

MEDICAL PRACTICE

Contemporary Themes

Patients with Acute Poisoning Seen in a General Medical Unit (1960-71)

ALEXANDER A. H. LAWSON, IAN MITCHELL

British Medical Journal, 1972, 4, 153-156

Summary

A review of the 637 out of a total of 941 consecutive cases of acute poisoning admitted to an acute medical unit without special facilities for the treatment of poisoning has shown that despite considerable limitations in the medical, nursing, and laboratory facilities available the results compare favourably with those reported from specialized units.

Introduction

Acute poisoning has reached epidemic proportions and is responsible for many acute medical admissions.^{1 2 3} The number of poisoned patients increases year by year and there is no evidence that the trend is altering. Official recommendations^{4 5} have been made that district and regional poisoning treatment centres should be established, but most patients with acute overdosage must still be treated in general medical units under the supervision of general physicians with the aid of local psychiatric services and routine diagnostic hospital laboratories.

The organization and work load of a regional treatment centre has been described,⁶ as has that of a district poisoning treatment centre.⁶ We therefore felt that it was appropriate to examine the work load involved in managing acute poisoning in a general medical unit without any special poisoning treatment centre and to report the results obtained.

General Medical Unit

The acute medical unit for West Fife (population about 130,000) consists of an 80-bedded ward area, and acute medical admissions including all patients over the age of 12 with acute poisoning, irrespective of the severity, are received into one of two modern 30-bedded wards each staffed by a sister supported by staff nurses, most of whom are part-time, and State-enrolled nurses. The medical staff consists of two whole-time consultant physicians, two registrars, and three house officers. The treatment facilities in the unit include cardiac monitoring and defibrillation, intermittent positive-pressure ventilation, and peritoneal dialysis. The routine diagnostic laboratory is centralized in another hospital 13 miles (21 km) away and has facilities for estimation of only barbiturate, iron, and salicylate levels and arterial blood gases. More extensive toxicological analysis is available in the toxicological laboratory, Royal Infirmary, Edinburgh, which is 15 miles (24 km) away.

The nearest casualty department is in another hospital in the group at a distance of two miles (3 km), and all patients with acute poisoning are assessed initially in the casualty department where gastric lavage, if indicated, is performed and any immediate resuscitative measures are taken. The patients are then transferred to the medical unit for subsequent management. The principles of treatment given throughout have been according to the intensive supportive therapy described by Matthew and Lawson.⁷ The psychiatric services for the area are based on a hospital about 25 miles (40 km) away, but all patients are assessed by a psychiatrist before discharge.

Method and Results

The study covered the years 1960-71. Details of the patients treated in 1970-1 were recorded prospectively and transferred to punched cards. For the other years the relevant information was obtained from the case records and again transferred to punched cards. The cards were then sorted by hand. More information

Millesmark Hospital, Dunfermline

ALEXANDER A. H. LAWSON, M.D., F.R.C.P., Consultant Physician
IAN MITCHELL, F.B., M.R.C.P., Medical Registrar

was available for the years 1965-71, and this period was analysed in more detail. The patients were classified into three basic types of poisoning—accidental, genuine attempted suicide, and self-poisoning.

The annual incidence of patients admitted with acute poisoning is shown in Table I. In the 12 years of the study 941 patients (327 males and 614 females) were admitted, amounting to 7% of the total general medical admissions during that time. Apart from some minor fluctuations the annual admission rate was fairly steady until 1968.

TABLE I—Sex Distribution of Acutely-poisoned Patients Admitted During 1960-71

	Year of Admission											Total	
	1960	61	62	63	64	65	66	67	68	69	70		71
No. of Males	5	24	25	30	21	23	24	21	19	36	50	49	327
No. of Females	39	46	35	49	30	34	30	52	51	48	86	114	614
Total	44	70	60	79	51	57	54	73	70	84	136	163	941

In the last three years of the study, however, there was a dramatic and progressive increase in incidence, and in this relatively short time there were 383 patients admitted (41% of the total poisonings). In 1960 acute poisoning accounted for 4% of all medical admissions, whereas in 1971 the figure was 12%. The relative numbers of male and female patients, however, remained remarkably steady throughout the period of review; females predominated in every year and accounted for 65% of the total.

