rise in temperature—were absent in many of the cycles, even though these were ovulatory by hormonal analysis (fig 1), and when these features were present they were not consistently related to the timing of the LH surge (table IV).

Most of the charts included in the series were from infertile patients and were obtained either before or during treatment. These were included in an attempt to simulate conditions in an infertility clinic. Since the classical changes seen in a BBT are only indirectly related to ovulation—namely, LH surge, rupture of the follicle, formation of corpus luteum, synthesis of progesterone,¹² rise in BBT¹—not surprisingly an infertile cycle (despite being ovulatory) may well give rise to an atypical BBT chart. This observation is not new.^{3 15} Indeed, abnormalities in BBT charts from infertile patients have often been described,^{9 16-18} though it is still commonly assumed that the day of ovulation can be predicted fairly accurately. As a result the condition of the cervical mucus^{11 19} or the results of isolated hormone assays may be wrongly assessed. Moreover, couples are often advised on the best time to have intercourse or attend hospital for artificial insemination on the basis of BBT recordings.³

Although we have emphasised the errors in interpreting charts from infertile patients, an appreciable number of the normal cycles were also scored wrongly.¹⁴ Even under optimum conditions—that is, retrospective assessment of the chart with prior knowledge of the day of the LH surge—only 72% of the normal cycles showed the conventional features correlating with hormonal events (table IV).

All charts were marked within 20 minutes, so an even lower degree of consistency would be achieved by anyone reviewing the charts produced by a patient at monthly intervals.

Unfortunately the cost and technical difficulties of obtaining hormonal profiles prohibits their routine use in an infertility clinic, so the clinician does not have regular feedback on the accuracy of his interpretations and therefore no chance of improving his future assessments.

Despite these drawbacks the use of BBT recordings in an infertility clinic is probably still justified as a means of providing

a concise visual record of menstrual dates, times of hormone assays, results of biopsies, and duration and dose of any treatment, so long as the temptation to draw detailed conclusions about the progress of hormonal events is avoided.^{13 20}

The willing co-operation of all participants, both expert and non-expert, is gratefully acknowledged. We should also like to thank Mrs Janet Southall for scoring all the result sheets.

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Deliberate self-poisoning: A study in London casualty departments

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Summary

During a prospective study of the whole spectrum of drug-related problems treated in one month by 62 casualty departments in the Greater London area, 949 cases of deliberate self-poisoning were identified. Nearly three-quarters of the patients were under the age of 40 years and in all age groups women outnumbered men. Psychoactive drugs of some sort were used in 673 incidents (71%) and ordinary analgesics and other drugs were used in 252 (27%). The incidence of polydrug overdose (423; 45%) was much higher than that found in

other studies. In at least 256 incidents (27%) there was a history of repeated overdose in the previous 12 months. Comparison with other studies showed a steady decline in the use of barbiturates in deliberate self-poisoning but an increase in the use of non-barbiturate hypnotics, minor tranquillisers, and antidepressants.

Introduction

The problem of attempted suicide has been studied intensively in Britain during the last 20 years in rural¹ and urban²⁻⁴ areas and many studies suggest that its incidence is increasing.^{2 4-6} This appears to be accounted for by a massive increase in the number of cases of deliberate self-poisoning and even the most recent studies show that the peak of this "epidemic" has not yet been reached. There is also evidence that the incidence of accidental overdose and of drug dependency has been increasing too,^{7 8} and the present study concentrates on cases of deliberate

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self-poisoning while attempting to set them against the wider background of other drug-related problems.

London was the subject of classic studies by Sainsbury⁹ into suicide and by Stengel and Cooke¹⁰ into attempted suicide. More recently Pritchard⁸ studied all admissions for attempted suicide to the London Hospital during the course of one year. Nevertheless, a large-scale survey of deliberate self-poisoning has not previously been carried out in London, although a study of the cosmopolitan capital city, which is popularly recognised as the centre of the current British drug scene from which fashion in drug use spreads to other parts of the country, is clearly of potential interest. Although the size of London leads to administrative problems when conducting such a survey, one advantage of the city's scope is that even a study conducted over a relatively short period can identify a large enough number of cases to provide reasonable figures for statistical analysis. Such information shows deliberate self-poisoning as a short-term prevalence, and is not blurred by changes in drug prescription and use that might occur over a longer period.

