

Utilisation behaviour in frontotemporal dementia

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ABSTRACT

Objective To study the occurrence of utilisation behaviour (UB) in patients with frontotemporal dementia (FTD).

Materials and methods Twenty patients who fulfilled all core Consensus statement criteria for FTD were examined by a neurologist experienced in dementia and by a clinical neuropsychologist. All patients had imaging evidence of predominantly frontal or frontotemporal involvement. Behavioural data were obtained from care givers using a semistructured questionnaire. Questions related to UB were asked in detail. Further assessment for UB was done during the interview with the patient using common objects. Only frank and coherent UB was considered for the study. For comparison, 34 patients with probable Alzheimer's disease diagnosed by the NINCDS-ADRDA criteria were also similarly studied.

Results 80 per cent of our patients with FTD but none with probable Alzheimer's disease exhibited UB. Fourteen out of the 16 patients with FTD who exhibited UB were less than 70 years old. Among patients with UB, 88% exhibited a wide range of 'incidental' UB. Objects of daily use tended to trigger UB most commonly. Utilisation behaviour tended to correspond to premorbid habits in at least 75% of our patients.

Conclusion Utilisation behaviour may be more common in FTD patients than is currently recognised. The presence of UB should be queried in every patient suspected to be suffering from FTD. A comprehensive questionnaire for UB such as that used here could be useful.

Utilisation behaviour (UB) is one of the many striking although uncommonly reported behavioural abnormalities seen in frontotemporal dementia (FTD).^{1–4} In UB, patients typically reach out to pick up and use objects around them coherently but in an incorrect setting,^{5–8} with limited capacity to over-ride such actions.⁶ UB may be induced by placing an object directly on the patient's hands or by holding out an object within the patient's range of vision. UB is 'incidental' if it occurs without explicit or implicit expectation that the object should be used.⁶

The pathophysiology of UB appears to involve dysfunction in structures of the mesial frontal lobe and frontostriatal pathways.⁹ Although seen with focal frontal-lobe lesions,^{5 7 8 10–17} UB is little reported in FTD in spite of being a recognised symptom.^{3 18} The current study looks at the frequency and patterns of UB in a group of Indian patients with FTD.

METHODS

A neurologist experienced in cognitive neurology and a clinical neuropsychologist saw consecutive

patients who came to our hospital between January 2005 and December 2007 with suspected FTD. Patients included in this study met all core Consensus criteria for FTD² in order to maximise specificity for the diagnosis,¹⁹ showed predominant frontal or frontotemporal involvement on CT, MRI or SPECT scans of the brain and had no other brain lesions to explain their clinical features. A control group consisted of consecutive patients who fulfilled the diagnosis of probable Alzheimer's disease (AD) by the NINCDS-ADRDA criteria.²⁰ The study was approved by the Local Ethics Committee, Apollo Gleneagles Hospitals, Kolkata.

A semistructured questionnaire was used for the carer accompanying each patient.⁵ Carers were asked to respond affirmatively to a query only if the particular behaviour in question was (a) clearly abnormal when compared with the patient's premorbid behaviour and (b) seen more than once. Each carer was required to answer the UB questionnaire.

The UB questionnaire

The following questions relating to UB were asked:

- ▶ Have there been instances of the patient reaching out, picking up and using an object that was around, in settings that would be socially inappropriate and not in keeping with the patient's need?
- ▶ If so, what was the object used?
- ▶ Was the object deliberately handed over to the patient, or deliberately brought near the patient, within the patient's field of vision?
- ▶ Did the patient use the object appropriately or just toy with the object? How exactly did the patient use the object?
- ▶ Did the patient use the object in this manner only once or on more than one occasion?
- ▶ Do you think the patient's behaviour was unusual compared with how the patient was before the onset of illness?
- ▶ Did you ask the patient not to use the object in this manner? If so, how did the patient respond?
- ▶ Did you ask for an explanation from the patient regarding this behaviour? If so, how did the patient respond?

If required, illustrative examples of UB were given to ensure that the symptom was correctly understood. When a patient exhibited UB with different objects, the questions were repeated for each of them.

