Report of Clinical Activity
Neuropsychology
(Specialist)

II "Shay"

Placement: Specialist **Word Count:** 2944

Name:	Shay (All names contained in this report are fictitious)
Age:	30
Sex:	Male
Location:	Neuropsychology Department; Teaching University Hospital
Date Seen:	3 sessions: 12.02.02; 20.02.02; 28.02.02
	1 session for feedback of results: 05.03.02

Reason for Referral & Initial Assessment:

Referral[1]: Shay was referred by his Consultant Neurologist for neuropsychological assessment as part of the work up investigation for epilepsy surgery. The referral contained information regarding his medication regime and previous brain scan results.

Initial Presentation:

Shay came accompanied by his wife to his first appointment who was also present during clinical interview. He impressed as a self-confident man who was determined to understand the rationale for all the assessment procedures involved in his assessment. He asked pertinent questions about the reasons why he had been asked to attend neuropsychology and about the different tests that he would be administered. Shay confirmed that he had recently been initiated on a new course of medication and this was having a benefit in reducing his seizures' frequency and severity. However, he was also being weaned off one of his drugs and this seemed to cause unusually severe cluster of seizures occasionally. Both Shay and his wife agreed that he had adjusted well to his disorder and that he was not preoccupied with depression or anxiety symptoms. Shay reported that he had always coped well with having seizures and that he had come to terms with having epilepsy. However, he reported finding it increasingly difficult to cope with some of the seizures side effects (e.g., concentration and attention) that he experienced up to 48 hours post-ictal. Shay

[1] See appendix A for reproduction referral letter and a sample of the appointment letter sent to patient.

admitted to being worried about the negative impact that his concentration difficulties were having on his work. His wife described Shay as: "a very hardworking person who likes to excel in everything he does".

Background History:

Background information was obtained from reviewing his medical chart, interview with the client and his wife and consultation with other professionals.

Personal History

Shay was born full term, normal delivery. There was no history of febrile convulsions in childhood, CNS infections or head injury with loss of consciousness. Magnetic Resonance Imaging (MRI) performed in 2001, showed a sclerosis on the right hippocampus with no other focal abnormality seen.

Family History:

Shay is the third of four children. His parents were both alive and he reported that his family is very close. He married in 2000 and his wife was pregnant with their first child at the time of this assessment.

Medical History: Shay is a right-handed man with a history of intractable complex partial seizures since the age of ten. His epilepsy remitted after four or five years from onset and he did well off medication for a time. Shay' seizures reoccurred in 1999 and presented as complex partial seizures. There was no family history of seizures or epilepsy or any other significant medical history.

Educational and Vocational History: Shay excelled academically in school, obtaining 580 points in his Leaving Certificate. He completed his professional qualification as a chartered accountant in 2001 and was working in a prestigious firm at the time of this assessment.

Social History: Shay grew up in a small town but moved out of his family home to study in Dublin when he was 17. He reported that he has always had many friends and that he had a very happy childhood.

Provisional Hypothesis:

On the basis of clinical interview, consultation with other professionals and medical notes review, the following provisional hypotheses were formulated:

1. Shay' MRI scan results showed right hippocampal abnormalities consistent with right Temporal Lobe Epilepsy (TLE) (Feindel, 1995). Test findings are therefore expected to show a profile consistent with localised dysfunctions in the right hippocampus (i.e., better memory ability for verbal items than for visual items);

2. While Shay' MRI scan results detected gross abnormalities in the right hippocampus it is possible that other existing abnormalities in the left hippocampus were not detected. In this case tests findings would be expected to show a profile consistent with bilateral hippocampal dysfunctions (i.e., difficulties with both verbal and visual memory).

3. There is a long-standing debate among neurologists regarding the diagnostic importance of the occurrence of febrile convulsions in childhood. Some believe that they are a strong indication of Mesial Temporal Sclerosis with a clearly localised epileptic focus[2]. The rationale behind this is that patients without a background history of febrile convulsions are believed to often have minor focal abnormalities other than those localised in the hippocampus. As a result, subsequent to surgery, other minor and undetected abnormalities often become new epileptic foci. As Shay has no background history of febrile convulsions, it is hypothesised that test findings will provide a neuropsychological profile consistent with abnormalities localised in other brain structures;

[2] Opposite positions regarding this hypothesis were put forward but different neurologists during multidisciplinary meetings held to decided on patients' suitability for hippocampectomy. Regrettably, no relevant literature was available at the time of writing this case study.