The admission rates at different times of the year are shown in Table II. There was no seasonal variation. Only 39% of the poisoned patients admitted to hospital were referred by general practitioners. The remainder were either self-referrals or were taken to the casualty department by relatives, police, Samaritans, and other similar bodies. During 1965-71 300 patients (47%) were admitted during the night (Table III) and 292 (46%) arrived in hospital at the week-end (Table IV).

TABLE II—Time of Year the 941 Patients were Admitted (1960-71)

Month	Jan.-Mar. 232	Apr.-June 238	July-Sept. 242	Oct.-Dec. 229
No. of patients ..				

TABLE III—Time of Admission (1965-71)

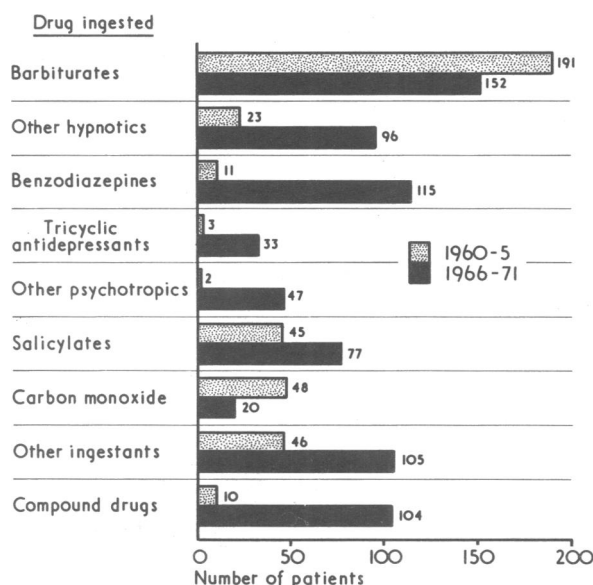
	Time of Admission			Total
	9 a.m.-9 p.m.	9 p.m.-3 a.m.	3 a.m.-9 a.m.	
No. of patients ..	337	219	81	637

TABLE IV—Day of Admission (1965-71)

	Day of Admission							Total
	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.	
No. of patients ..	99	105	59	82	79	99	114	637

PATTERN OF DRUG OVERDOSE

The types of drug taken altered over the years (see Chart). The changes are more striking when the period 1960-5 is compared with 1966-71; one important development being the increasing tendency for patients to take more than one drug, which may complicate clinical assessment of the patient. The total numbers of barbiturate overdosage had not altered much but the relative frequency of this poisoning had undergone appreciable change; in 1960 barbiturate poisoning constituted 70% of all poisonings, whereas in 1971 it accounted for only 22%. The increase in



Change in pattern of poisoning during 1960-71; some patients took more than one preparation.

incidence of "other hypnotics" in the second period was largely due to Mandrax (methaqualone and diphenhydramine). Striking increases in the second six-year period occurred in benzodiazepines, tricyclic antidepressants, other psychotropics, and other ingestants which included many widely-prescribed drugs such as analgesics other than salicylates, and antibiotics, and these groups of drugs were mainly involved in the overall increase in poisoning in recent years. In contrast carbon monoxide intoxication was less popular; so much so that in the years 1969-71 only four patients were admitted. Alcohol was involved in 93 cases (16%) in the period 1966-71.

MEDICAL MANAGEMENT

This was assessed from a detailed analysis of the data for the years 1965-71. Of the 637 patients (222 males and 415 females) suffering from acute poisoning 611 (96%) were successfully treated by intensive supportive therapy alone. Only 17 (2.7%) had special treatment to remove the poison and 9 (1.4%) died. The average length of stay was 3.2 days despite the routine psychiatric assessment before discharge.

The conscious levels and duration of coma are recorded in Tables V and VI. Altogether 170 patients (27%) had moderate

TABLE V—Grade of Consciousness (Criteria of Matthew and Lawson⁷ (1965-71))

	Grade					Total
	0	1	2	3	4	
No. of patients	135	332	42	71	57	637

TABLE VI—Duration of Unconsciousness (1965-71)

	Duration			Total
	Under 12 hours	12-24 hours	Over 24 hours	
No. of patients ..	90	45	35	170

or severe impairment of consciousness, and of these 80 were unconscious for prolonged periods. All 70 patients with salicylate overdosage were conscious but a large number were seriously ill, as was a significant proportion of those classified as "other ingestants."