Assessing UB during the patient's interview

The patient and the examiner sat facing each other across a table. A number of objects capable of triggering UB were kept near the two ends of the table, to the patient's right and left. These included pen and paper, a cup and a saucer, a bottle of water

and a glass, two pairs of reading glasses, a wristwatch and a wallet containing currency notes. Intermittently, the objects were brought one by one within the patient's reach and field of vision, and kept there for a few seconds without any comment from the examiner. If no UB was seen, the object was moved closer to the patient, once again without comment. However, the object was not applied to the finger or palm of the patient.⁵ After all the objects were presented, the patient who exhibited UB was asked to explain the action. Any incidental UB exhibited anywhere during the examination was similarly recorded. Toying behaviour was also recorded.

Statistics

Statistical analyses were done using the SPSS version 11.0 software. An unpaired t test was used to look for significant differences between means obtained from the two groups with respect to age, duration of illness and MMSE²¹ scores. A χ^2 test was used to compare the occurrence of UB in patients with FTD and AD, and to compare age and gender in patients exhibiting UB. $p < 0.05$ was considered significant.

RESULTS

Twenty patients with FTD (11M; 9F) and 34 patients with AD (25M; 9F) met all the inclusion criteria. The FTD patients were significantly younger (62 ± 9 years vs 67 ± 8 years; $t = 2.23$; $p = 0.03$). The two groups were found to be well matched for duration of illness (2.5 ± 1.5 years vs 2.6 ± 1.7 years; $t = 0.73$; $p = 0.47$) as well as for MMSE scores (17 ± 6 vs 16 ± 5 ; $t = 0.41$; $p = 0.68$). We were able to do MMSE in 18 FTD patients and in all AD patients. Behavioural problems affected the MMSE performance in FTD.

UB

Sixteen of the 20 patients with FTD (80%), but none with AD, showed frank UB ($\chi^2 = 34.911$; $p < 0.001$). The four patients with FTD who did not exhibit UB were all aged 70 years or older at the time of disease onset. One of the 16 patients who exhibited UB was exactly 70 years old, while 14 patients were younger ($\chi^2 = 7.872$; $p < 0.005$). Incidental UB occurred in 14 patients, two of whom also exhibited induced UB during examination. Two other patients exhibited induced UB alone. Ten patients showed UB with one object, four patients with two objects and one patient each with three and five different objects. In three patients, UB was first seen at the time of formal examination. UB tended to correspond to the patient's premorbid habits. Garments, reading glasses, pen and paper, and doors were the most frequent triggers (table 1). Utilisation of garments was appropriate for gender. However, gender did not influence the overall occurrence of UB ($\chi^2 = 0.619$; $p = 0.432$).

None of the patients who were asked could justify their UB. Often, no explanations were provided. Patients could temporarily inhibit UB when asked, only to repeat the same behaviour minutes later or on a different occasion.

Twelve patients with frank UB and 70% patients overall showed toying behaviour.

DISCUSSION

The presence of UB in 80% of our patients with FTD stands sharply in contrast to existing literature. This is notable for two reasons. First, we chose not to induce UB in our patients by stimulating their palms and fingers with objects.⁵ Various authors have criticised this method of testing induced UB.^{8 13} Moreover, only incidental UB has looked to be specific for frontal

Table 1 Details of utilisation behaviour (UB) in patients with frontotemporal dementia

| Patient no. | Age (years) | Gender | Type of UB | Objects triggering UB |
|-------------|-------------|--------|------------------------|---|
| 1 | 51 | M | Incidental | Doors |
| 2 | 54 | M | Incidental | Garments |
| 3 | 74 | M | Incidental | Garments; food on plate |
| 4 | 70 | F | Incidental | Garments |
| 5 | 75 | M | — | — |
| 6 | 68 | F | Incidental | Garments |
| 7 | 72 | F | — | — |
| 8 | 56 | M | Incidental | Doors; cigarettes |
| 9 | 70 | F | — | — |
| 10 | 70 | F | — | — |
| 11 | 50 | M | Incidental | Garments |
| 12 | 53 | F | Induced | Reading glasses |
| 13 | 48 | M | Incidental | Office sofa |
| 14 | 58 | F | Incidental | Garments |
| 15 | 65 | M | Incidental | Toilet door; pen and paper; reading material |
| 16 | 64 | M | Incidental and induced | Reading glasses |
| 17 | 65 | F | Incidental | Doors; clip-holder |
| 18 | 66 | F | Incidental | Reading glasses; garments; pen and paper; slippers; food on plate |
| 19 | 55 | M | Induced | Reading glasses; pen and paper |
| 20 | 46 | M | Incidental and induced | Bottle of water; glass/cup |