Formal Clinical Assessment & Hypothesis Testing:

Assessment procedure	Purpose	Hypothesis
Review of Medical Chart	While reviewing client's previous history is always a fundamental part of assessment, in neuropsychology this is even more important as it normally gives access to findings obtained by other professionals that are going to be of central importance in "designing" a neuropsychological assessment battery appropriate to the client presentation (Lezak, 1995).	All hypotheses
Clinical Interview	To gain insight into the patient's adjustment to his seizure disorder and to obtain additional information regarding the seizure's semiology.	All hypotheses
WAIS-III UK	To obtain a reliable and valid measure of Shay' level of cognitive functioning. To assess laterality of functioning. To identify deficits consistent with deficits in brain cortical structures.	3
WMS-III UK	To obtain an objective measure of memory functioning. To determine possibility of anomalous language dominance based on test pattern. To identify potential difficulties with verbal and/or visual memory consistent with deficits in the right and/or left hippocampus.	1; 2
RAVLT	To identify potential difficulties in learning of unrelated verbal items, consistent with left hippocampus abnormalities.	1; 2
RCFT	To identify potential difficulties with visuo-spatial constructional skills consistent with parietal lobe abnormalities. To identify potential difficulties in memory for visual items consistent with right hippocampus abnormalities.	All hypotheses
The Hayling & Brixton Test	To identify potential executive function deficits consistent with frontal lobe abnormalities.	3

Hospital Anxiety and Depression Scale (HADS)[3]	This measure was administered in order to establish an objective baseline measure of anxiety and depression symptoms in these two areas.	No specific hypothesis

Assessment Outcomes

- Review of Medical Chart

No baseline assessment of cognitive functioning was available, as Shay has never attended psychological assessment before. A report from a consultant psychiatrist identified no Axis I or Axis II disorders which would counterindicate epilepsy surgery. MRI scan, performed in 2001 suggested right hippocampus sclerosis with no other focal abnormalities seen. Shay was prescribed *Oxcarbazepine* (anti-epileptic drug) six months prior to this assessment and Phenobarbitone had been concurrently reduced.

- Clinical Interview:

Shay reported that his seizures occur without warning and are associated with loss of awareness and subsequent short retrograde amnesia for five to ten minutes. This is consistent with partial complex epilepsy (Hanscomb & Hughes, 1996). He reports being disoriented postictally and that it takes him up to twenty minutes to recover. He also added that his concentration remains effected up to 48 hours following a seizure and this was negatively impacting on the quality of his work. Shay was started on different medication six months prior to this assessment. While the change in medication appeared to produce a general reduction in the seizures' frequency and severity, Shay reported an unusually severe cluster of seizures in the weeks prior to his assessment. His neurologist felt that the latest exacerbation in the seizures' severity was probably due to the concurrent reduction in phenobarbitone (previous epileptic drug). Shay did not report mood difficulties and appeared to be well-adjusted to his seizure disorder. Upon questioning, he reported to still be undecided whether he wanted to undergo surgery. Shay hoped to be deemed suitable for surgery as this would leave all options open for

[3] Although Shay did not present with any features of depressive or anxiety symptomatology, it is standard procedure to include objective measures of mood in a neuropsychological assessment battery to identify emotional factors possibly interfering with the patient performance on tests (i.e., depressive symptomatology can effect an individual's processing speed)

him. He was however aware that a final decision, on his suitability for elective surgery of the hippocampus, could only be made by a multidisciplinary team of professionals[4].

- Wechsler Adult Intelligence Scale-III UK (WAIS-III UK):

Shay obtained a Full Scale IQ (FSIQ) score within the "very superior" range. His very considerable intellect was especially evident on his verbal related tasks. His Verbal IQ (VIQ) was, within the very superior range of intellectual ability. A significant discrepancy between verbal and performance related tasks was evident. Shay' Performance IQ (PIQ) score was within the high average range, which is significantly lower than his verbal IQ. On individual verbal subtests Shay' highest score was on the vocabulary subtest reflecting his high level of education and remarkable verbal abilities. All remaining verbal subtests scores were within the high average to superior range. Shay' lowest score was on the digit symbol coding subtest (scaled score of 9), suggesting a relatively lower ability in fine motor co-ordination or psychomotor speed, which was possibly related to medication side effects[5]. (See Appendix B for a copy of summary of profile).

- Wechsler Memory Scale-III UK (WMS-III UK):

Three subtests were administered:

Logical Memory I and II were administered to assess Shay' immediate and delayed memory ability for stories. On this subtest his performance was within the high average range for both immediate and delayed recall.

Faces I and II was administered to assess Shay' immediate and delayed memory ability for visual items (faces). On this subtest his performance was impaired for both immediate and delayed recalls.

Word List I and II were administered to assess Shay' learning ability and immediate and delayed recall of unrelated verbal items. Surprisingly Shay' performance on this test was at the lower end of the average range for both immediate and delayed recalls (scaled scores of 9 and 8 respectively) This was felt to be inconsistent with his high IQ and a second test of verbal learning and memory was administered (Rey Auditory Verbal Learning Test, RAVLT), (See Appendix C for a copy of summary profile).

