

# Acute poisoning: an epidemiological and clinical profile and analysis of the digestive tract decontamination techniques used in emergency departments in Spain in 2006– the HISPATOX study

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**Introduction:** Epidemiological multicentre studies on acute poisonings attended at hospital emergency departments (ED) in Spain are scarce. There is significant heterogeneity among inclusion criteria, as concept of poisoning, age of patients, toxics registered, and admission reasons. Besides, few studies have assessed the application of digestive decontamination technologies in emergency departments, and the applicability/follow-up of European Association of Poison Centres and Clinical Toxicologist/American Academy of Clinical Toxicology guidelines.

**Material and methods:** Prospective multicentre cross-sectional national study of acute poisonings attended in 24 hospital emergency departments during 1 year (September 2005-August 2006). Each six days 24-hour information was collected beginning at 8:00

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A.M. The study included the total of patients with digestive exposition to toxics, and collected information related to demographic characteristics, assistance period, type of assistance received before arriving to the hospital, type of poisoning, symptomatology at admission, treatment of digestive rescue and patient destiny.

**Results:** A total of 2245 patients with a mean age of 35.77 years (SD 15.75) and moderate prevalence of males (59.6%) were enrolled. Among all patients 51.2% presented directly to the Hospital and one third of them were assisted primarily by the Emergency Medical Systems; 35.6% arrived to the emergency department within an hour and 78.2% within 4 hours. The rate of patients symptomatic was 18.7%. Digestive decontamination was done in 29.84% of the sample. The most used technology was one or repeated doses of coal (45.98%) followed by nasogastric or orogastric probe in equal percentage (45.22%). A single dose of active coal was the technology most commonly used (41.2%), being applied in 12.3% of all poisoned patients. About 58.84% of patients were discharged from emergency department within 12 hours. The observation extended until 12 P.M. in 21.45% of cases. The rate of patients admitted to hospital was 14.1% (ICU 2.3%, conventional wards 3.5%, psychiatry department 3.7%). The corresponding figures for patients transferred to other centers were 4.6%.

**Conclusions:** For the first time in Spain active coal is the method of digestive decontamination most used in acute digestive poisoning, improving the intervals of assistance in ED. [Emergencias 2008; 20: 15-26]

**Key words:** Acute poisoning. Gut decontamination. Activated charcoal.

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## Introduction

Acute poisoning is one of the most common conditions found in Emergency Medicine<sup>1</sup> and these patients are predominantly treated in primary care emergency departments, in medical emergency system ambulances and in hospital emergency departments (HED). In the case of HEDs, patients either go there directly for treatment or arrive there having already passed through a primary care emergency department or ambulance<sup>2,3</sup>.

In Spain there are few epidemiological studies on acute poisoning treated by these hospital services. Furthermore most only refer to one hospital<sup>4,7</sup> and as a result multi-centre studies are scarce<sup>8,9</sup>. In addition, the samples studied in multi-centre studies are often biased or are not general enough given that they either only analyse patients who have been admitted to intensive care units, which means that they overlook the majority of cases of acute poisoning<sup>10-12</sup>, or the sample only includes patients from a single region<sup>13-15</sup>.

The inclusion criteria for the different studies are also diverse and the definition or concept of poisoning varies from one to another. The ages of the patients included in the study, the toxic substances recorded and the admission criteria also varies<sup>16,17</sup>. The objectives of the studies differ as well as the way the data used is collected which contributes to the lack of diagnostic codes in the HED<sup>18</sup>. For all these reasons, it is difficult to compare the different studies available and obtain a general profile of the incidence and characteristics of this acute condition in Spain<sup>19</sup>.

In contrast with the situation in the United States, where most cases of poisoning are dealt with over the telephone and recorded in Poison Control Centres<sup>20-22</sup>, the Department of Toxicology of the National Toxicology Institute only receives 30% of the cases that are sent from the Health Care System, including primary care and hospitals, sometimes unnecessarily, and as a result the registered activity can only offer a limited perspective on the care given to patients suffering from poisoning in emergency departments in Spain<sup>23</sup>.

Apart from life support measures that should be considered for any emergency patient, the treatment of acute poisoning is based on three pillars: the reduction and absorption of the toxic substance, increased elimination and blocking of its effects on the target organs by using specific antidotes. Other important aspects of care for patients with poisoning are related to the medical history, which should focus on toxicology and is often carried out at the same time as life support techniques, the treatment of toxic complications (arrhythmias, coma, high blood pressure, etc.), a psychiatric evaluation in cases of attempted self harm, the implementation of preventative measures in the home, collaboration in legal/forensic investigations and counselling or social guidance for young people<sup>19</sup>.

As in any branch of medicine, the most important measures that should be taken to avoid poisoning and reduce mortality are preventative and are essentially linked to aspects such as labelling, the storage of certain substances in the home and at work, limi-

ting the availability of medicines for those patients with a tendency to self harm, early treatment of depression and raising awareness about these medical issues etc.<sup>9</sup>.

Out of all the possible care options, one of the main elements of treatment from a clinical point of view is the reduction in the absorption of the toxin, both because this is easy to do and because it can greatly reduce the level of seriousness of the poisoning<sup>24</sup>.

