

PAPERS AND ORIGINALS

Nocturnal femoral fracture and continuing widespread use of barbiturate hypnotics

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Summary

A survey of 390 patients aged over 65 with fractured femurs showed that nearly all the fractures that had been caused by nocturnal falls had occurred among the many patients who were still taking barbiturate hypnotics. Barbiturates were also strongly associated with a history of frequent falls.

Barbiturates are still prescribed surprisingly often for the elderly. An analysis of 1622 elderly patients referred to a geriatric clinic in Nottingham showed that 41% were taking barbiturates in 1973. By 1976 this figure had actually increased to 51%, despite the substantial campaign against barbiturate prescribing. This campaign thus appears to have made little or no impact on prescriptions for the elderly in at least one large town. The dangers of barbiturates may well need constant re-emphasis.

Introduction

The problems caused by barbiturates have recently become widely recognised. It has been generally accepted that, among its other effects, long-term use of barbiturates can cause confusion, depression, and ataxia with a tendency to fall, especially in the elderly. There is, however, virtually no objective evidence to support this widely held clinical view.¹ We set out to assess the effect of barbiturates on ataxia by analysing perhaps the most serious sequel of unsteadiness—a fall producing a fractured femur. On discovering some surprisingly high levels of barbiturate consumption, we also assessed barbiturate use in the elderly in Nottingham by noting the

number of outpatients recently referred to the geriatric service, who were taking barbiturates.

Patients and methods

The case notes of all patients admitted to the geriatric-orthopaedic unit at Basford Hospital, Nottingham, during 1970-6 were assessed. This unit provides comprehensive rehabilitation facilities for elderly women after femoral fracture. The timing and circumstances of the fall causing the fracture were noted, as were previous falls, medication, concurrent disease, and physical incapacity. Previous physical incapacity was assessed on a score developed by Townsend and Wedderburn² (TW score) ranging from 0 (fully mobile outdoors) to 12 (unable to dress, wash, or walk). The mental status questionnaire (MSQ) measures orientation on a 0-17 scale.³ Each patient's score was recorded on admission and discharge.

To assess barbiturate prescribing in the elderly population we analysed the case notes of new outpatients attending the department of geriatric medicine, Sherwood Hospital, Nottingham. This department serves a population of 760 000 in the Nottingham area. The incidence of falls and barbiturate prescribing on referral were noted. To discover any recent trend 1973 referrals were compared with those in 1976.

Results

Altogether 390 inpatients with femoral fractures were studied. Their ages ranged from 65 to 101 years with a mean age of 85.0 years. The fractures occurred between 10 pm and 6 am in 98 patients, between 6 am and 2 pm in 217, and between 2 pm and 10 pm in 75. These three groups were compared for a range of factors (table I).

The only striking difference between the groups was in the use of barbiturate hypnotics. Ninety-three per cent of the patients who suffered nocturnal fractures were taking barbiturate hypnotics compared with only 6% of those with morning fractures and none of those with afternoon fractures. This difference was highly significant ($P < 0.001$). Overall hypnotic use showed a slight trend towards higher consumption in the afternoon and nocturnal groups, but this was not significant at the 10% level. The use of non-barbiturate hypnotics did not differ significantly between the morning and afternoon fracture groups, and the massive use of barbiturates in the nocturnal group precluded any valid comparison of non-barbiturate hypnotic use for this group.

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While 46 (45%) of the 103 patients taking barbiturates had a history of frequent falls (over four falls per week), only 64 (22%) of the 287 patients not on barbiturates had had frequent falls. This association between barbiturate use and a history of frequent falls was highly significant ($P < 0.001$). Thus the lesser association between nocturnal fracture and frequent falls ($P < 0.02$) seen in table I may be only indirect, since both were more strongly associated with barbiturate use than with each other. Time of fracture was not related to any of the five other factors studied.

TABLE I—Details of patients with femoral fractures

	Time of fracture			P value
	10 pm-6 am	6 am-2 pm	2 pm-10 pm	
No (%) on barbiturates	91 (93)	12 (6)	0	<0.001
No (%) on any type of hypnotics	96 (98)	182 (84)	46 (61)	NS
No (%) with fracture:				
Intertrochanteric	38 (39)	88 (41)	32 (43)	} NS
Subcapital	31 (32)	71 (33)	25 (33)	
Transcervical	14 (14)	35 (16)	10 (13)	
Other	15 (15)	23 (11)	8 (11)	
No (%) with history of frequent falls	39 (40)	54 (25)	17 (23)	<0.02
No (%) physically incapacitated (TW score):				
0-2	77 (79)	161 (74)	53 (71)	} NS
3-6	14 (14)	42 (19)	15 (11)	
7-12	7 (7)	14 (7)	7 (9)	
No (%) living alone	45 (46)	123 (57)	41 (55)	NS
No (%) with concomitant disease	61 (62)	151 (70)	51 (68)	NS
No (%) on other medication	51 (52)	138 (64)	31 (41)	NS
Total No of patients	98 (100)	217 (100)	75 (100)	

