Original Paper

Necessity of Regional Surveys of Poisoning Scenario for Establishing Clinical Toxicology Units in Major Hospitals

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ABSTRACT

A clinical toxicology unit (CTU) is the functional union of two or more hospital professionals who combine their efforts for the generic purpose of improving the treatment of poison victims who go to a hospital for acute or chronic exposures. Clinical analytical toxicology is one of the most essential parts of CTU in treatment of patients poisoned with drugs or toxic chemicals in hospitals.

The police morgue of Department of Forensic and State Medicine, NRS Medical College, Kolkata received over 288 cases during the period May 2013 to April 2014. This study aims to analyze the data compiled during this period on different types of poisoning cases undertaken for postmortem examination, as also from medical history records. A total of 288 forensic toxicological cases were received from nine different districts, of which 134 (47%) were hospital-admitted cases. 127 cases (44%) were of unknown poisoning, while snakebites accounted for 57cases (20%), heavy metal-related for 38 cases (13%), alcohol-related for 22 cases (7%), and pesticides (mostly organophosphorus) for 30 cases (10%).

The State Forensic Science Laboratory is unable to provide clinical toxicology services due to inadequate resources and lack of awareness in clinical toxicology procedures. It is expected that a separate clinical toxicology set up will help clinicians to treat poisoned patients in the hospital in a more effective manner if facility for clinical analytical toxicology service is provided.

Key Words: Clinical toxicology; Analytical toxicology; Poisoning

INTRODUCTION

Over the last few years, a tremendous upsurge has occurred in the chemical and pharmaceutical industry sectors, which has undoubtedly proven to be not only of great benefit to mankind, but also resulted in an increased danger of exposure to hazardous products, with consequent increased incidence of poisoning. An average human being's daily life takes place alongside strong chemicals, whether in the home, at the workplace, or in agriculture practices. The environment is increasingly being heavily polluted with organic and inorganic wastes. In short, everyone is the potential target of a toxic agent, regardless of sex, age or profession. Acute poisoning is a common reason for presentation to hospital. Fortunately, many poisoned patients make full recovery without specific treatment. However, in the case of some common poisons, it is important to establish a clear diagnosis for guiding treatment.

Chronic poisonings are more difficult to evaluate and quantify. Their insidious symptoms, non-specific and sometimes multiorganic manifestations, along with a frequent lack of association with an external toxic agent hamper diagnosis, resulting in official figures, mostly involving the workplace, that undoubtedly underestimate the scope of the problem.

The wide variety of potential toxic agents, and the fact that some of the most dangerous appear infrequently,

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make it essential that diagnostic protocols and suitable therapies be readily available. The availability of reliable analytical facilities can greatly assist in this aspect, as also in other clinical areas such as assessing illicit drug use and management of environmental toxins, as well as in the management of incidents related to the accidental or deliberate release of chemicals into the environment (chemical incidents) and other aspects of chemical safety. However, clinical toxicology is generally neglected in public healthcare, both in and out of hospitals, which has had negative repercussions in treatment, education and research. It is this gap that setting up of specialized Clinical Toxicology Units can aim to fill.

An essential preliminary to the task of establishing an analytical toxicology service under CTU is to undertake a detailed survey of the perceived toxicological problems encountered in the region. These problems may be clinical (not only acute poisoning, but also adverse effects of medication and substance abuse), forensic, and occupational or environmental.

MATERIALS AND METHODS

In the present survey, a prospective study of the cases that had died due to poisoning during the period May 2013 to April 2014, and subsequently subjected to autopsy in the Department of Forensic and State Medicine (FSM Dept) of NRS Medical College & Hospital, Kolkata has been done. The cases were analyzed for different types of poisons involved category-wise across age groups and sex. The cases were received from different districts, and special emphasis was given to unknown poisoning. During this period, a total of 2800 cases were brought for autopsy at FSM Dept of NRS Medical College & Hospital. Of these, 288 cases were brought with alleged history of poisoning. These were investigated for trend and nature of poisoning. Of the 288 cases, 187 cases in the year 2013 and 101 cases in 2014 were brought for autopsy. The cause of death was kept pending for chemical analysis in all poisoning cases after autopsy, and final opinion regarding the cause death was given on receipt of chemical analysis report. We received reports of chemical analysis in only 30 cases at the time of going for publication of the results of this survey. Moreover, reports on 158 cases have not yet been received, indicating the scope of the problem of inability of the State Forensic Science Laboratory in handling so many forensic cases in timely manner, leave alone clinical toxicology samples.