In 1997 the Digestive Tract Decontamination guidelines were drafted by the European Association of Poison Centres and Clinical Toxicologist/American Academy of Clinical Toxicology (EAPCCT/AACT)<sup>25-28</sup> and were subsequently revised in 2004<sup>29-33</sup>. They were based on the level of scientific evidence available at the time and recommended that digestive tract decontamination techniques should be carried out within the first 60 minutes after the toxin had been ingested. The guidelines also highlighted the usefulness of each of the techniques.

In Spain, few studies have analysed the specific use of digestive tract decontamination techniques in emergency situations or the usefulness/monitoring of the aforementioned international recommendations. As far as we are aware projects like MULTICATOX<sup>34</sup>, SEMESTOX<sup>35</sup> and more recently, CALITOX<sup>36,37</sup> have been carried out by members of the Clinical Toxicology Group of the Spanish Society of Emergency Medicine and the Clinical Toxicology Department of the Spanish Toxicology Association.

The objective of this study is to prospectively analyse the current application of digestive tract decontamination techniques in hospital emergency departments and out-of-hospital settings in Spain.

## Method

This study is based on a subgroup of patients of the HISPATOX STUDY: a prospective cross-sectional national multi-centre study on cases of acute poisoning treated in hospital emergency departments around Spain. The study lasted 12 months and began collecting data on 1st September and finished on 31st August 2006.

Thirty-four secondary and tertiary care hospitals were selected from all the autonomous communities in Spain.

The data was collected consecutively every 5 days for a period of 24 hours, from 08:00 to 08:00 the following day. Given the duration of the study and the breaks for collecting information, a mobile phone text message was sent 24 hours before the data was due to be gathered

and another afterwards using e-mail to all the head researchers in each of the centres involved in the study.

The inclusion/exclusion criteria are shown in Table 1. A specific form was created for gathering data which had been validated in a previous study<sup>35</sup> making data collection "at the foot of the bed" in the emergency department easier. Afterwards one researcher converted all the forms into electronic format using an Access database.

The information related to patients who had been exposed to a toxin via the digestive tract was used for this study. The following parameters in the general questionnaire were analysed:

- Demographic characteristics of the patient: centre, age, day of the week, month and time of arrival at the emergency department.
- Time elapsed before seeking medical care (ranges:  $\leq 30$ minutes,  $\leq 1$  hour,  $> 1$  hour).
- Did the patient receive any care before arriving at the hospital emergency department?
- Type of poisoning: voluntary, accidental, work-related, overdose, drugs, alcohol only.
- Symptoms on admission (presence of symptoms).
- Cause of accidental poisoning: the toxic substance was not in its original container, error in prescription or dispensing, misinterpretation, unknown and other.

**Table 1.** Inclusion/exclusion criteria

### Patients of any age with a diagnosis of acute poisoning:

- The diagnosis of poisoning was established based on the medical history (exposure to or ingestion of xenobiotics) and/or clinical symptoms.
- Supported by toxicology tests when necessary.
- Cases where an initial diagnosis of poisoning was not made but was later established following tests were also included.

### Types of toxins:

- Medication, illegal drugs, domestic, personal, agricultural or industrial products.
- The ingestion of caustic or irritant substances.
- The ingestion of any kind of batteries or the transportation/concealment of drugs in the digestive tract.
- Alcohol intoxication, when this is the reason for the visit.
- Natural poisons which may come from plants or animals. In the case of the latter, only snake bites, spider bites, jelly fish stings and sea spider bites were included.
- For poisoning related to medication, the ingested amount had to be higher than the maximum daily treatment dose.

### Excluded cases:

- Adverse reaction to medication or side effects to certain drugs.
- Chronic poisoning.
- Food poisoning or food-related infection.
- Patients who had ingested an amount of medication that was not higher than the maximum daily treatment dose.
- Patients that were dead on arrival or pronounced dead despite suspicion that death may have been caused by poisoning.
- Insect bites/stings.
- Ingestion of inert foreign bodies.

**Table 2.** Variables in the questionnaire

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- Affiliation (code) and demographic characteristics of the patient.
- Time elapsed before seeking medical care
- Care received before coming to the emergency department.
- Type of poisoning: voluntary, accidental, work-related, overdose, drugs, alcohol only.
- Type of toxin: medication, domestic product, drug abuse, alcohol, agricultural or industrial products, bites/stings, mushrooms, plants, gas.

Circumstances of the poisoning:

- Place.
- How the toxin entered the body.
- How the toxin was obtained.
- Cause of accidental poisoning.
- Previous cases of poisoning.

- Symptoms on admission.
- Treatment administered.
- Toxicology analysis.
- Diagnosis.
- Destination.

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- Digestive tract rescue treatment administered: ipratropium bromide, gastric content aspiration without lavage, gastric lavage with an oro-gastric catheter, dilution, a single dose of activated charcoal and repeated doses of activated charcoal.

- Has extraction from the digestive tract been successful? (remains of the ingested product that could be visually identified was considered a successful result depending on the method of digestive tract rescue used).

