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## **Don't forget : contributions to the assessment and management of suicide attempters in the general hospital**

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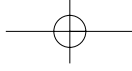
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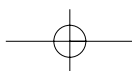
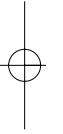
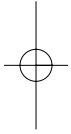
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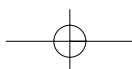
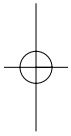
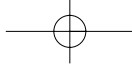
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**PART II – STUDIES ON THE APPROPRIATE  
ASSESSMENT AND MANAGEMENT  
OF SUICIDE ATTEMPTERS**





## *Chapter 5* – Memory impairment in those who attempt suicide by benzodiazepine overdose

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## ABSTRACT

### *Background*

A prospective study was carried out to investigate the presence of anterograde amnesia in suicide attempters who took benzodiazepines (BZ) and to study the correlation with sedation.

### *Method*

In 43 patients, who attempted suicide by taking benzodiazepines, memory performance was tested on a 15-word memory recall task. The immediate and delayed recall on the first day after admission (day 1) and 24 hours later (day 2) were rated. Each patient and the interviewer scored the patient's degree of sedation on a visual analogue scale (VAS). Patients also had to try to recognize, from photographs, the psychiatrist to whom they had spoken the day before.

### *Results*

The ratings of immediate and delayed recall were significantly lower on day 1 than on day 2. Subjective ratings of sedation of the patients were not significantly higher than the ratings of the observer. Less than half of the patients recognized the psychiatrist and knew that he was the one they had spoken to the day before.

### *Conclusion*

Anterograde amnesia is present in suicide attempters who take benzodiazepines. The implications of this finding for the assessment of suicide attempters in the acute phase are discussed.

## INTRODUCTION

It has been demonstrated in many studies that benzodiazepines (BZ) can induce memory impairment (Barbee, 1993; Curran, 1986). A common finding is anterograde amnesia, the phenomenon whereby information is poorly remembered when presented after BZ has been taken (Patat, Klein, & Hucher, 1987; Soldatos, Kales, & Bixler, 1985). Severity and duration of the amnesia are dependent on the particular BZ used, the dosage, the route of administration, the time (post-drug) at which information is presented and retrieval is required, and characteristics of the subject population tested (Curran, 1991; Ghoneim, Hinrichs, & Mewaldt, 1984; Preston et al., 1988). The memory task used is also of importance. For instance, recall tasks are more sensitive than recognition tasks and verbal tasks are more sensitive than visual tasks (Curran, 1986). In longitudinal studies it was found that only partial tolerance develops into amnesic effects: in verbal recall tests tolerance was found to the effects of BZ on immediate, but not on delayed (15-20 min) recall in normal volunteers (Ghoneim, Mewaldt, Berie, & Hinrichs, 1981) as well as in patients with generalized anxiety disorder (Morton & Lader, 1990). Impaired delayed recall was also found in chronic BZ users after acute administration of their medication (Lucki & Rickels, 1986).

Anaesthetists welcome the amnesic effects as they cause patients to forget unpleasant operative procedures. However, in other situations they are a reason for concern. In the large group of people who are using BZ on a daily basis, anterograde amnesia may interfere with the ability to function optimally and in patients using BZ who are also being treated with psychotherapy, anterograde amnesia may impair remembrance of what happened during a therapy session (Curran et al., 1994).

In a case report it has been suggested that anterograde amnesia also interferes with the efficacy of psychiatric consultation in patients admitted to hospital after a suicide attempt with benzodiazepines (Laan & Verwey, 1992). As BZ are involved in almost half of the suicide attempts (Michel, Waeber, Valach, Arestegui, & Spuhler, 1994), we decided to further explore possible memory impairment following a BZ overdose. We examined systematically whether anterograde amnesia occurs in a group of patients consecutively admitted to hospital following a suicide attempt involving BZ. We investigated verbal recall with the 15-words test, because such a test has been applied frequently in the evaluation of BZ induced anterograde amnesia. This test is thought to be highly sensitive to the presence of anterograde amnesia induced by BZ (Ghoneim & Mewaldt, 1990). Scores on a highly standardized verbal recall test do not necessarily reflect clinically significant memory impairment.

Therefore we added a visual recognition task with a more immediately obvious relevance to clinical practice: a photo recognition test to investigate whether patients were able to recognize the face of the psychiatric resident who had examined them. In clinical practice it is often assumed that the degree of anterograde amnesia can be predicted from the degree of sedation as estimated by the psychiatrist. However, the results of laboratory studies are equivocal (Curran, 1991). In this study therefore, we also assessed the degree of sedation as estimated by the patient and the psychiatric resident who examined the patient, and related these estimations to the degree of memory impairment.