Table II shows that on admission to the unit patients taking barbiturates were significantly more confused than patients not taking them (the MSQ scores were significantly lower). During their stay in hospital barbiturates were withdrawn from all but six patients. After withdrawing barbiturates 12 of these 97 patients were discharged on no hypnotics and 85 were discharged on non-barbiturate hypnotics. At discharge the MSQ scores of the patients who had taken barbiturates had improved significantly, so that they were rather better than those of patients who had not previously had barbiturates, which had remained virtually unchanged during admission (table II). The MSQ score improved by three or more in 57 patients (59%) whose barbiturates were stopped. On admission 37 (38%) of the 97 patients had an MSQ score below 12, the minimum level thought necessary for an independent existence.³ After weaning patients off barbiturates only one patient had a score below 12. Thus barbiturate withdrawal during admission reduced confusion and gave clinically important benefits.

TABLE II—MSQ scores recorded on admission and on discharge in all patients according to barbiturate use

MSQ score:	7	9	10	11	12	13	14	15	16	17	Significance
<i>Patients taking barbiturates</i>											
No with each score on admission	1	3	14	19	34	6	12	4	5	5	$\chi^2 = 85.05$; $P < 0.001$
No with each score on discharge				1	10	2	40	20	14	16	
<i>Patients not taking barbiturates</i>											
No with each score on admission				13	13	50	152	6	20	33	$\chi^2 = 1.72$; NS
No with each score on discharge				14	12	45	155	10	22	29	

On admission, barbiturates v no barbiturates: $\chi^2 = 161.84$; DF = 7; $P < 0.001$.
On discharge, barbiturates v no barbiturates: $\chi^2 = 52.31$; DF = 6; $P < 0.001$.

Table III shows hypnotic use in new outpatients referred to the geriatric department. In 1973 41% of patients referred were taking barbiturates and in 1976 51% of patients had been prescribed barbiturates. This increase was highly significant ($P < 0.001$). In 1973 91% of outpatients were taking hypnotics (92% in 1976). The use of non-barbiturate hypnotics declined from 50% in 1973 to 41% in 1976, but the type of hypnotic used remained very similar. Nitrazepam (17% of patients) was the most popular, followed by chlormethiazole (6%), chloral (5%), chlorpromazine (4%), glutethimide (3%), and diazepam (2%).

TABLE III—Types of hypnotics used by new outpatients referred to geriatric department in Nottingham in 1973 and 1976

	1973	1976
No (%) on barbiturate hypnotics	324 (41)	424 (51)
No (%) on non-barbiturate hypnotics	392 (50)	340 (41)
No (%) not taking hypnotics	74 (9)	68 (8)
Total No of patients	790	832

The general practitioner's letter mentioned falls or episodes of dizziness as a reason for referral in 86% of the patients referred in 1973 who were taking barbiturates (84% in 1976). Falls or dizziness were, however, reasons for referral in only 23% of new outpatients not taking barbiturates in 1973 (24% in 1976). The association of barbiturate medication and a history of falls or dizziness was highly significant in both these years ($P < 0.001$).

Discussion

The groups of patients sustaining femoral fractures at different times of day were very similar in nearly all aspects except one—their use of barbiturate hypnotics. Over 90% of patients with nocturnal fractures were taking barbiturate hypnotics compared with 6% of those with morning fractures and none of those with afternoon fractures. This striking association strongly suggests that barbiturate use is a major factor in producing nocturnal falls resulting in a femoral fracture.

Barbiturates produce the greatest impairment of mental and motor performance in the first few hours after administration, when serum concentrations are highest.¹ So barbiturate-linked effects should be greatest at night in patients who have taken barbiturate hypnotics before retiring. Our finding that the fractures associated with barbiturate use were indeed nocturnal suggests a genuine association. The presence of a few barbiturate-taking patients in the group with morning fractures fits in well with the known ability of barbiturates to impair mental and motor functions for up to 20 hours.¹ Non-barbiturate hypnotics were taken significantly more often by the morning than by the afternoon group. Also patients in both these fracture groups used non-barbiturate hypnotics rather more often than the outpatients referred to the geriatric service. These two facts suggest that using non-barbiturate hypnotics might slightly predispose patients to falls producing femoral fractures. This effect, however, should be very small compared with the effect produced by barbiturates.