- Patient destination: home (less than 12 hours in the emergency department), home following observation in the emergency department > 12 hours, admission to a conventional ward/room, admission to the ICU, admission to the psychiatric unit, moved to another centre, voluntary discharge, fled from hospital, death.

The statistical programme SPSS 14.0.1 for Windows was used for statistical analysis (SPSS Inc. Chicago, Illinois, USA). The data are expressed in frequency tables and include percentages, means and standard deviations (SD). We used the Chi-square test to compare proportions and the Mann Whitney U test to compare ranges. For the non-parametric statistics we used the Kruskal-Wallis test.

## Results

Twenty-four emergency departments (Table 3) contributed data throughout the whole period of the study. A total of 2,981 cases of poisoning were registered and 2,245 corresponded to the digestive tract and became the subject of this study (Table 4). By updating the study every 73 days an incidence of almost 11,225 cases involving the digestive tract

may be observed per year, representing 31 patients poisoned per day in the centres participating in this study.

### *Demographic characteristics and temporal distribution*

The cases of each hospital are shown in Figure 1. Each centre contributed an average of 93.45 cases of poisoning via the digestive tract (SD 65.16, range 13- 317). The average percentage of cases per centre was 4.16% (SD 2.9%), with Hospital Clínic in Barcelona observing the highest number of cases (14.12%). The average age was 35.77 years (SD 15.75), 38 cases involved patients under the age of 3 (7 under one year of age and 22 under the age of 24 months) and 59.6% of cases involved men. There were no differences in age with regard to sex (36.62 for men versus 34.76 for women).

The number of cases per month can be seen in Figure 2A. An increase in cases was observed between July and October. When the cases were distributed according to the type of poisoning (Figure 2B) it was found that most cases registered during the summer months were caused by alcohol and illegal drugs, although the former began to increase again during December.

On analysing the days of the week, we can see that there was a mean of 285 cases of poisoning via the digestive tract on each day of the week (SD55.93). The type of poisoning and the distribution throughout the week are shown in Table 5. Non-alcohol related voluntary poisoning was most common (50.2%), followed by alcohol related poisoning (29.7%) and illegal drugs which was much less common (9.4%) and accidental poisoning.

The distribution throughout the week showed a higher number of cases at weekends, from Friday to Sunday ( $p < 0.001$ ), essentially because of drugs and alcohol, and less commonly, voluntary poisoning (Figures 3A and 3B).

With regard to the time the patient came to hospital, the time span from 13:00 to 05:00 generally covered most of the cases (Figure 4A). On breaking down the times at which the patients came to the hospital and taking into consideration the type of poisoning (Figure 4B) some interesting variations may be observed: cases of voluntary poisoning increased from midday onwards, and were constant until 02:00, while alcohol related poisoning was more common from 19:00 onwards and rose again at around 02:00, falling after 06:00.

### *Clinical and treatment characteristics*

With regard to the initial care received by the patient, 51.2% came directly to the hospital, one

**Table 3.** Centres participants in the HISPATOX Study

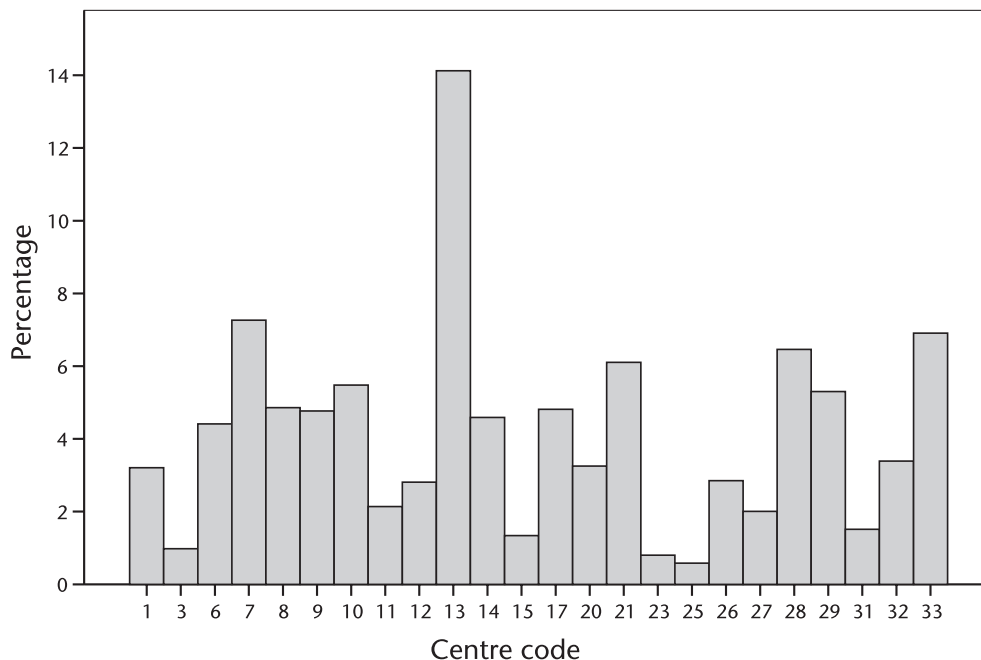
Autonomous Community	Hospital	City	Centre code	Health care level
1. Andalusia	Hospital Reina Sofía	Cordoba	1	3
2. Andalusia	Hospital de Valme	Seville	3	2
3. Aragon	Hospital Clínico Lozano Besa	Zaragoza	29	3
4. Balearic	Hospital Son Dureta	Palma de Mallorca	6	3
5. Balearic	Hospital Can Misses	Ibiza	33	2
6. Canary	Hospital Univ. de Canarias	Tenerife	7	3
7. Cantabria	Hospital Marqués de Valdecilla	Santander	8	3
8. Castile-La Mancha	Hospital de Santa Bárbara	Puertollano	25	2
9. Castile-Leon	Hospital de León	Leon	9	2
10. Castile-Leon	Hospital Clínico de Salamanca	Salamanca	10	3
11. Castile-Leon	Hospital de Segovia	Segovia	11	2
12. Castile-Leon	Hospital del Río Hortega	Valladolid	12	3
13. Catalonia	Hospital Clínic	Barcelona	13	3
14. Catalonia	Hospital Mutua de Terrasa	Tarrasa	14	3
15. Catalonia	Hospital del Espíritu Santo	Sta. Coloma de Gramanet	26	2
16. Catalonia	Hospital Virgen de la Cinta	Tortosa	27	2
17. Extremadura	Hospital Virgen del Puerto	Plasencia	15	2
18. La Rioja	Hospital San Millán	Logroño	17	2
19. Navarre	Hospital de Navarra	Pamplona	20	3
20. Basque Country	Hospital Donostia-Donostiako Ospitalea	San Sebastian	21	3
21. Basque Country	Hospital de Zumárraga	Guipuzcoa	23	2
22. Valencia	Hospital Gral Universitario	Valencia	28	3
23. Valencia	Hospital Marina Alta	Denia	31	2
24. Valencia	Hospital General Universitario de Alicante	Alicante	32	3

