

Case Study 7

A 52 year old female has an aneurysmal rupture with frontal lobe damage.

7.1 Frontal lobe dysfunction

Q1. Provide a problem list

Q2. Describe frontal lobe dysfunction in a patient with ABI.

7.1.1 Mini-Mental State Examination (MMSE)

Q3. What is the Mini Mental State Examination (MMSE)?

Q4. What are the advantages of using the MMSE?

Q5. What are the disadvantages of using the MMSE?

7.1.2 Montreal Cognitive Assessment (MoCA).

Q6. What is the Montreal Cognitive Assessment (MoCA)?

Q7. What are the advantages and disadvantages of using the MoCA?

7.2 Depression post TBI

Q8. Describe the difficulties distinguishing between depression and frontal lobe syndrome post ABI?

7.2.1 The Beck Depression Inventory

Q9. Describe the Beck Depression Inventory.

Q10. What are the advantages of the Beck Depression Inventory?

Q11. What are the disadvantages of the Beck Depression Inventory?

7.2.2 Treatment of Depression

Q12. What medications would you recommend to treat her depression?

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A 52 year old female smoker has sustained an acquired brain injury resulting from an aneurysm (AVM). Upon arrival at hospital her GCS was 11. Once in rehabilitation, the patient was found to be apathetic, she was not presenting with any behavioural problems. A CT scan at the time of injury revealed damage from the injury was contained in the frontal lobe. This was later confirmed by a follow-up MRI. The patient had little to no insight and appeared to be depressed. In addition, she would not respond when her family came to visit. The patient is also menopausal.

Q1. Provide a problem list

Answers:

- Inability to plan
- Loss of the ability to solve problems
- Impaired concentration
- Reduced fluency of speech
- Apathy
- Inattentiveness
- Delayed responses to questions
- Lack of inhibition
- Displays of socially inappropriate behaviour.

7.1 Frontal Lobe Dysfunction

Q2. Describe frontal lobe dysfunction in a patient with ABI.

Answers

The following may be seen in the frontal lobe syndrome:

- Impaired concentration
- Reduced fluency of speech
- Apathy
- Inattentiveness
- Delayed responses to questions
- A striking lack of inhibition, including socially inappropriate behavior (anger, agitation, aggression) (Rees et al., 2008)
- Depression (Baguley et al., 2006a)

7.1.1 Mini-Mental State Examination (MMSE)

Q3. What is the Mini Mental State Examination (MMSE)

Answer

The MMSE provides a quantitative assessment of cognitive impairment and provides a record of cognitive changes over time (Folstein et al., 1975). Although the tool was originally developed to assist in the detection of dementia within a psychiatric setting, its use is now more widespread.

Q4. What are the advantages of using the MMSE?

1. Can be completed in a very short period of time (10 minutes)
2. Brief, inexpensive and simple to administer
3. Widely used
4. Widespread use and accepted cut-off scores increase its interpretability

Q5. What are the disadvantages of the MMSE?

1. Low levels of sensitivity have been reported:
 - Particularly among individuals with mild cognitive impairment and patients with right-sided strokes (Tombaugh & McIntyre, 1992; de Koning et al. 1998, Dick et al. 1984).
 - The low level of sensitivity may be derived from the emphasis placed on language items and a paucity of visual-spatial items (Grace et al. 1995; de Koning et al. 1998; Suhr & Grace, 1999).
2. The MMSE has been shown to be affected by age, level of education, and sociocultural background, which may lead to misclassification (Tombaugh & McIntyre 1992, Bleeker et al. 1988, Lorentz et al. 2002).

Discussion

The test which includes 6 domains of cognition: orientation, registration of new information, attention and calculation, recall, language and visuospatial construction (Elhan et al., 2005), yields a total score of 30. The test provides a picture of the subject's present cognitive performance based on direct observation of test items/tasks. A score of 23/24 is the generally accepted cutoff point indicating the presence of cognitive impairment (Dick et al., 1984). Levels of impairment have also been classified as none (24-30); mild (18-24) and severe (0-17) (Tombaugh & McIntyre, 1992).

It has been suggested that the MMSE may attempt to assess too many functions in one brief test. An individual's performance on individual items or within a single domain may be more useful than interpretation of a single score (Wade, 1992; Tombaugh & McIntyre, 1992). However, an acceptable cut-off for the identification of the presence of an

impairment may be possible only when the test is used as a measure of “cognitive impairment” (Blake et al., 2002). Blake et al. (2002) reported that when the test is used to screen for problems of visual or verbal memory, orientation or attention acceptable cut-off scores could not be identified.