Physical conditions present in the patients (Table VII) varied widely and included chronic cardiac, renal, and respiratory diseases, and also incurable neurological and neoplastic disorders in addition to the diseases itemized in Table VII. One hundred and seventy-six patients (28.3%) were affected in this way, and undoubtedly this contributed to both the mortality and morbidity which occurred. Despite this special methods to maintain respiration were necessary in only 50 (8%) (Table VIII) and maintenance intravenous infusions and supportive drugs, mainly to correct peripheral vascular failure and arrhythmias, were required in 50 (8%) and 56 patients (9%) respectively (Table IX). Cardiac resuscitation was required in four patients (0.6%) who developed cardiac arrest, and gastric lavage was administered in only 440 patients (69%).

In the period 1965-9 only six patients were transferred to specialized units for further care. Two of the six had severe uraemia requiring haemodialysis, three developed severe respiratory difficulties and were transferred for mechanical ventilation,

TABLE VII—Existing Physical Conditions Associated with Poisoning (1965-71)

	Trauma	Epilepsy	Pregnancy	Other Existing Medical or Surgical Condition	Total
No. of Patients	8	30	22	116	176

TABLE VIII—Methods Used to Maintain Respiration (1965-71)

	Airway Maintained with or without Oropharyngeal Tube	Endotracheal Tube	Mechanical Respirator	Tracheostomy
No. of Patients	589	34	14	2

TABLE IX—Other Special Methods of Treatment (1965-71)

	Gastric Lavage	Maintenance Intravenous Infusions	Forced Diuresis	Supportive Drugs	Cardiac Resuscitation
No. of Patients	440	50	17	56	4

TABLE X—Deaths from Acute Poisoning (1965-71)

Case No.	Year	Age and Sex	Drug Involved	Comments
1	1965	60 F.	Barbiturate	Cerebral arteriosclerosis. Moribund on admission
2	1966	67 M.	Barbiturate	Cerebral arteriosclerosis. Grade 4 unconscious for 5 days. Tracheostomy performed
3	1967	21 F.	Carbon monoxide	Anuric and grade 4 unconscious. Transferred for renal dialysis, suffered cardiac arrest, subsequently deteriorated. Necropsy evidence of cerebral death many hours before death of rest of body
4	1968	37 F.	Sulthiame, methoin, salicylate	Epileptic. Grade 4 unconscious on admission. I.P.P.V. Tracheostomy performed 50 hours after admission. Spontaneous respiration re-established after 72 hours but then several episodes of cardiac arrest
5	1968	54 F.	Barbiturate	Initially treated with I.P.P.V., subsequent spontaneous respiration. I.P.P.V. restarted after cardiac arrest. Ventilation discontinued because of irreversible brain damage
6	1970	83 M.	Codeine, barbiturate	Recovered consciousness after 36 hours. Developed bronchopneumonia and died
7	1970	52 F.	Barbiturate	Rheumatic heart disease. Deteriorated 36 hours after admission and I.P.P.V. ventilation started. Became hypotensive and died
8	1970	69 M.	Barbiturate	Chronic bronchitis. I.P.P.V. for 5 hours, then conscious level improved and I.P.P.V. discontinued. Subsequently collapsed suddenly and attempted resuscitation unsuccessful
9	1971	54 F.	Barbiturate, chlorpromazine	Epileptic, anaemic (not macrocytic), mitral regurgitation. Improved after admission, then had cardiac arrest in asystole. I.P.P.V. restarted, and several further episodes of cardiac arrest. Evidence of myocardial infarction

I.P.P.V. = Intermittent positive pressure ventilation.

and one patient developed an incidental abdominal emergency requiring laparotomy. With improvements in treatment facilities, particularly in intermittent positive-pressure ventilation, there were no transfers for special medical care in 1970-1 despite the sharp increase in admission rate.