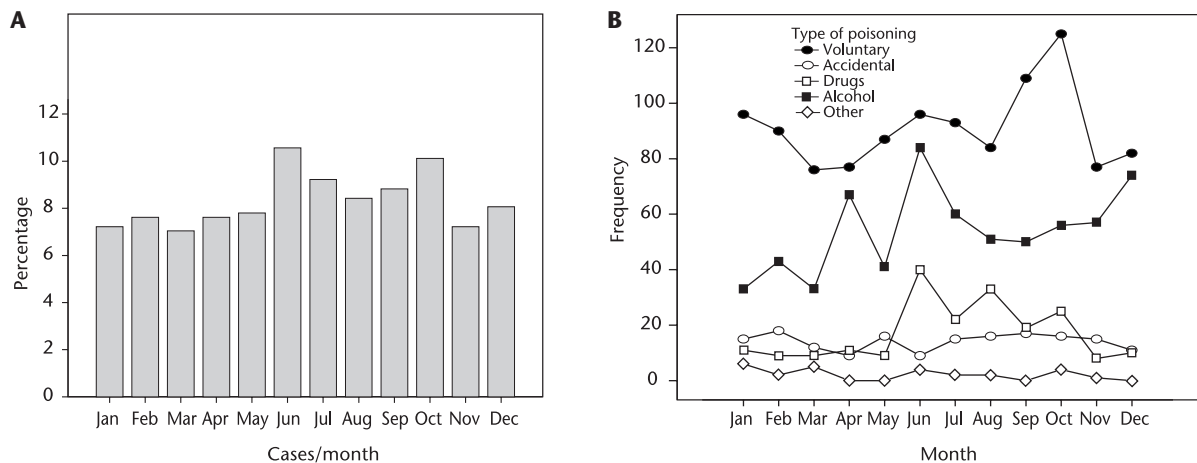
**Table 4.** How the toxins entered the body

	Frequency	Percentage
Digestive tract	2,245	77.7
Inhaled	346	12.0
Skin	41	1.4
Eyes	34	1.2
Vein	42	1.4
Other	8	0.3
Blank	201	6.9

third were first seen by the medical emergency systems and the rest in primary care or in other hospitals (Table 6). This parameter was recorded in 94.4% of cases.

The same did not occur with regard to the time elapsed before seeking medical care, which was recorded for 1,270 patients (56.6%) with 35.6% of patients coming to the emergency de-

