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Psychological and emotional effects of the use of oral baclofen: a preliminary study

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Spasticity is a common problem following spinal cord injury. The drug of choice to control spasms is baclofen. There would appear to be no reported studies which have evaluated the psychological and emotional effect of this drug. This preliminary study investigated a number of such effects, including depression, anxiety and general mood state. First, we examined 10 subjects before and during the administration of baclofen. They were then compared to a control group of 12 subjects. A second cohort of 12 subjects taking baclofen were compared to a control group of nine subjects at a specific time after injury. Results indicated that whilst some significant differences were found, suggesting an increase in fatigue with use of baclofen, no major adverse psychological effects were noted. The implications of these results were discussed and suggestions for further research were highlighted.

Keywords: spinal cord injury; spasms; baclofen; psychology; adverse side effects.

Introduction

For years, oral baclofen has been one of the main drugs for the treatment of spasticity after spinal cord injury. It is usually well tolerated, but with common adverse side effects such as sedation, confusion and fatigue. There have also been case reports of temporary side effects induced by baclofen, such as frontal lobe syndrome,[1] psychotic depression,[2] and pseudopsychosis.[3]

The reported incidence of side effects has ranged from 30%[4] to 75%.[5] Gradual withdrawal is usually recommended as rapid withdrawal may induce adverse effects such as visual hallucinations.[6]

Despite baclofen being one of the most widely used drugs controlling spasticity, the authors can find no reference in the literature concerning the evaluation of emotional and psychological side effects of its user. Previously, these effects have merely been clinically reported. This initial pilot study investigates the relationship between the use of baclofen and the disturbance in emotional and psychological measures.

The study attempts to do this in three ways. First, by within-subject comparison of ratings taken before and during the use of oral baclofen. Secondly, by a between-subject comparison of ratings at a fixed point in time after injury of a group of subjects taking baclofen at that time and a control group who used no antispasticity medication at any time in their rehabilitation. Finally, the study investigates whether there is any correlation between dosage of baclofen and disturbance in psychological and emotional measures.

Method

Subjects

Comparison 1: repeated measure and control group

The experimental group consisted of 10 male inpatients, whose average age was 24 years, SD = 5 (range 18–34), and included two incomplete tetraplegic patients, four complete tetraplegics and four complete paraplegics. Patients were assessed before (mean of 17 weeks post injury, range 17–24 weeks) and after (mean of 28 weeks post

injury, range 24–30 weeks) baclofen therapy. They had been on baclofen for an average of 8 weeks, within a mean daily dose of 51 mg, SD = 27 (range 10–100). They were then compared to a control group who received no antispasticity medication at any time during rehabilitation. The 12 inpatient controls were matched for age at injury (27 years, SD = 5, range 19–36), and level (three incomplete tetraplegics, four complete tetraplegics, five paraplegics), and were 18 weeks post injury when the measures were taken.

Comparison 2: 30 weeks post injury cross-sectional comparison

Two groups of inpatients were compared at 30 weeks post injury; one taking baclofen at that time, the other known not to have taken any antispasticity medication at any time during rehabilitation. The group taking baclofen at 30 weeks post injury consisted of the 10 patients in the experimental group described above, plus two further patients, one tetraplegic and one paraplegic (these had not been included in the original experimental group because the data for before taking baclofen is not available for them).

The comparison 2 control group was chosen so as to match for age and comprised five males and four females, average age 29 years, (SD = 8), range 19–45. It included one incomplete tetraplegic, two complete tetraplegic patients and six complete paraplegics.

Measures

Depression was measured using the Beck Depression Inventory,[7] in which subjects have to choose for each item the most appropriate of four concerning their well-being for the previous week. The 21 questions measure both somatic symptoms (eg appetite, insomnia, fatigue) and nonsomatic symptoms (eg guilt, dissatisfaction, sadness) of depression. Each item is scored 0–3, higher scores indicating more depressive symptoms.

Hopelessness was measured with the Beck Hopelessness Scale.[8] Subjects indicate whether their attitude toward the future, over the past week, matches that of each of the 20 statements in the scale.

Anxiety was measured using the State Anxiety Inventory (Form Y).[9] This consists of 20 statements concerning both anxiety, present states (eg 'I am worried'), and anxiety absent states (eg 'I feel calm'). The subjects indicate their agreement with each item at that moment. Each item is scored 1–4, higher scores indicating higher anxiety.

The Psychosocial Adjustment to Illness Scale Seven: Psychological Distress[10] was used to measure dysphoric thoughts and feelings that are associated with the subject's disorder, or are a direct result of the illness and its sequelae. Its seven items investigate anxiety, depression, hostility, reduced self esteem, body image problems and inappropriate guilt and refer to the preceding month. Each item is scored 0–3, higher scores indicating higher distress.

The Intrusion Scale of the Impact of Events Scale[11] was used to measure the frequency of intrusive thoughts and images, troubled dreams, strong pangs or waves of feelings, and repetitive behaviour in the preceding week. Each of the seven items is scored 0–5, higher scores indicating higher distress.

The Profile of Mood States[12] measured affect by subjects indicating the extent to which they felt their mood corresponded to the list of adjectives presented. The scales of anger, vigour, fatigue and confusion were measured by 12 and these were not elevated, eight, seven and seven items respectively. Each item is scored 0–4, higher score indicating higher level of that emotion.

Procedure

The subjects of this study form a subset of a larger longitudinal study currently in progress. The patients are rated every 6 weeks from admission to discharge on each of the psychological impact measures with a research psychologist. This assessment takes approximately 30 minutes. The available medical records of these patients were investigated to study whether they had at any time been taking baclofen or any other antispasticity medication. This was done after all the impact measure had been taken. Hence, the rating had been taken 'blind'.