During these seven years nine patients died (Table X), and these figures include any patient who died even if death occurred after transfer to another unit. All but one of these patients (Case 3) had important existing medical conditions which contributed to their deaths. The remaining patient was otherwise healthy.

TABLE XI—Psychiatric Factors Associated with Poisoning in 637 Patients (1965-71)

	Neurosis	Psychosis	Personality Disorder	Sub-normality	Alcoholic or Drug Addict	No Psychiatric Illness
No. of patients	132	73	86	14	22	310

USE OF LABORATORY

Salicylate and iron poisonings were the only common types of poisoning in which the serum levels were used as a criterion to start special methods of treatment designed to remove the poison. For similar reasons the serum levels of these drugs were used subsequently to monitor the effectiveness of these types of therapy once started. In the years 1970-1 salicylate levels were measured in the ward side-rooms with Lovibond comparator discs, and blood specimens were not routinely sent to the laboratory for this purpose. The only other toxicological investigation readily available to us was the blood barbiturate level, which was used on occasions to confirm the diagnosis when this was in doubt from a clinical point of view. Requests were made very infrequently to the regional toxicological laboratory (only once in 1971), but of course as with any other ill patient arterial blood gas analysis, blood urea, and electrolytes and other standard diagnostic estimations were requested freely when needed. From the toxicological point of view, therefore, our use of the laboratory was minimal.

PSYCHIATRIC MANAGEMENT

From 1965 to 1971 488 cases (77%) were regarded as self-poisoning, 126 (19%) as genuine attempted suicide, and 23 (3%) as accidental poisoning. One hundred and ninety-two patients (30%) had had previous formal psychiatric treatment and 136 (21%) had previously taken an overdosage of drugs. The psychiatric diagnoses made in the 637 patients are shown in Table XI. Altogether 310 patients (48.7%) were regarded as free of psychiatric disease. Of the remainder the commonest type of mental illness was neurosis (132; 20.6%). Psychosis accounted for 73 (11.4%) and personality disorders were found in 86 (13.5%). Only 14 patients (2.2%) were suffering from sub-normality and 22 (3.5%) from alcoholism or drug addiction.

One hundred and sixty-three patients (35.6%) were subsequently treated as psychiatric inpatients and 179 (28.1%) were supervised on a psychiatric outpatient basis. No formal arrangements were thought necessary for the remaining 295 patients (46.2%) and they were returned to general-practitioner care.

Discussion

The number of patients admitted each year because of acute poisoning in the West Fife area had risen by 370% since 1960, which is similar to the increase reported from Newcastle by Sydney Smith and Davison.⁸ A similar rise was reported by

Burston⁶ from the Sunderland area, and clearly from several other recent studies from various teaching hospital centres⁷⁻¹² this steady and dramatic increase in incidence is occurring nationally. The evidence suggests that self-poisoning will continue to increase and that it will provide an increasing burden on the hospital services throughout the country. Previous reports have all been from teaching hospital centres or large district general hospitals where special arrangements for the treatment of poisoned patients have been made. In view of the recommendations of the Hill report⁵ that poisoning treatment centres should be established, staffed, equipped, and designated throughout the country it is pertinent to consider what can be achieved in a small local general medical unit which is some distance from its laboratory services and psychiatric services and even from its local casualty department.

In contrast to the other reports, which are from areas of high density population, this unit serves a mixed small urban and rural population, and this may explain some of the differences which we found, particularly regarding the pattern of incidence. In the reports mentioned above there was found a steady and progressive increase in the annual admission rate throughout the 1960s. In this area the number of poisoned patients admitted each year was remarkably steady until about 1969, since when there was a rapid and progressive increase. Certainly throughout this period there was no alteration in the admission policy to the unit and so far as can be ascertained no change in the approach of the local general practitioners to referral to hospital for these patients. In any event in recent years most poisoned patients have found their way to hospital by means other than general-practitioner referral. In keeping with the experience of others² we found that a large number of these patients arrived during the night and at week-ends, which is particularly important in a district hospital as it is at these times that there tends to be a shortage of medical and nursing personnel. Despite this the mortality was low and compares very favourably with that reported previously.²⁻¹² This was achieved simply by the careful application of standard forms of treatment of intensive supportive therapy and, particularly in recent years, with improvement in the therapeutic facilities within the unit it was not found necessary to transfer any patient to more specialized departments in the Edinburgh teaching centre.