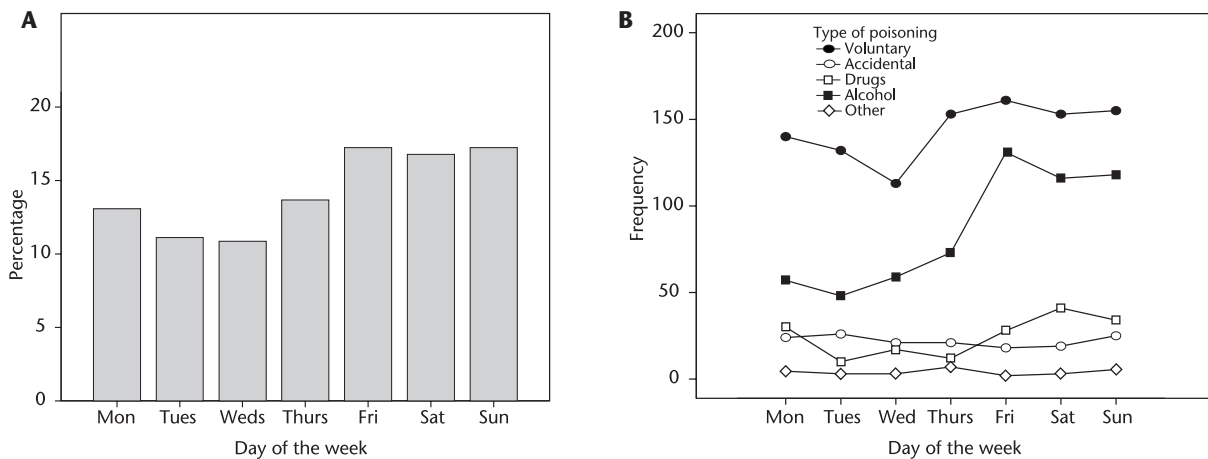
**Figure 1.** Percentage of cases from each centre.



**Figure 2.** A. Monthly distribution of cases (as a percentage). B. Monthly distribution and the type of poisoning.

**Table 5.** Type of poisoning and distribution per day of the week

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Total (%)
Voluntary	140	132	113	153	161	153	155	1,007 (50.2%)
Alcohol alone	57	48	59	73	131	116	118	602 (29.7%)
Overdose of illegal drugs	30	10	17	12	28	41	34	172 (9.4%)
Accidental	24	26	21	21	18	19	25	154 (7.9%)
Unknown	9	6	6	14	4	6	11	56 (2.8%)
Total (%)	260 (13.07)	222 (11.12)	216 (10.87)	273 (13.67)	342 (17.23)	335 (16.78)	343 (17.23)	1,991



**Figure 3.** A. Percentage of cases on each day of the week. B. Day of the week and type of poisoning.

partment within one hour and 78.2% within 4 hours (Table 7).

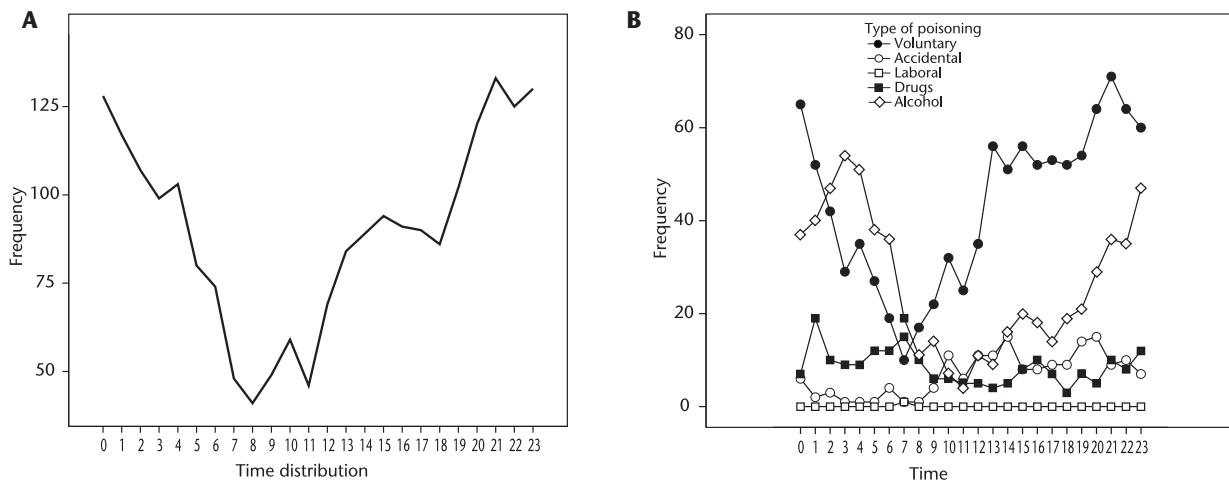
The cause of accidental poisoning was recorded in 68% of cases. The most common cause was misunderstanding (25.64%), toxic substance not in its original container (19.65%) and prescription/dispensing errors (14.52%).

Symptoms of poisoning were present in 18.7% of patients on admission. In cases involving patients with a decreased level of consciousness, the Glasgow Coma Scale score was below 8 for 67 patients, between 9 and 12 for 189 patients and

over 13 for 821 patients. However, intubation was performed in only 21 cases and 18 were in hospital. CPR was only performed in one case.

In 1,215 (54% of the sample) patients received non-specific treatment and this was administered in 89.2% of hospital cases.

Digestive tract decontamination was carried out in 670 cases (29.84% of the sample) (Table 8). The most frequently used techniques were single dose or repeated dose activated charcoal (45.98%), closely followed by a nasal or orogastric catheter (45.22%). All in all, single dose acti-



**Figure 4.** A. Hourly distribution of cases. B. Hourly distribution of cases.

**Table 6.** Initial patient care

	N	%
Direct to hospital	1,085	51.2
Emergency Medical Services- 061	645	30.4
Primary Care	185	8.7
Other	114	5.5
From another hospital	45	2.1
Unknown	45	2.1

vated charcoal was the most commonly used technique (41.2%) being administered to 12.3% of the total number of patients.