Methods

Full details of the methodology of the London Casualty Survey have been described elsewhere¹¹ and only brief details will be given here. A one-month prospective study was carried out in 62 London casualty departments in July 1975. A questionnaire was completed by the casualty officers on behalf of all patients who presented with a drug-related problem during the study period. It recorded, among other things, the age and sex of the patient and the drugs of abuse and self-poisoning. The underlying reason for the overdose was also explored. An overdose might be classified as a "suicidal attempt or gesture," an "accidental overdose in the course of drug addiction," or an "accidental overdose," with a further category for "not known." In the present study no effort was made to distinguish between suicidal attempts and gestures. This paper is concerned only with patients whose overdose was considered to be a suicidal attempt or gesture.

Results

There were 1641 drug overdose incidents during the month of the survey and 949 (58%) of these were unequivocally categorised as deliberate self-poisoning in a suicidal attempt or gesture. Twenty-four per cent were either accidental overdoses (165; 10%) or overdoses taken in the course of drug addiction without suicidal intent (226; 14%). In a significant minority (301; 18%) the category of the drug overdose was not known.

Age and sex distribution—Table I shows that overall the female:male ratio was 2.2:1. In all age groups women outnumbered men, particularly in the group aged under 20 years. The mean age of male patients was 34.5 years ($\pm$ SE 0.8), which was significantly older than that of the female patients, whose mean age was 31.4 years ($\pm$ 0.5); ($t=3.3$; DF=894; $P<0.001$). Nearly three-quarters of the patients were under the age of 40, and in both sexes there was a peak incidence in the 20s.

Drugs taken—Table II shows that the drugs most frequently used in deliberate self-poisoning were "other psychotropic" drugs—that is, antidepressants, major and minor tranquillisers, and stimulants. More detailed analysis of this group of drugs showed that minor tranquillisers were used in 342 of the 949 drug overdoses (36%) and antidepressants in 140 incidents (15%). Non-barbiturate hypnotics and alcohol were taken significantly more often by patients over the age of 40 than by younger patients (non-barbiturate hypnotics: $\chi^2=6.8$; DF=1; $P<0.05$; alcohol: $\chi^2=10.6$; DF=1; $P<0.01$), but there was no significant relationship between age and the use of "other psychotropic" drugs. Barbiturates were used more frequently by patients over the age of 40, but the difference failed to reach statistical significance. Barbiturates and alcohol were taken significantly more often by male patients than female patients (barbiturates: $\chi^2=4.4$; DF=1; $P<0.05$; alcohol: $\chi^2=32.1$; DF=1; $P<0.001$).

Table III shows that at least 423 patients (45%) took more than one type of drug simultaneously. The incidence of polydrug overdose may well have been much larger as some patients may have taken more than one drug of the same type, for example—two different antidepressants. In cases in which two types of drugs were used (347; 37%) the common combinations were "other psychotropics" with alcohol, analgesics with alcohol, and non-barbiturate hypnotics with

TABLE III—Drug combinations used in 949 incidents of deliberate self-poisoning

One type of drug		Two types of drugs					
Drug	No (%) of incidents	Drugs	No (%) of incidents	Drugs	No (%) of incidents	Drugs	No (%) of incidents
B	46 (5)	B, H	7 (1)	H, P	41 (4)	P, E	81 (9)
H	75 (8)	B, P	15 (2)	H, A	12 (1)	N, A	2 (<1)
P	214 (23)	B, N	1 (<1)	H, O	6 (1)	A, O	18 (2)
N	2 (<1)	B, A	2 (<1)	H, E	22 (2)	A, E	43 (5)
A	126 (13)	B, O	5 (1)	P, A	31 (3)	O, E	12 (1)
O	39 (4)	B, E	24 (3)	P, O	19 (2)	E*	6 (1)
Total	502 (53)	Total 347 (37)					

Of the remaining 100 (11%) cases, 76 (8%) took 3 or more types of drugs and 24 (2%) took unrecorded drugs.

*Six patients took alcohol with unrecorded drug(s).