It is interesting to note the changing patterns in drug overdosage and in particular the rise of anxiolytic agents and other psychotropic drugs accompanied by a relative fall in popularity for barbiturates. This was the experience described in most other recent reports.²⁻⁸ Undoubtedly this was due to the increasing availability of these drugs and reflects a change in medical prescribing largely due to the influence of advertising and medical literature. Also another major factor is that these drugs are prescribed for the very patients who are most likely to indulge in self-poisoning.

From the psychiatric point of view the results found in the study also compare very favourably with those reported from specialized and highly-staffed units.²⁻¹⁴ Despite the lack of immediate psychiatric support the average duration of stay in the medical unit and the incidence of repeat overdosage over the years was the same as reported elsewhere. In the types of psychiatric disorder found it is interesting to note the relative in-

frequency of chronic alcoholism and drug addiction, which is considerably less than from areas of large conurbation, and this no doubt is another reflection of the type of population served by this unit.

In view of the many other priorities which place demands on Government funds for the health services in this country it seems unnecessary to implement in full the recommendations of the Hill report. The results of intensive supportive therapy,² which is simply the application of good medical practice, show that it is possible to treat successfully the vast majority of acutely-poisoned patients in any general medical unit. The results also show that with co-operation and enthusiasm psychiatric services, even when working under great difficulties such as is the case in this area, can meet the needs of these patients. There are, of course, special problems involved in managing such patients in a general medical ward, and in particular the nursing staff often have difficulty in coping with the psychiatric and emotional problems which arise. These problems often seem trivial when other patients in the same ward are seriously ill with physical disease and require frequent attention. Much depends, therefore, on the interest and consideration shown by the medical staff, but this is no more than any patient deserves.

It would be wrong, however, to conclude that special regional and district poisoning treatment centres are not required. Only in such specialized areas is it possible to conduct sophisticated toxicological and epidemiological studies into poisoning and thereby develop new techniques of treatment and provide an early warning system for the medical profession. Within these limitations, in large hospital centres where medical units are organized on a specialized basis the conclusions of the Hill report remain justified.

Dr. K. Sinclair, Milesmark Hospital, Dunfermline, kindly allowed us to study patients under his care. We are also grateful to Dr. R. Barclay and to Dr. A. D. B. Harrower for their help in compiling some of the data presented, and also to our medical and nursing colleagues for their continued support during this study.

References

- 1 Ellis, G. G., Comish, K. A., and Hewer, R. L., *Practitioner*, 1966, 196, 557.
- 2 Matthew, H., Proudfoot, A. T., Brown, S. S., and Aitken, R. C. B., *British Medical Journal*, 1969, 3, 489.
- 3 Matthew, H., and Lawson, A. A. H., *Treatment of Common Acute Poisonings*. Edinburgh, Livingstone, 1970.
- 4 Central Health Services Council, *Emergency Treatment in Hospital of Acute Poisoning*. London, H.M.S.O., 1962.
- 5 Central and Scottish Health Services Councils, *Hospital Treatment of Acute Poisoning*. London, H.M.S.O., 1968.
- 6 Burston, G. R., *British Medical Journal*, 1969, 1, 679.
- 7 Matthew, H., and Lawson, A. A. H., *Quarterly Journal of Medicine*, 1966, 35, 539.
- 8 Sydney Smith, J., and Davison, K., *British Medical Journal*, 1971, 4, 412.
- 9 Evans, J. G., *British Journal of Preventive and Social Medicine*, 1967, 21, 97.
- 10 Graham, J. D. P., and Hitchens, R. A. N., *British Journal of Preventive and Social Medicine*, 1967, 21, 108.
- 11 Linton, A. L., Luke, R. G., and Briggs, J. D., *Lancet*, 1967, 2, 377.
- 12 Mawer, G. E., and Lee, H. A., *British Medical Journal*, 1968, 2, 790.
- 13 *British Medical Journal*, 1967, 1, 519.
- 14 Greer, S., and Bagley, C., *British Medical Journal*, 1971, 1, 310.