MMSE scores have been shown to be affected by age, level of education, and sociocultural background (Tombaugh & McIntyre, 1992; Bleeker et al. 1988; Lorentz et al. 2002). These variables may introduce bias leading to the misclassification of individuals. Though perhaps the prevalent view, such biases have not always been reported. For instance, Agrell & Dehlin (2000) found neither age nor education to influence scores. Lorentz et al. (2002) expressed concern that adjustments made for these biases may limit the general utility of the MMSE.

Perhaps the greatest limitation of the MMSE is its low reported levels of sensitivity, particularly among individuals with mild cognitive impairment (Tombaugh & McIntyre, 1992; de Koning et al., 1998), in patients with focal lesions, particularly those in the right hemisphere (Tombaugh et al., 1992), within a general neurological patient population (Dick et al., 1984) and within a stroke population (Blake et al., 2002; Suhr & Grace, 1999). It has been suggested that its low level of sensitivity derives from the emphasis placed on language items and a paucity of visual-spatial items (Tombaugh et al., 1992; Suhr & Grace, 1999; de Koning et al., 1998; Grace et al., 1995). Various solutions have been proposed to the problem of the MMSE’s poor sensitivity including the use of age-specific norms (Bleeker et al., 1988) and the addition of a clock-drawing task to the test (Suhr & Grace, 1999). Clock-drawing tests themselves have been assessed as acceptable to patients, easily scored and less affected by education, age and other non-dementia variables than other very brief measures of cognitive impairment (Lorentz et al., 2002) and would have little effect on the simplicity and accessibility of the test.

Reliability		Validity		Responsiveness		
Rigor	Results	Rigor	Results	Rigor	Results	Floor/ceiling
+++	+++ (TR) ++ (IO) ++ (IC)	+++	++	n/a	n/a	n/a

NOTE: +++=Excellent; ++=Adequate; +=Poor; n/a = insufficient information; TR=Test re-test; IC= internal consistency; IO = Interobserver; varied (re. floor/ceiling effects; mixed results)

7.1.2 Montreal Cognitive Assessment (MoCA)

Q6. What is the Montreal Cognitive Assessment (MoCA)

Answer:

The MoCA is an assessment tool designed to detect mild cognitive impairment

Q7. What are the advantages and disadvantages of using the MoCA?

Advantages

The MOCA is able to detect mild forms of impairment in patients that score in the normal range on other assessment measures (e.g. the MMSE).

Disadvantages

The validity of the MoCA has not been thoroughly tested.

Discussion

The MoCA uses tasks such as picture naming, clock drawing, and recall to assess the following domains: attention and concentration, executive functions, memory, language, visuoconstructional skills, conceptual thinking, calculations, and orientation. The MoCA yields a total score out of 30 with scores of 26 or lower indicating the presence of cognitive impairment.

7.2 Depression Post ABI

Q8. Describe the difficulties in distinguishing between depression and frontal lobe syndrome post ABI

Answers

Many of the symptoms of depression mimic those of frontal lobe syndrome post ABI

The following may be seen:

- Impaired concentration
- Reduced fluency of speech
- Apathy
- Inattentiveness
- Delayed responses to questions
- A striking lack of inhibition, including socially inappropriate behavior (anger, agitation, aggression) (Rees et al., 2008)
- Depression (Baguley et al., 2006b)

Many of the same features will be seen in depression.

As well, frontal lobe syndrome and depression can overlap, whereby depression is seen as part of the frontal lobe syndrome.

7.2.1 The Beck Depression Inventory

Q9. Describe the Beck Depression Inventory (BDI).

1. Designed to identify the presence of depression and to provide a quantitative expression of its intensity (Beck et al. 1961).
2. The BDI follows a forced choice format in which respondents must choose one of the 4 self-evaluative statements for each item in the inventory.
3. Designed to evaluate 21 symptoms of depression.
4. Each item is rated on a 4 point intensity scale with overall scores from 0-63.

5. A score of 10 is generally accepted as indicating the presence of depression which score ranges of 10-18, 19-29, and 30-63 have commonly been used to classify mild, moderate, and severe depression, thus 0-19 = no or minimal depression; 10-18 = mild to moderate depression; 19-29 = moderate to severe depression; > 29 = severe depression.