## METHOD

### *Material and procedure*

From September 1st, 1994 until November 25th, 1996 all patients admitted to the general hospital 'Rijnstate' in Arnhem, The Netherlands following attempted suicide by taking benzodiazepines were prospectively studied. The medical ethics committee of the hospital approved the study.

### *Subjects*

All patients with BZ in their blood were included. Additional use of other drugs or non-drug methods in the suicide attempt was not an exclusion criterion but all patients that had alcohol in their blood were excluded.

Patients with the following criteria were also excluded: younger than 18 (because the tests used were not developed for younger people); a diagnosis of dementia or amnesic disorder before admission (cognitive dysfunction may interfere with the drug effects); alcohol dependence or abuse (cognitive dysfunction and impaired liver function may interfere with the drug effects); delirium, according to DSM IV criteria; inability to read or understand test instructions and items on the verbal recall test.

### *Assessments*

- 1 The '15-woorden test' (15-words test) is the Dutch equivalent of the Rey Auditory Verbal Learning test, a verbal recall test often used in research on anterograde amnesia caused by BZ (Lezak, 1983). We adapted the procedure slightly by administering the list of words only once on day 1 and once on day 2. On both days the research assistant instructed the patient in the use of a computerized version of the test. The patient was asked to remember words that were presented successively on the computer screen for a period of 2 seconds each. Immediately after the presentation of 15 unrelated words

the patient was asked to recall as many words as possible (immediate recall). After 15 minutes the patient was asked again to recall as many words as possible (delayed recall). The test was assessed on day 1 and day 2. To prevent learning, patients were presented different but equivalent lists on these days.

- 2 A *photo recognition test* was used as a visual recognition test. The patient was presented with a series of 6 photographs of faces with a variety in features such as hair, spectacles, etc., one of which showed the resident in psychiatry who had examined the patient. This procedure is used in formal police investigations in the Netherlands. The patient had to answer three questions: [1] do you recognize anyone; [2] who do you recognize; [3] how do you know this person? This test was administered on day 2 only. Patients who were known to the resident, possibly because of earlier suicide attempts, were excluded from this test.
- 3 *Degree of sedation* was rated on a 10 cm Visual Analogue Scale (VAS). On day 1 the patient as well as the resident in psychiatry filled in this scale. A low score indicates a high level of sedation.
- 4 *Blood alcohol concentration* was measured with gas liquid chromatography.
- 5 *Presence of benzodiazepines in blood* was ascertained by the immunochemical method TDxFLx (Abbott Laboratories, USA).

#### PROCEDURE

In 'Rijnstate' hospital all patients admitted following a suicide attempt are seen by a psychiatric resident for a routine clinical interview at least 12 hours after admittance, provided the patient is sufficiently alert for psychiatric consultation. For this study, at the end of the interview, the psychiatric resident informed patients who had used BZ in the suicide attempt about the study and asked them to participate. When informed consent had been obtained, a research assistant (an experienced consultation-liaison nurse) immediately started assessments on what we refer to as day 1. Twenty-four hours later the research assistant again performed assessments on what we refer to as day 2.

#### STATISTICAL ANALYSIS

Data were analyzed using the paired t-test; the level of significance was  $p < 0.05$ . Relationships between memory variables and subjective sedation ratings were assessed using the Pearson correlation coefficients.



## RESULTS

Forty-seven patients were eligible for the study. Three refused to cooperate and one had to be excluded because of insufficient cooperation. In this paper data on the remaining 43 patients (9 male and 34 female; mean age was 39.1 years; SD 12.4) are presented. The following BZ had been used: oxazepam (in 16 patients), temazepam (11), diazepam (10), clorazepate (4), alprazolam (6), flurazepam (4), lormetazepam (3), lorazepam (1), clobazam (1), flunitrazepam (2) and zopiclon (1). Eleven patients had used more than one BZ. Six patients had also used an antidepressant agent. Three others had taken a neuroleptic. One of them had used 3 neuroleptics.

### *Verbal recall tested with the 15-words test*

Immediate recall on day 1 was significantly lower than on day 2 (means respectively  $4.91 \pm 1.76$  and  $6.0 \pm 1.93$ ,  $p = 0.002$ ). Delayed recall was also significantly lower on day 1 than on day 2 (means respectively  $3.02 \pm 1.82$  and  $4.26 \pm 1.77$ ,  $p = 0.000$ ). The results are presented in Table 10.