B=Barbiturate; H=Non-barbiturate hypnotic; P=Psychotropic ("other psychotropic"); N=Narcotic; A=Analgesic; O=Other; E=Alcohol.

TABLE I—Sex and age distribution of patients who attended casualty departments after deliberate self-poisoning

Sex	Age groups (years)						Total	Age unknown	Total
	<20	20-29	30-39	40-49	50-59	>60			
M (%)	26 (9)	111 (39)	56 (20)	47 (17)	25 (9)	16 (6)	281 (100)	15	296
F (%)	102 (17)	242 (39)	130 (21)	68 (11)	50 (8)	23 (4)	615 (100)	27	642
Both sexes (%)	128 (14)	353 (39)	186 (21)	115 (13)	75 (8)	39 (5)	896 (100)	42	938*
Ratio of female:male	3.92	2.18	2.32	1.45	2.00	1.44	2.19	1.80	2.17

*Total does not include 11 cases, of whom 4 had no sex recorded (3 aged 20-29, 1 aged 30-39) and 7 had neither age nor sex recorded.

TABLE II—Drugs taken by 949 patients who attended casualty departments after deliberate self-poisoning

Age groups (years)	Barbiturates (%)	Non-barbiturate hypnotics (%)	Other psychotropics (%)	Narcotics (%)	Analgesics (%)	Others (%)	Alcohol (%)
<20	16 (13)	18 (9)	51 (11)	1 (9)	44 (16)	18 (14)	16 (7)
20-29	33 (27)	69 (34)	185 (40)	8 (73)	129 (47)	40 (32)	79 (34)
30-39	32 (26)	45 (22)	93 (20)	1 (9)	44 (16)	27 (22)	53 (23)
40-49	10 (8)	26 (13)	69 (15)		19 (7)	18 (14)	44 (19)
>50	25 (20)	36 (18)	46 (10)	1 (9)	25 (9)	14 (11)	30 (13)
Age unknown	7 (6)	8 (4)	19 (4)		14 (5)	9 (7)	9 (4)
Total (%)	123 (100)	202 (100)	463 (100)	11 (100)	275 (100)	126 (100)	231 (100)
Total* as % of 949	13	21	49	1	29	13	24

*This row does not sum to 100% as some patients used more than one class of drugs.

"other psychotropics," but it is striking that nearly every possible combination of class of drugs occurred. Alcohol and "other psychotropics" were each used significantly more frequently in combinations of two drugs than any other drug combinations (alcohol: $\chi^2=25.5$; DF=1; $P<0.001$; "other psychotropics": $\chi^2=26.1$; DF=1; $P<0.001$). In overdoses of one type of drug only "other psychotropic" drugs were used in 214 (23%) incidents, and in 118 (55%) of these, minor tranquillisers were used alone.

Altogether, psychoactive drugs—barbiturates, non-barbiturate hypnotics, "other psychotropics" and narcotics such as heroin, morphine, methadone, and pethidine—were used in 673 incidents (71%) and non-psychoactive drugs only—that is, analgesics and "other" drugs such as anticonvulsants, antibiotics, and vitamins—were used in 252 (27%). Alcohol was used in 231 incidents (24%), 166 (17%) in combination with a psychoactive drug, and 65 (7%) with a non-psychoactive drug.

Origin of drug used—In 589 incidents (62%) the drug(s) of overdose had been prescribed for the patient either by a general practitioner or by a doctor in a hospital; in 152 (16%) the drugs had been obtained without prescription but legally, in 85 (9%) the drugs had been obtained illicitly, and in 123 (13%) the origin of the drug was not known.

Multiple episodes and drug dependency—In half of the incidents the patient denied having taken an overdose during the previous year, but in 123 (13%) there was a history of one overdose during this period and in a further 133 (14%) there had been two or more. During the month of the survey 25 patients were responsible for 50 drug overdoses; six of these patients were drug-dependent. Out of the total of 949 drug overdoses, 95 (10%) concerned patients who were dependent on drugs; in 672 incidents (71%) the patient was not drug-dependent, and in 182 (19%) the dependency state could not be assessed. The distribution of male and female patients within these groups was not significantly different.