We have shown that barbiturate use was significantly associated with a history of falls or dizziness in two distinct groups. Among the patients with fractured femurs a significantly higher proportion of patients taking barbiturate hypnotics had a history of previous falls. Among new outpatients at a geriatric clinic falls or episodes of dizziness were a reason for referral in over 85% of patients taking barbiturates but in less than a quarter of patients not on these drugs. These percentages were almost identical for referrals in two separate years. Thus the clinical view linking barbiturates and falls seems well founded.

Confusion, sometimes progressing to a "pseudodementia," has been described with long-term barbiturate use.⁴ Nevertheless, no study has been performed to assess either the frequency of occurrence of this confusion or its reversibility on stopping barbiturates. We found that over half the patients weaned off barbiturates in hospital improved their MSQ score by three points or more, whereas other patients' scores remained virtually constant. An MSQ score improvement of three may often mean the difference between independence and institutional care. Also the incidence of MSQ scores of under 12—the lowest score normally taken as compatible with an independent life—dropped from 39% to 1% on stopping barbiturates. Caution is necessary in extrapolating findings in a group selected for a possibly barbiturate-linked disease (fractured femur) to the general population. None the less, our findings

suggest that barbiturates commonly cause a clinically important degree of confusion in old people, which is reversible when the drugs are withdrawn.

The continuing widespread use of barbiturates by elderly outpatients is disquieting. Several years ago informed medical opinion hardened against using barbiturates for any purpose other than controlling epilepsy or as an anaesthetic induction agent. CURB (Campaign on the Use and Restriction of Barbiturates) was set up in 1975 with government support and has since distributed leaflets etc throughout the profession. Frequent editorials in the *BMJ*⁵⁻⁷ and other journals have emphasised the perils of barbiturates. With barbiturate prescribing declining at 7.5% a year⁸ this campaign seemed to be succeeding throughout the country. Our results, however, indicate that this may be a complacent view. Our disconcerting figures show that over 40% of old people referred to a geriatric outpatient service in Nottingham in 1973 were on barbiturates and that by 1976 this figure had actually risen to over 50%. It is also surprising that after several years of campaigning about

barbiturates and ataxia about 74% of old people referred because of falls in 1976 were still being prescribed barbiturates. So in one town the message on barbiturates is still largely being ignored. In how many other areas of the country is this also happening?

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Effect of calcitonin treatment on deafness due to Paget's disease of bone

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Summary

Seventeen patients with Paget's disease of the skull and deafness were followed for nine to 18 months. Patients who received calcitonin treatment showed less deterioration in hearing than untreated patients.

Calcitonin treatment may retard the progression of deafness in Paget's disease, and further studies are indicated.

Introduction

Deafness is an important complication of Paget's disease of bone. Almost half the patients with diagnosed skull disease develop hearing loss.¹ The nature of the deafness is complex. Typically there is mixed low-frequency conductive and high-frequency sensorineural loss but in some cases pure forms may occur.¹⁻³ Despite occasional reports of benefit, surgical intervention is not usually recommended,^{2,4} and until recently a hearing aid has been the only effective treatment available.

Calcitonin treatment may relieve the pain and also improve the biochemical abnormalities of Paget's disease and there have been occasional reports of benefit to patients with neurological

complications, such as cranial nerve palsies and nerve compression syndromes.^{5,6} It is not yet known whether or not continuous calcitonin treatment helps other features of the disease such as deafness, deformity, and radiological changes. We therefore investigated the effect of calcitonin treatment on the deafness of Paget's disease.

Patients and methods

During the first year of a special clinic for treating patients with Paget's disease of bone all patients were assessed clinically and audiological for deafness. Seventeen patients who had a history of subjective deafness, radiological evidence of skull disease, and both low-tone conductive loss and high-tone sensorineural loss on a pure tone audiogram were selected for further study. Whenever possible these patients had serial pure-tone audiograms and underwent impedance audiometry every three months by the same audiotechnician. Biochemical follow-up included three-monthly measurements of serum calcium, phosphorus, and alkaline phosphatase concentrations. When biochemical resistance was suspected in patients on calcitonin treatment the acute hypocalcaemic response to the appropriate calcitonin was measured.⁷

Seven patients (aged 51-77) with severe bone pain or distressing cosmetic deformity—such as facial involvement in young women—had continuous calcitonin treatment and three patients with skeletal pain were given intermittent courses of the hormone. The control group consisted of seven patients (aged 60-76) who were free of pain and in whom there were no specific indications for calcitonin treatment. The severity of deafness in the two groups was of similar degree. Salmon calcitonin 50-100 U subcutaneously or porcine calcitonin 80-160 U intramuscularly was given six days a week either by the patient or by the district nurse.

Results

Most patients who complained of bone pain achieved substantial relief of symptoms from calcitonin treatment. No patient in the treated group noticed any substantial subjective improvement in hearing over the period of study.

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