With regard to the question about the effectiveness of digestive tract decontamination, this was answered in 268 cases. It was successful in 32.01% of cases (86 cases) and questionable in 20.52% (Table 9). Gastric lavage using a nasogastric catheter followed by aspiration was effective in 6 of the 9 cases recorded (66.7%). The same percentage was registered for the orogastric catheter, although this was only carried out in 3 patients. Dilution was effective in 4 cases where this information was available and ipratropium

bromide was effective in one case. The number of patients treated within the first six hours with the different decontamination techniques and time elapsed before treatment are shown in Table 10.

#### Progress

The final destination of the patient was recorded in 90.9% of cases with 58.84% being directly discharged from the emergency department after less than 12 hours. Among the 21.41 also discharged, the period of observation was extended to 24 hours. Fourteen point one percent were admitted to hospital (2.3% to the ICU, 3.5% to a conventional ward, 3.7% to a psychiatric ward and 4.6% were transferred to other health centres). Three patients died and 5.5% fled the hospital or voluntarily discharged themselves (Figure 5).

With regard to the time taken for treatment, the Kruskal-Wallis test showed that patients who were admitted had also arrived at the hospital later ( $p = 0.04$ ) (Table 11).

**Table 7.** Time generally elapsed and for each type of poisoning

Time elapsed	N (%)	Cumulative %	Voluntary	Accidental	Work-related	Drugs	Alcohol	Other
< 0,5	184 (14.5)	14.5	85	30	0	13	52	0
0,5-1	268 (21.1)	35.6	109	31	0	36	91	0
1-2	252 (19.8)	55.4	155	20	0	20	52	2
2-3	163 (12.8)	68.3	93	5	0	21	42	0
3-4	126 (9.9)	78.2	72	7	0	13	31	1
> 4-8	141 (11.2)	89.3	92	9	0	22	18	0
> 8-12	64 (5.1)	94.4	44	8	0	10	2	0
> 12-24	52 (4.3)	98.7	37	7	1	3	3	1
> 24	20 (1.3)	100	5	9	0	4	0	0
Total	1,270		692 (54%)	126 (9.9%)	1 (0.1%)	142 (11.2%)	291 (22.9%)	4 (0.3%)
Blank cases	864 (38.64%)		398 (46.06%)	46 (14.58%)	0	62 (7.17%)	339 (39.26%)	22 (2.54%)

**Table 8.** Type of digestive tract decontamination used

	Before reaching the hospital	At the hospital	Both	Total	% (decontaminations)	% (total sample)
Ipratropium bromide	0	30	0	30	4.48%	1.3%
Gastric content aspiration without lavage	1	5	1	7	1.04%	0.2%
Gastric lavage nasal catheter	32	183	4	219	32.68%	9.8%
Gastric lavage orogastric catheter	5	79	0	84	12.54%	3.7%
Dilution	4	18	0	22	3.28%	1%
Single dose activated charcoal	38	237	1	276	41.20%	12.3%
Repeated dose activated charcoal	0	32	0	32	4.78%	1.4%
TOTAL	80	584	6	670		29.84%

**Table 9.** Time elapsed before treatment and effectiveness of decontamination

Time elapsed	Product remains	Positive result	% of positive results	p
< 0,5	25	20	80%	0.022
0.5-1	19	14	73.7%	0.004
1-2	34	18	52.9%	n.s.
2-3	13	9	69.2%	n.s.
3-4	7	4	57.1%	n.s.
5-6	7	2	28.6%	n.s.
6-7	1	0	0%	n.s.
7-8	3	1	33.3%	n.s.
8-10	2	0	0%	n.s.
10-12	1	1	100%	n.s.

## Discussion

Although this study focuses on acute poisoning via the digestive tract, to our knowledge it is the first prospective, multi-centre study that spans a whole year and was carried out in hospital emergency departments all over Spain. This allows a realistic perspective of acute poisoning on a national level to be obtained.

The percentage of cases per health centre is practically uniform and the low patient numbers in smaller hospitals is compensated by the higher numbers of patients in the larger cities. Of the 34 hospitals that agreed to participate in this study, 5 were unable to do so despite expressing their commitment in writing. The participation of some other centres was irregular in terms of the cases they contributed and were therefore excluded from the analysis.

Few children were included in this study, despite the fact that many of the hospitals that participated have a paediatric emergency department, and this is reflected in the low percentage of accidental poisonings. The incidence of accidental cases in our study was 9.9%, being 99% in the study carried out by Mintegi in 2002 which referred exclusively to paediatric emergency situations involving poisoning<sup>38</sup>. The incidence in this study is surprising given that it only focused on poisoning via the digestive tract which is the most common way for toxins to enter the body in children.

With regard to the daily distribution, this study produced the same incidence found by our group in 2000<sup>35</sup> and that of the primary care emergency departments in 1999<sup>2</sup>. In the first series, the fact that the frequency of voluntary poisoning generally remains stable is of note, for voluntary as well as alcohol-related poisoning, (currently 79.9% versus 77.7% in 2000), and poisoning involving alcohol alone (29.7% versus 26.3%)<sup>35</sup>.