Level of consciousness and disposal of patient—In 443 drug overdose incidents (47%) there was an impaired level of consciousness, in 475 (50%) there was not and in 20 cases (2%) the level of consciousness was not recorded. Impairment of consciousness occurred more frequently among the 296 male patients (169; 57%) than among the 642 female patients (274; 42%). Table IV shows the disposal of male and female patients according to their level of consciousness. A higher proportion of male patients (256; 86%) were admitted to hospital than female patients (504; 78%), and this difference is accounted for by the significantly greater proportion of men who were admitted to hospital although their level of consciousness was not impaired ($z=2.85$; $P<0.01$). In contrast, a significantly higher proportion of women left casualty against advice, irrespective of whether their consciousness was impaired ($P<0.05$) or not ($P<0.01$).

TABLE IV—Level of consciousness and disposal of 949 patients after deliberate self-poisoning

Level of consciousness	Sex	Admitted (%)	Left on advice (%)	Left against advice (%)	Died in casualty (%)	Disposal not known (%)	Total No (%)
Impaired	M	151 (89)	14 (8)	3 (2)	1 (<1)	<1	169 (100)
	F	239 (88)	11 (4)	19 (7)	1 (<1)	3 (1)	274 (100)
Not impaired	M	100 (83)	16 (13)	3 (3)		1 (1)	120 (100)
	F	254 (71)	61 (17)	36 (10)		4 (1)	355 (100)
Not known	M	5 (71)	1 (14)	1 (14)			7 (100)
	F	11 (85)	2 (15)				13 (100)
Total		760 (81)	105 (11)	62 (7)	2 (<1)	9 (1)	949*(100)

*Total includes 11 cases for which the sex of patients was not recorded.

Discussion

Procedures for gathering information were carefully standardised, but conclusions should be qualified by an awareness of the difficulties in establishing the reliability and validity of data in this type of study. Validity was checked in a substudy by urine testing.¹¹ The results must to a degree be an underestimate since an unknown number of patients were admitted directly to psychiatric hospitals or private institutions. It must also be remembered that four hospitals did not participate in the survey, and figures do not include those who did not seek medical advice after a suicidal attempt or those who were treated at home by a general practitioner.¹²

This survey seems to confirm the fact that deliberate self-poisoning is a common form of behaviour. Extrapolation of these results from one month to one year suggests that in this period about 11 500 cases of deliberate self-poisoning will be seen in London casualty departments. The problem continues to be one predominantly of younger people: the mean age of the patients in this survey, in the 30s, is similar to that found in previous studies in which a peak incidence in the 20s age group has also been noted. All other studies have also reported a higher proportion of female patients.^{4 13}

Although demographic characteristics such as age and sex seem to have remained fairly constant during the last 10-15 years there have been changes in the types of drugs used in deliberate self-poisoning. Since 1962, when barbiturates were used in 55% of episodes,² there has been a steady decline in their use to 30% in 1970⁴ and to 13% in the present study. Their place as the principal drug of overdose has been taken by drugs such as non-barbiturate hypnotics, tranquillisers, and antidepressants. Direct comparison with other studies is difficult, as drugs are classified differently, but drugs other than barbiturates or aspirin were used by only 23% in 1962² and by 27% in 1966.³ In 1972¹⁴ 49% of patients used non-barbiturate hypnotics, tranquillisers, or antidepressants and in the present study these drugs were taken by 665 patients (70%). A relationship between the age of the patient and the drug used in deliberate self-poisoning has been noted previously—for example, Kessel² reported in 1965 that the percentage of those using barbiturates rose with age while the proportion of those using salicylates fell, and Morgan¹⁴ observed a similar trend in 1975. In the present study, however, non-barbiturate hypnotics and alcohol were taken by a significantly greater proportion of patients over the age of 40 years but there were no significant age-related differences in the use of barbiturates, antidepressants, tranquillisers, or "other" drugs.

The use of more than one drug occurred in at least 423 cases of deliberate self-poisoning (45%) in the London Casualty Survey, which is a much higher incidence than has previously been reported.^{15 16} The proportion of cases (24%) in which alcohol was used together with other drugs, particularly psychoactive ones, is very high. These trends of polydrug overdose and of alcohol use were also observed among the drug-dependent patients in the London Casualty Survey,¹⁷ who appeared to form a separate and identifiable group with a different age and sex distribution from non-dependent patients.