### *Visual recall with the photo recognition test*

Less than half of the patients recognized the psychiatric resident from the photograph and knew that he was the one formally spoken to the day before (Table 11). Scores of the recognizers on the verbal recall test were not significantly different from the scores of the non-recognizers. Likewise, the subjective ratings of sedation of the recognizers were not significantly different from the ratings of the non-recognizers.

### *Sedation*

On day 1, patients rated themselves more sedated than the residents rated them but the difference was not significant (means respectively  $5.09 \pm 2.22$  and  $5.80 \pm 2.15$ ,  $p = 0.142$ ). There was a low correlation between subjective ratings of the patients and immediate or delayed recall on day 1 (Pearson correlation coefficients 0.12,  $p = 0.463$  and 0.08,  $p = 0.576$ ). There was a higher correlation between ratings of the resident and immediate and delayed recall on day 1 (Pearson correlation coefficients 0.5,  $p = 0.00$  and 0.47,  $p = 0.00$ ).

When the 9 patients who had also used antidepressants or neuroleptics were excluded, the results did not differ from those of the whole group.

**Table 10 Recall ratings on the 15-word test (N = 43)**

	Day 1 Mean (SD)	Day 2 Mean (SD)	P Value (Paired t-test)
Immediate	4.91 (1.76)	6.0 (1.93)	0.002
Delayed	3.02 (1.82)	4.26 (1.77)	0.000

**Table 11 Results of interviewer recognition from photograph (N = 35)\***

	yes/correct	no/incorrect
Do you recognize anybody?	22	13
Who do you recognize?	20	2
How do you know this person?	12	8

\* Some patients had previously received treatment from the resident psychiatrist and therefore did not participate in the photograph recognition test.

## DISCUSSION

This is the first study that demonstrates memory impairment in patients who made a suicide attempt by taking BZ. First of all, in a verbal recall test, patients performed more poorly on the first day of admittance to the hospital than on the second day with respect to both immediate and delayed recall. These results are in agreement with the existing wide body of literature in which verbal recall test results demonstrate memory impairment after the intake of BZ in a laboratory setting (Curran, 1991). Secondly, impairment was found in a photo recognition task. This result is surprising because a number of factors make memory loss in this task less probable. Patients were confronted much longer with the psychiatric resident than with the words of the verbal recall

test, given that psychiatric examination of these patients takes 45 minutes on average (Verwey, Koopmans, Opmeer, Zitman, & Huyse, 1997). Moreover, a psychiatric interview immediately after a suicide attempt is often a very emotional experience for the patient, implying that the interview and the interviewer are more meaningful and thus more likely to be remembered than the words of the verbal recall test. In addition, in laboratory studies visual tasks are much less sensitive than verbal tasks and recognition tasks less sensitive than recall tasks (Patat et al., 1987). The results of our study also show that anterograde amnesia is not necessarily accompanied by a decreasing of consciousness.

Because 9 patients had used psychopharmacological agents in addition to BZ, we also studied those who had only taken BZ. The results described above were also found in this subgroup of patients who made a suicide attempt with BZ only, which makes it more probable that BZ are the main factor in the memory disturbances. The fact that the type of memory loss is typical for BZ also implies that the role of BZ is an important factor. However, these arguments do not exclude the possibility that the impairment of memory results from the turmoil caused by the acute admittance to hospital and the diagnostic and treatment procedures on the emergency ward. On the other hand, stress can also induce ameliorating of memory. Only a comparison between patients having made a suicide attempt with BZ and patients having made an attempt without BZ can provide a definitive answer. At least in our hospital, such a control group is difficult to obtain because most suicide attempters use BZ, and patients who do not use it almost always leave the hospital within a few hours after arrival without having been seen by a psychiatrist.

Notwithstanding these shortcomings, the results support the hypothesis that the efficacy of psychiatric consultation in patients who made a suicide attempt with BZ can be compromised by memory impairment, even in patients who do not seem to be sedated. With many patients who made a suicide attempt, arrangements for follow-up care and rules of life have to be negotiated. It is, of course, very important that the patients remember these arrangements later on. In accordance with case reports, our study lends support to the notion that patients who made a suicide attempt with BZ are likely to forget arrangements. This is even true if during the interview the patient does not look sedated and seems to be cooperative with and responsive to the psychiatrist. Therefore it is preferable to make arrangements later. This is not always doable in clinical practice. We recommend providing essential information in writing as well and, whenever possible, drawing significant others into the discussions about the arrangements that have to be made.

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