The hourly distribution of poisonings is also quite striking since despite following the same distribution as general visits to the hospital emergency department<sup>39,40</sup>, the behaviour of each type of poisoning showed an hourly distribution pattern which should be analysed in future studies to better understand this subject from both a sociological and health care point of view.

Half of the patients came directly to the hospital and only a small percentage went through

**Table 10.** Decontamination methods and time taken for treatment (cases registered within the first six hours)

	< 0.5	0.5-1	1-2	2-3	3-4	5-6	6-7	Total
Ipratropium bromide	3	2	1	3	3	3	1	16
Gastric content aspiration without lavage	0	0	1	1	2	0	0	4
Gastric lavage nasal catheter	16	38	18	29	12	3	5	121
Gastric lavage orogastric catheter	6	11	8	9	6	2	3	45
Dilution	3	1	3	5	0	0	0	12
Single dose activated charcoal	19	32	29	34	17	5	9	145
Repeated dose activated charcoal	4	7	0	2	3	1	1	18
Total	51	91	60	83	43	14	19	361

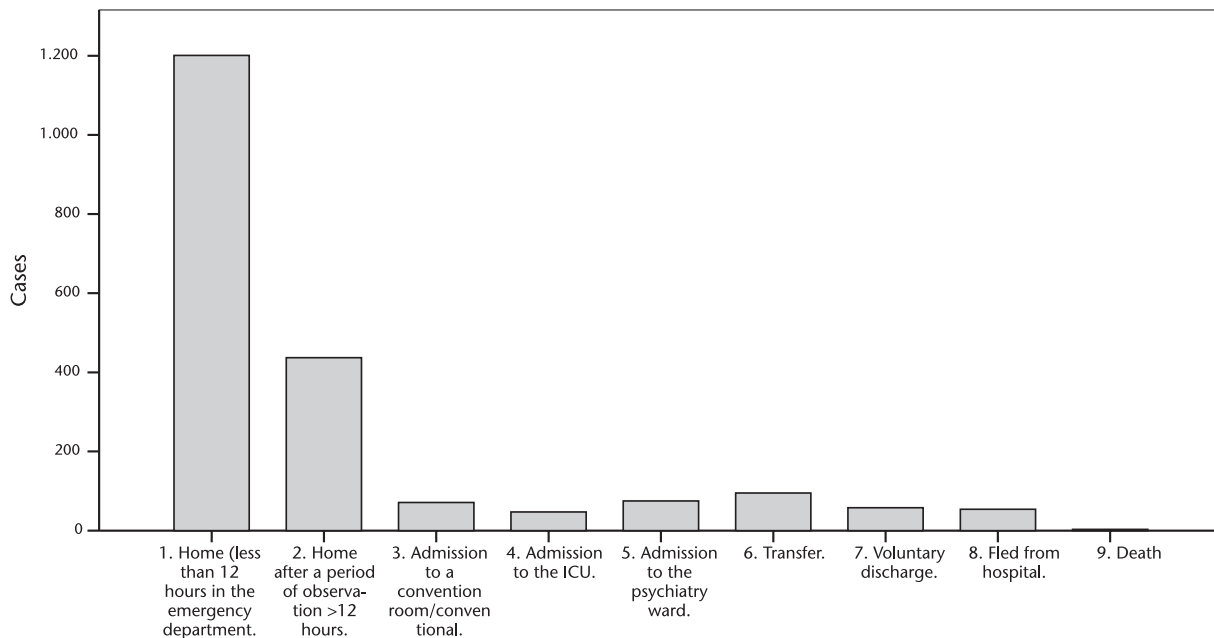


Figure 5. Patient destination.

**Table 11.** Time elapsed before treatment and the decontamination method in relation to discharges from the emergency department

Time elapsed	Total No.	% of discharges	Method	No. of discharges	% discharges
< 0.5	161	84.5%	Aspiration	4	100%
0.5-1	254	85.4%	Nasal catheter	159	82%
1-2	224	84.4%	Orogastric catheter	63	85.1%
2-3	139	82%	Dilution	17	85%
3-4	99	86.9%	Charcoal	218	84.2%
> 4-8	117	77.77%			
> 8-12	57	71.92%			
> 12-24	46	78.26%			
> 24	12	83.33%			

primary care emergency services. In the previously mentioned study by Riquelme et al related to poisonings in the Health Care Area (including hospitals and primary care), primary care services attended 75.5% of cases achieving direct resolution in 58.5%<sup>2</sup>. Therefore, it is likely that acute poisoning contributes to overcrowding and incorrect use of already over-burdened hospital emergency services<sup>41</sup>.

With regard to the time elapsed before treatment, the number of patients that came within the first few hours after the poisoning was quite high. Even though it only increased from 34.2% in 2000 to 35.6%, and visits within the first four hours increased from 54% to 78%, which is an important statistic from a clinical perspective<sup>35</sup>. However, it should be taken into account how difficult it is at times to reliably gather this kind of information.