Although patients who take a drug overdose in a suicidal attempt or gesture and drug-dependent patients all present to casualty departments as cases of drug overdose, they are, in fact, two separate populations. Not surprisingly there is an area of overlap between them, shown in this survey by the fact that 95 (10%) of the patients who made a suicidal attempt or gesture were considered to be drug-dependent—a much higher proportion than has been observed before.^{3 4} The large group (11%) of those who took an "accidental" overdose probably included some patients whose overdose was deliberate, but who later denied their intention.¹⁸ In this paper only cases of deliberate self-poisoning, whether suicidal attempt or gesture, were considered so that a clear picture of this population could be obtained. Although these patients probably do form a separate group, it is one which overlaps not only with those who commit suicide¹⁹ but also with drug-dependent patients who take an overdose in the course of their addiction, and perhaps with those who take overdoses accidentally. A relationship between drug dependency and suicide has already been shown,¹⁹ and there may be further areas of overlap between the different populations described above.

To consider deliberate self-poisoning together with other reasons for drug overdose puts the problem in perspective. The massive increase in all of these aspects during the last 15 years has coincided with an increase in the prescription of tranquillisers, hypnotics, and antidepressants. As most overdoses concern prescribed drugs the problem is clearly, in the simplest sense of the word, iatrogenic ("resulting from the

activity of physicians").²⁰ Certainly it is an iatrogenic condition of incomparable magnitude. In 1966 Matthew²¹ described deliberate self-poisoning as "a major epidemic" and this appears to be continuing. But epidemic is defined as "prevalent among a people or a community at a special time, and produced by some special measures, not usually present in the affected locality,"²² so perhaps "endemic" is a more appropriate adjective to describe the present situation ("habitually prevalent in a certain country and due to permanent local causes").²² In the interest of preventive medicine the identification of these local causes, whether social or medical, or both, must surely be of the greatest importance.

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Asthma: analysis of sudden deaths and ventilatory arrests in hospital

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Summary

The incidence of episodes of unexpected ventilatory arrest, some of which led to sudden death, was studied in 1169 consecutive hospital admissions for asthma. Of the most acute cases, 458 were initially managed in a special care unit where only one ventilatory arrest occurred. A further nine cases of arrest, three of which proved fatal, happened on general wards. Accepted clinical criteria of a severe attack were not present in those episodes occurring outside the unit, which were apparently mild attacks. The risk of sudden death could not be related to the severity of the attack but it did correlate with the presence of excessive diurnal variation in peak expiratory flow rate (PEFR). Special treatment of patients with this sign might reduce mortality.

Introduction

Death may occur suddenly in asthma patients in hospital.¹ There is usually little information about the severity of the

premonitory attack and it is difficult to understand why some patients die. We therefore analysed asthma admissions to the Brompton Hospital to evaluate accepted criteria of acute attacks² as indicators of patients at risk of sudden death. We also studied the possible association of excessive diurnal variation in PEFR with sudden death. We included as potential sudden deaths episodes of sudden ventilatory arrest that were successfully treated by the resuscitation team. We called these "respiratory crises."

Treatment in specialised units may reduce mortality.^{3,4} To assess our own unit's effectiveness in preventing sudden death, we compared the fate of patients initially treated there for severe acute asthma with that of apparently less severe cases managed on general wards.

Patients and methods

The study was retrospective for two years from January 1974 to December 1975 and prospective for a further six months to June 1976. All patients admitted to adult wards with a diagnosis of asthma were studied. Retrospectively patients were located from a diagnostic index, and those who had been treated in the unit were cross-checked from unit records. A further check for asthma deaths was made by review of all death certificates. Prospectively admissions were monitored on the high dependency unit and general wards, and a further check for respiratory crises and deaths was made with ward sisters and the switchboard, who recorded calls for the resuscitation team.

CONFIDENCE OF DIAGNOSIS

Patients were classified into a "historical" group, in which diagnosis relied on a history of variable wheezy breathlessness, and a "physi-

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