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[4] All candidates for epilepsy surgery are routinely discussed during a weekly "Epilepsy Review Meeting" attended by Consultant Neurologist, Radiologists, Neurosurgeons, Psychologist, Psychiatrists and other professionals.

[5] The possible impact on processing speed/psychomotor speed of Shay' current change in medication was discussed with his neurologist.

- Rey Auditory Verbal Learning Test (RAVLT)

On the RAVLT, which is a list learning task, Shay' total score over five trials was within the average range. His immediate recall of items following an interference trial was also within the average range. His delayed recall of the list was one standard deviation below average, which was surprising given Shay' very considerable intellect. His relatively low performance on this test is especially surprising in light of MRI results showing involvement of the right hippocampus but no involvement on the left (See Appendix D for a copy of the test).

- Rey Complex Figure Test (RCFT)

On the copy trial, a measure of visuo-spatial constructional skills, Shay' score was above average for his age, suggesting no difficulties with visuo-constructional and visuo-perceptual abilities. His performance for both immediate and delayed recall of the figure was severely impaired, below the first percentile. These results would indicate impaired retrieval ability for complex visual information, which is consistent with right hippocampus involvement (See Appendix E for a copy of summary profile).

- Hayling & Brixton Test

On this measure, Shay showed a high average performance for response initiation and response inhibition and a "very superior" performance on a task requiring rule detection and rule shifting. These results would suggest intact frontal lobe functioning and would also be consistent with Shay' overall level of functioning (See Appendix F for a copy of the test).

- Hospital Anxiety and Depression Scale (HADS):

Shay' score on the the HADS suggested a mild level of anxiety symptomatology but no depressive symptomatology. (See Appendix G for a copy of inventory).

Summary and Interpretation of Assessment Findings

Results of Neuropsychological assessment suggest that Shay' overall cognitive abilities lay within the very superior range with a significant difference between his Verbal and Performance IQs in favour of the former. These results would suggest a right hemisphere involvement. Assessment of memory functioning suggested visual memory

deficits consistent with right hippocampal abnormalities. However, Shay' performance on verbal memory testing, although mostly within the average range, was poorer than expected given his high IQ score. Moreover this would raise concern of some functional abnormality in the left hippocampus and a WADA (McMackin, Jones-Gotman, Dubeau, Lukban, Dean, Evans, Lisbona, 1998)[6] test would therefore be strongly recommended to determine the hemisphere dominant for language. This procedure is fundamental in determining the risk of global amnesia following unilateral temporal lobe resection.

Neuropsychological assessment provided evidence to support provisional hypothesis 1. Hypothesis 2 was only partially supported while hypothesis 3 was rejected.

Hypothesis 1 (that neuropsychological assessment profile will be consistent with localized left hippocampal abnormalities). Shay' performance on tests of visual memory was significantly poorer than his performance on tests of verbal memory. This would be consistent with Mesial Temporal Sclerosis underlying left TLE (Aikia, Salmenpera, Partanen, Kalviainen 2000).

Shay's scores on test of verbal learning, whilst average were significantly lower than would be expected, given is "very superior" IQ. As learning and memory for verbal items are functions associated with the left hippocampus (Grunwald, Lehnertz, Heinze, Helmstaedter, Elger, 1998) this was seen as partially supporting hypothesis 2. However, further tests would be required before drawing definitive conclusions on left hippocampus involvement. A "WADA test" was recommended as a result.

Shay' performance on tests investigating visuo-constructional, visuo-perceptual and executive functioning did not suggest deficits in the cortical structures underlying these functions (i.e., parietal, occipital and frontal lobes). His neuropsychological profile was for this aspect, consistent with MRI scan findings and hypothesis 3 was therefore rejected.

[6] To determine the hemisphere dominance prior to hippocampectomy for TLE is a fundamental aspect of a neuropsychologist work. Preliminary investigations using specific verbal and visual memory tests would normally provide sufficient information to identify hemisphere dominance for language. However, given the potentially catastrophic effects of a misdiagnosed dominance a Intracarotid Amobarbital Procedure is often carried in all cases presenting with contradictory findings regarding hemisphere dominance. The test is also known as WADA after his developer.

Formulation

Shay is a right-handed 30 year old man with a history of intractable epilepsy since the age of ten. He is a qualified accountant of well above average intelligence. Shay has been recently employed as an accountant by a prestigious firm. He is married and his wife is currently pregnant with their first child. An MRI scan performed in 2001 suggested right hippocampal sclerosis. As a result he underwent multidisciplinary investigation to assess his suitability for epilepsy surgery (right hippocampectomy).