RESULTS AND DISCUSSION

During the period May 2013 to April 2014, a total of 2800 cases were brought for autopsy at FSM Dept of NRS Medical College, Kolkata. Of these, 288 cases were of poisoning, of which 127 cases (44%) were due to unknown poisoning, 38 cases (13%) were metal-related, 22 (7%) alcohol-related, and pesticides (mostly organophosphorus) comprised 30 cases (10%). Out of these cases, 154 (53%) had not been admitted to hospital; within a few hours after ingestion of poison they had died. Maximum cases were in the age group 21–30 years accounting for 76 cases (26% of the total age groups), and 11-20 yrs accounted for 56 cases (20%). Males accounted for 204 cases (71%), whereas females account for 84 cases (29%). Most of these cases received were from South 24 (96 cases or 33%), followed by Kolkata (58 cases or 20%) and Nadia (56 cases or 20%).

The opinion in each case was furnished based on the history of ingestion of poison and postmortem findings supported by chemical analysis. Unknown cases were those in which reports relating to chemical analysis were not confirmatory and there was history of ingestion of unknown poison.

The State Forensic Science Laboratory in Kolkata is currently facing problems in providing clinical toxicology services due to inadequate resources, manpower, and lack of awareness in clinical toxicology procedures. It is expected that a separate clinical toxicology set up in every major hospital will help clinicians to treat poisoned patients in a more effective manner if facility for clinical analytical toxicology service is provided.

CONCLUSION

Most poisoned patients can be treated successfully without any contribution from the laboratory other than routine clinical biochemistry and haematology. This is particularly true for those cases where there is no doubt about the poison involved and the results of quantitative analysis would not affect therapy. However, toxicological analysis can play a useful role if the diagnosis is in doubt, the administration of antidotes or protective agents is contemplated, or the use of active elimination therapy is being considered.

Existing forensic science laboratories are struggling to handle even forensic samples, let alone take up clinical cases. It is therefore imperative that major hospitals set up clinical toxicology units (CTUs) with analytical facility to improve management of poisoning cases.

Table 1: Data relating to nature and incidence of poisons

Type of Case	No. of Cases	Percentage
Snakebite	57	20
Alcohol	22	7
Heavy metal	38	13
Insecticide	30	10
Kerosene	2	1
Pharmaceuticals	2	1
Copper sulphate	4	1
Food poison	2	1
Carbolic acid	2	1
Rodenticide	2	1
Unknown	127	44
Total	288	100

Table 2: Data relating to West Bengal districts covered in the survey

District	No. of Cases	Percentage
South 24	96	33
North 24	23	8
Nadia	56	20
Kolkata	58	20
East Mednipur	13	5
West Mednipur	4	1
Burdwan	7	3
Murshidabad	18	6
Malda	1	1
Hooghly	11	4
Howrah	1	1
Total	288	100

Practical aspects of collection, transport and storage of samples appropriate to a particular type of analysis is very important. Tests for any poison that the patient is thought to have taken and for which specific treatment is available would have to be designed for toxicology screening. Of course, an attempt must always be made to correlate the laboratory findings with clinical observations. The CTU should incorporate several types of healthcare professionals (doctors, nurses, pharmacists, biologists and others) who in their day-to-day activities attend to poisoned patients in one way or another.

ACKNOWLEDGEMENT

The authors wish to acknowledge the help received from the Head of the Department of Forensic & State Medicine, Nilratan Sirkar Medical College, Kolkata in conducting this survey.

REFERENCES

1. Pillay VV. Textbook of Forensic Medicine & Toxicology, 14th ed., 2004. Hyderabad: Paras Publishing. pp350–352,479–-481.
2. Broussard L. Inhalants. In: Levine B, ed. Principles of Forensic Toxicology; 1999. Washington DC: AACC Press; p346.
3. Tiwari PK. A study of existing and emerging trends in poisoning in Surat city. *J Indian Acad Forensic Med* 1996;18:24–28.
4. Reddy KSN. The Essentials of Forensic Medicine & Toxicology, 24th ed., 2005. Hyderabad: K Sugunadevi; pp419–423.
5. Flanagan RJ, Brown SS. Basic Analytical Toxicology; 1995. World Health Organization; pp6–10.
6. Mokhlesi B, Leikin JB, Murray P, et al. Adult toxicology in critical care. Part II: Specific poisonings. *Chest* 2003;123:897–922.