Discussion

Within the ABI/TBI population the prevalence of depression ranges from 33-42%. It has been noted that although depression rates tend to fall three years post injury, the estimated prevalence is higher within the ABI population, compared to the non-ABI population (Homaifar et al., 2009). In one study it was found that depression was found in approximately 26% of the ABI survivors 30 years post injury (Koponen et al., 2002). Although several scales have been used to study depressions within the ABI population, the Beck Depression Inventory (BDI) will be looked at in detail (Green et al., 2001).

Q10. What are the Advantages of the Beck Depression Inventory?

1. Short and simple measure of depression (McDowell & Newell 1996).
2. Does not require formal training to administer.
3. Does not heavily rely on the somatic symptoms of depression, making the BDI suitable for use with stroke patients (Aben et al. 2002).
4. BDI has been tested with ABI/TBI patients (Green et al., 2001).

Q11. What are the Disadvantages of the Beck Depression Inventory?

1. Although the standardized cutoff is optimal for use with stroke populations, it has been found to yield a high rate of misdiagnoses (approx. 31%) among stroke patients (Aben et al. 2002).
2. Some stroke patients have been reported to have difficulty with the BDIs forced choice format (House et al.1991).

Discussion

Interpretability: The BDI is a well established measure, with generally accepted cut-off scores for both the presence, and severity of depression. No standardized norms are available.

Acceptability: Although the BDI takes approximately 5 to 10 minutes to complete, problems with completion have been noted within the stroke population (Aben et al. 2002). The scale has not been tested for administration using proxy respondents.

Feasibility: The BDI is short and simple to administer, requiring no training. There is limited information available regarding its effectiveness when used for evaluation purposes in a longitudinal study (Salter et al., 2008).

Reliability		Validity		Responsiveness		
Rigor	Results	Rigor	Results	Rigor	Results	Floor/Ceiling
+++	+++ (TR) +++ (IC)	+++	+++	+	+	n/a

NOTE: +++=Excellent; ++=Adequate; +=Poor; n/a = insufficient information; TR = Test re-test; IC = Internal consistency; IO = Interobserver; varied (re floor/ceiling effects; mixed results)

7.2.2 Treatment of Depression

Q12. What medications would be recommended to treat her depression?

Answer:

1. SSRIs would be considered the first line of treatment for depression post ABI.
2. SSRIs have the added benefit of treating other mood states such as anxiety and agitation
3. Tricyclic antidepressants can be used, but are generally not ideal due to a high incidence of side effects; in particular, depression.
4. May serve an added benefit of treating pain and sleep disturbance, in addition to depression.

Discussion

For those who have been diagnosed with depression following an ABI, various non-pharmacological and pharmacological treatments have been suggested. For pharmacological treatments, SSRI are considered the first line of treatment (Bayley et al. 2007). Non-pharmacological treatments may include exercise, psychotherapy, or other forms of counseling. Both patients and their caregivers should be made aware of the risk of depression and patients should be monitored for depression (Bayley et al. 2007). Research on medications to treat depression post ABI are listed below:

Anti-depressants post ABI	Reason	Amount Given	Effect	Levels of Evidence
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Citalopram (Perino et al., 2001)	To assist with the reduction of depression, anxiety, and to improve overall mood	10 mg per day was administered. Along with this 600 mg per day of carbamazepine was given to patients.	Citalopram and carbamazepine may help in the treatment of mood disorders resulting from an ABI.	Level 4
Sertraline (Fann et al., 2000)	Sertraline was given to reduce major depression	Patients began taking 25mg/day but at the end of the 8 weeks some had their doses increased to 200mg daily. Increases in medication occurred only if the patient was tolerating the drug.	Depression decreased while on sertraline	Level 2
Desipramine (Wroblewski et al., 1996)	To help reduce depression	Desipramine was given to those who had sustained an ABI. 150 mg per day was given for the first 30 days. This was increased (if needed) to 300 mg per day during the 2 nd month.	Desipramine assists in reducing depression and improving mood post injury.	Level 2
<i>Although these medications assisted in improving mood and decreasing depression post injury, more study is needed on each treatment.</i>				

For more details on the effectiveness of these medications please see Rees et al., (2008) and Van Reekum et al.(2008)

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