Neuropsychological assessment showed a profile consistent with right hippocampus involvement. However, there was also evidence from tests of verbal memory of possible left hippocampus involvement. Given the potentially catastrophic effect of misdiagnosed hippocampal involvement (global amnesia), he was placed on the waiting list for a WADA (Sodium Amytal) test. While Shay suitability as a surgery candidate was still not established, he often raised concerns about his motivation to undergo epilepsy surgery. His indecisiveness was motivated by lack of knowledge regarding potential pros and cons of such a procedures and by the fact that "I have so much to lose if something goes wrong".

Predisposing factors: Shay' epilepsy is of unknown aetiology with no obvious predisposing factors. This is not rare and it is known as idiopathic epilepsy (Pincus and Tucker, 1985).

Precipitating factor: No precipitating factors were identified for Shay' epilepsy, which developed at age 10 or 11.

Maintaining factors: A maintaining factor is represented by the fact that TLE is often intractable with medication. At the time of the present assessment there was only one centre in Ireland for the administration of the WADA. This results in patients being placed on waiting lists for sometimes more than a year. Given that a WADA test was recommended as fundamental in deciding Shay' suitability for surgery, this represents an important maintaining factor. Should Shay decide not to undergo epilepsy surgery despite being found suitable, this would represent an important maintaining factor for his epilepsy.

Protective factors: High IQ and at least average memory ability are always positive factors in determining an individual's suitability for surgery. Also the fact that Shay is undergoing multidisciplinary evaluation for surgery is in itself a protective factor as it will for valuable information to be obtained and used in best planning his therapy. A final protective factor is represented by the fact that he appears to suffer from TLE, which has one of the highest rates of post surgery success among all types of epilepsies (Awad & Chelune, 1993).

Intervention.

Shay attended 3 assessment sessions. He was given a full feedback of the neuropsychological assessment results in a separate meeting scheduled at his request. He asked many pertinent questions seeking detailed explanations regarding the implications of specific assessment findings. Shay requested a copy of the Neuropsychological Report (See appendix H for a copy of the report), which was given to him at the end of the session. He also enquired about where to access up-to-date literature regarding the neuropsychological morbidity, for drug resistant TLE. Shay was especially interested in knowing the likelihood of cognitive decline secondary to his epilepsy. Information was provided on how to access up-to-date researches on the topic. This was also provided to him after discussing the pros and cons of "sending him off" with so much information and so little help to interpret the medical jargon.

An issue that was discussed at length was that of the pros and cons for undergoing epilepsy surgery. Information regarding the likely impact that a "successful operation" would have on his overall cognitive and memory status was provided to him in order to facilitate an informed decision in this area.

Outcome:

The neuropsychological report was sent to Shay' Consultant Neurologist. His overall presentation, including assessment findings, was discussed at the "Epilepsy Review Meeting". During this meeting he was deemed a suitable candidate for epilepsy surgery pending results of WADA test for which he was placed on a waiting list. Regrettably, at the time of this patient's assessment, there was only one hospital in Ireland where the WADA test was administered. This resulted in the patient's surgery being delayed considerably beyond the duration of placement.

Critical Review & Discussion:

This assessment was invaluable in providing the psychologist in clinical training with experience in the area of assessment for epilepsy surgery. The assessment battery used was in line with the Neuropsychology Department guidelines for epilepsy pre-surgery work up. The assessment procedure was also in line with the recommendations for this type of assessment (Lezak, M. D., 1995). However, given the unexpected results from verbal memory testing, more testing may have been appropriate. Example of other memory and learning tests suitable to further assessment in this area include: the Auditory Verbal Learning Test (AVLT), the Recognition Memory Test (RMT) or the California Verbal Learning Test (CVLT). Additional information about verbal memory functioning could have also been obtained by administering additional scales from the WMS-III such as the Verbal Paired Associates.

A potential limitation in this intervention was the relatively short time allocated for feedback of results. This is especially true given Shay' keen interest in understanding assessment findings and his difficulty in deciding whether or not to undergo surgery. While a great variety of information was made available to him, neuropsychology literature often contains a lot of medical jargon that would make it difficult for most people to comprehend.

References

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Appendices

Appendix A

Send @: 13/ 08/2001 18:39:16 14/08/2001 07:58:20

Subject: XX Epilepsy

Consult for patient XX (Case No: xx)

Dear XX

We would value a neuropsychological assessment on this 44 yo gentleman with a history of intractable complex partial epilepsy since age 10. MRI scan performed in December 2001 shows hippocampal sclerosis on the right with no other focal abnormalities. Please review him for epilepsy surgery.

Many thanks,

XXX

SHO to XXX

Appendix B

Appendix C

Appendix D

Appendix E

Appendix F

Appendix G

Appendix H