4, the CES-D was more sensitive than the TDI (80% and 70% respectively) in screening for depression, but the TDI was more specific than CES-D (79.4% and 69.8% respectively). This showed that CES-D was more appropriate for screening for depression in SCI than the TDI. To confirm this outcome by using the logistic regression analysis, the authors found that CES-D produced a better model than the TDI (Chi-square value = 23.196 and 4.578 respectively).

There are several self-report measures for the detection of depression which are convenient, easily adapted, and easily administered to people with mobility impairments. One of the most popular measures, suitable for use in research and practice, is the Center for Epidemiological Studies Depression Scale (CES-D)[9]. Cairns et al chose the CES-D to detect depression in acute traumatic SCI patients who developed pain after injury[25]. In addition, Weitzenkamp et al studied depression in spouses of SCI survivors by using CES-D[26]. Finally it was concluded that the CES-D can be used for early detection as a screening test for depression in SCI patients.

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แบบประเมินความซึมเศร้าในผู้ป่วยบาดเจ็บไขสันหลัง : เปรียบเทียบระหว่าง CES–D และ TDI

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วัตถุประสงค์ : เพื่อศึกษาแบบประเมินความซึมเศร้าที่ง่าย, สะดวก และเหมาะสม สำหรับผู้ป่วยบาดเจ็บไขสันหลัง เปรียบเทียบระหว่างแบบทดสอบ 2 ชนิด คือ Thai depression inventory (TDI) และ The Center for Epidemiological Studies Depression Scale (CES–D)

วัสดุและวิธีการ : ผู้ป่วย 83 รายตอบแบบประเมินความซึมเศร้า TDI และ CES–D นอกจากนี้ผู้เข้าร่วมโครงการ ทุกคนยังได้รับการสัมภาษณ์โดยจิตแพทย์ เพื่อการวินิจฉัยภาวะซึมเศร้า โดยใช้ข้อกำหนดตาม The Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM–IV)

สถิติ : Receiver Operating Characteristic (ROC) curve และ Logistic regression analysis

ผล : ผู้ป่วยที่ได้รับการวินิจฉัยว่ามีภาวะซึมเศร้าจำนวน 20 ใน 83 ราย และพื้นที่ใต้กราฟ ROC ของแบบทดสอบ CES–D และ TDI เท่ากับ 0.826 และ 0.827 ความไวและความจำเพาะของแบบทดสอบ CES–D และ TDI เท่ากับร้อยละ 80.0, 69.8 และร้อยละ 70.0, 79.4 ตามลำดับ ส่วนค่า Positive predictive value (PPV) และ Negative predictive value (NPV) ของแบบทดสอบทั้งสองเท่ากับร้อยละ 45.7, 91.7 และร้อยละ 51.9, 89.3 และได้ใช้การวิเคราะห์ Logistic regression เพื่อยืนยันคุณสมบัติของแบบทดสอบที่เหมาะสมพบว่า CES–D ดีกว่า TDI (ค่า chi–square improvement = 23.196 และ 4.578)

สรุป : แบบทดสอบความซึมเศร้า CES–D มีความเหมาะสมกว่าแบบทดสอบ TDI ที่จะใช้คัดกรองผู้ป่วยที่มีภาวะ ซึมเศร้า ในกรณีบาดเจ็บไขสันหลัง

คำสำคัญ : ภาวะซึมเศร้า, แบบประเมิน, บาดเจ็บไขสันหลัง, CES–D, TDI

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