F, female; M, male.

damage.⁸ Second, we chose frank and coherent actions alone for UB. We excluded toying or complex toying of objects⁸ in order to avoid any dispute regarding the definition of UB.

Relatively little attention has gone into the study of UB in frontal lobe degeneration.^{10 22} Some studies looking at the wider behavioural profile in FTLD have found UB only rarely.^{3 18} UB and similar abnormal motor responses are likely to occur from an imbalance between the internally driven frontal and the externally driven parietal responses.⁸ Goldberg elaborated on this by proposing a balance between the medial and the lateral premotor systems.²³ Damage to the medial system releases the stimulus-dependent lateral system and results in UB and other abnormal motor responses. Although useful, this theory fails to explain why UB should be so much more common in our patients when compared with other studies on FTD. Sociocultural reasons alone are unlikely. Most of the UB seen in our patients would be abnormal in any sociocultural setting. Moreover, UB was not seen in our patients with AD. An earlier study failed to find UB in normal subjects.⁵ Differing definitions of UB could be a factor. Repeatedly opening and closing doors, as well as continuously eating 'if unlimited supplies of food are within reach' are included among UB in the Consensus criteria document.² However, some authors might have reported them as repetitive behaviour or abnormal eating behaviour, lowering the frequency of UB in their studies.⁵

As part of environmental dependency, UB is more likely to occur in natural environments like the patient's own home rather than in 'artificial' situations across the examiner's table. The frequency of incidental UB as opposed to induced UB seen in our patients supports this view. Much of the incidental UB observed by the carers occurred in the patient's own environment where they were closer to possible triggers for a much longer period. We have also shown that the type of objects that patients habitually use could be the most potent triggers for UB. This was seen in 75% of our patients. It could therefore be quite informative to look for UB, keeping premorbid familiarities and habits

Short report

in mind. Our approach of using a structured questionnaire on UB for the carers, together with illustrative examples when appropriate, could also have encouraged greater identification.

In our study, both duration and MMSE scores were found to have matched between patients with FTD and AD. Our choice of consecutive patients meant that these were coincidental and not by study design. The use of MMSE scores in assessing 'severity' highlights the difficulty in interpreting this test in FTD where behavioural issues dominate as opposed to AD where memory and cognition are more important. Nevertheless, no patient with AD exhibited UB, irrespective of MMSE or any of the demographic parameters. Severity of cognitive loss alone, therefore, cannot explain the frequency of UB. Behavioural issues are likely to be more important. Our patients with FTD presented on average 2.5 years into their illness. In spite of this, their overall MMSE score was low at presentation. In two patients, the decline in behaviour had been too rapid for us to test the MMSE at all. Could there be a link between the speed of degeneration of the frontal pathways and UB? If so, a more gradual degeneration early in the illness could allow the medial frontal system to retain some of its inhibitory control, thereby preventing rampant UB. The reverse could occur with more rapid disease progression from the outset. It is relevant that florid UB described in the literature mostly occurred with focal frontal lesions where the secondary degeneration of the inhibitory frontal pathways would have been faster than in primary degenerative dementias. Future studies could look to answer these queries. The genetics of FTD in Indian patients could also provide clues but remain largely unexplored.

Our results also suggest that in patients with FTD, UB could be more common below a cut-off age of 70 years. Future studies should look to clarify this observation.

We conclude that it could be easier to identify UB in the patient's own environment, and a careful history taken from the carer could therefore be fruitful. Looking for UB in settings that are more formal, for example in the clinic, is important but not as productive.

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Competing interests None.

Ethics approval Ethics approval was provided by the Institutional Ethics Committee, Apollo Gleneagles Hospitals, Kolkata.

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