Comparison 1: The within-subject data were provided by comparing the last set of results, before taking baclofen, with results obtained after baclofen had been taken for at least 2 weeks. The pre-baclofen group was compared also to the matched control.

Comparison 2: Between-subject data compared those taking baclofen and those not taking any antispasticity medication at 30 weeks, post injury.

Results

Comparison 1: Using independent t tests, no significant differences were found in any of the measures between the baclofen group before they started using the drug and the control group, or between the pre-baclofen scores and during baclofen scores in the baclofen group. Pearson product–moment correlations were calculated with the dosages of baclofen being taken at the time of testing and the emotional and psychological measures. None of the correlations were significant.

Comparison 2: Independent t tests were carried out to compare the scores at 30 weeks post injury for those taking baclofen at that time and those who had not taken any antispasticity at any time in their rehabilitation. Significant differences were found in two measures. Those not taking any antispasticity medication were significantly more vigorous than those on baclofen, as measured on the POMS ($t = 2.38$, $p < 0.05$). Correspondingly, those patients taking baclofen were significantly more fatigued than those not on any antispasticity medication as measured on the POMS ($t = 2.57$, $p < 0.05$). The full results are presented in Table I.

However, these two groups differed greatly with respect to severity of injury. The group taking baclofen contained proportionally more tetraplegics who might be expected to have lower vigour and higher fatigue than paraplegics. In order to investigate this, the two groups were collapsed across drug use and the scores for paraplegics and tetraplegics were compared. No significant differences were found on any of the measures.

Table I Mean score and standard deviations of emotional and psychological measures at 30 weeks post injury for group taking baclofen and group taking no antispasticity medication at any time during rehabilitation

Measure	No drug group ($n = 9$)	Taking baclofen ($n = 12$)	p
BDI	10.22 (8.33)	13.67 (12.4)	NS
BHS	4.56 (4.80)	5.33 (5.71)	NS
SAI	29.89 (7.99)	39.75 (14.8)	NS
PAIS-7	5.22 (4.87)	6.75 (4.16)	NS
RIES-1	8.00 (10.2)	9.67 (8.61)	NS
Anger	5.78 (4.81)	5.33 (6.53)	NS
Vigour	17.00 (8.20)	9.58 (6.11)	0.028
Fatigue	5.33 (3.28)	10.92 (5.85)	0.019
Confusion	0.78 (2.22)	3.50 (4.87)	NS

BDI = Beck Depression Inventory, BHS = Beck Hopelessness Scale, SAI = State Anxiety Inventory, PAIS-7 = Pain Adjustment to Illness Scale Seven, RIES-1 = Revised Impact of Events Scale One
Standard deviations in parentheses.

Discussion

Significant differences were found on measures of vigour and fatigue between those taking baclofen and those who took no antispasticity medication at any time in their rehabilitation, as measured by the POMS at 30 weeks post injury.

This result can be challenged in two main ways. First, the no medication group consisted of three tetraplegics and six paraplegics as compared to seven tetraplegics and five paraplegics in the baclofen group. Paraplegics might be expected to be more active and less tired than tetraplegics, which would explain the observed differences. However, when the patients were collapsed across drug use and compared by severity of injury, no significant differences were

found between paraplegics and tetraplegics. Paraplegics, in fact, showed slightly more fatigue. Secondly, it could be claimed that those patients who take baclofen form a distinct group and there would be differences between them and the remaining spinal cord injured population, even before they started using the drug. This can be discounted by the lack of significant differences found in comparison 1, between the scores of the baclofen-taking group before they used baclofen and those of the matched control group.

Thus it seems that the difference in vigour and fatigue are not merely experimental artefacts but due to the use of baclofen. This is consistent with clinical evidence that drowsiness is the most common adverse effect associated with the use of the drug.[13,14]

However, the within-subject design study failed to detect any significant differences between the scores of patients taking baclofen and those not taking baclofen. There was a trend, though, for the patients to be more fatigued and confused, and less vigorous whilst taking the drug. The failure to find significant differences may result from the small number of subjects and large variances in the measures used. This is similarly true of the failure to find any significant correlations between dosages and the measures used. Of the measures, vigour and fatigue showed the highest correlations with dosage.

Recognising the limitations of this preliminary study, results tend to indicate that psychological measures such as depression, anxiety, hopelessness and intrusive thoughts are not significantly affected by the use of baclofen. This fails to provide evidence for Rawson's suggestion that factors such as depression and anxiety may be exacerbated by the presence of spasms and thus baclofen may be expected to reduce such measures.[15]

Increased fatigue and decreased vigour associated with baclofen use could present problems and *Martindale's Pharmacopoeia* states that 'patients taking baclofen should not drive or operate machinery for loss of attention might lead to accidents'. Since baclofen is the most widely used and most effective drug for treating spasticity, knowledge of its psychological effects and implications are of great importance in ensuring provision of appropriate support for patients who may experience adverse effects.

An area for further study that is indicated by these results is whether baclofen affects the cognitive functioning of patients. If cognitive functioning is significantly altered this will have implications for rehabilitation, goal planning and integration. This study has highlighted the impact on emotional wellbeing of the use of oral baclofen. Further studies would be needed to explore the impact of cognitive functioning of the use of oral baclofen. Furthermore, future studies would need to include large subject numbers to increase the power of the analysis and the adoption of a within-subject design that would provide the most direct evidence of the effects of the use of oral baclofen.

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