The number of patients in coma was lower in our study, probably because of the group of poisonings studied which exclude intravenous drugs, smoke, industrial toxins, insecticides that enter the body through the skin etc. However, it should be pointed out that more patients had a Glasgow Coma Scale (GCS) score below 8 than intubations carried out (67 patients with a GCS score of < 8 versus 21 orotracheal intubations). One possible explanation for this could be that these cases involved GHB or liquid ecstasy poisoning and emergency physicians are normally reluctant to use early intubation in these setting because patients may “wake up” more easily and more quickly<sup>42,43</sup>. In this study we did analyse the toxins involved, which could be the subject of another study, although this might detract attention from some of the findings in this study.

In comparison to the study carried out in 2000, the percentage of non-specific treatments also decreased (54% versus 71.6%), although, in contrast the use of digestive tract decontamination methods increased somewhat (29.8% versus 28.6%). Undoubtedly both results may be attributed to the fact that the study was specifically focused on poisonings via the digestive tract<sup>34,35</sup>.

For the first time in a Spanish study, the most commonly used decontamination method used was single dose activated charcoal<sup>34,35</sup>. This reflects a significant change in attitude towards the care given to patients with digestive tract poisoning. Nevertheless, a high number of naso-

gastric catheters continue to be used which increases the risk of complications when wide catheters are used, or inefficient decontaminations when thin ones are used. We have also observed that the percentage of positive decontaminations has fallen from 50 % to 32%, despite an improvement in waiting times. However, the low number of cases that provided this kind of information (112 results of the 670 decontaminations carried out) may have affected its apparent lack of effectiveness.

As we already mentioned in a previous study<sup>3</sup>, we can assume that a considerable number of cases of poisoning are not correctly managed, given that nasogastric digestive extraction implies certain risks and is uncomfortable for the patient<sup>44</sup>. Unfortunately this "classic" technique is used too often, to the detriment of activated charcoal, above all if we evaluate its use in relation to the time elapsed before decontamination that is considered useful<sup>3,45</sup>. Therefore, we need to evaluate whether the protocol that is currently in force in emergency departments, as well as the general guidelines drafted by our working group and others should be revised<sup>3,36,47</sup>. We should highlight the importance of avoiding routine behaviour when it comes to digestive tract decontamination, providing personalised treatment in response to the nature of the substance ingested, the amount ingested and the amount of time exposed to the toxin.

In line with EAPCCT/AECT recommendations, decontaminations that were carried out within the first hour were most effective<sup>24-26,29</sup>. However, as our study from 2000 already pointed out, it is surprising that even several hours after the poisoning it is possible for doctors to obtain positive results when they attempt to extract the toxin<sup>24,43</sup>. Even though the actual amount of the toxic substance recovered after 60 minutes was not analysed due to the scope and methods used in this study, we should consider extending the time period that elapses before treatment is considered no longer useful with regard to the different decontamination techniques<sup>47</sup>.

Ipratropium bromide is used late on and the clinical recommendations on the amount of time that can elapse before it is no longer considered useful are likely to be overlooked<sup>32,48</sup>. In contrast, even if activated charcoal is used after the first hour from the time the poisoning occurs, we believe its use is justified because it poses very little risk to conscious patients<sup>45</sup>.

The percentage of patients who were discharged from the emergency department was

slightly lower than that of the study from 2000 (79.6% versus 73%), although the percentage is the same for patients that were discharged within the first 12 hours (53.5%). The number of admissions to conventional wards, psychiatric wards and intensive care units did not vary from one study to another and the number of patients who voluntarily left the hospital or fled was also the same<sup>34,35</sup>.

This study was limited by the fact that the toxins involved in the poisonings were not analysed, as mentioned before. A detailed analysis of this subject may be the objective of another future study by our group.

Another factor that limited this multi-centre study was the lack of participation from centres in Madrid, Galicia and Murcia and the low number of participating centres from autonomous communities such as Andalusia and Castile La Mancha, although we believe that this does not detract value from the study since there are no significant differences between one region and another in Spain from a sociological and health care point of view.

Finally, it is possible that having carried out a study in centres with people with an interest in clinical toxicology and with a direct involvement in care for patients with poisoning in the emergency department, along with the fact that the observation of any clinical situation modifies our behaviour with regard to its development, the patient care practices for dealing with cases of acute poisoning may have been positively influenced.

We can conclude that in cases of acute poisoning via the digestive tract seen in HEDs in Spain we have observed significant differences from an epidemiological point of view when compared to previous studies that used a similar methodology. With regard to treatment, the time elapsed before treatment has been reduced and at the same time, activated charcoal has become the most commonly used digestive decontamination method thereby suggesting an improvement in the management of acute poisoning. However, with regard to the other digestive extraction techniques, we have observed that ipratropium bromide and nasogastric catheters are probably being used incorrectly.

Finally we observed that the vast majority of patients with poisoning are treated in less than 24 hours in the HED without requiring admission. We believe that we should focus our efforts on promoting ongoing training for doctors and nurses working in the emergency department and more research in the field of clinical toxicology.

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## Intoxicaciones agudas: perfil epidemiológico y clínico, y análisis de las técnicas de descontaminación digestiva utilizadas en los servicios de urgencias españoles en el año 2006 –Estudio HISPATOX–

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**Introducción:** En España son escasos los estudios epidemiológicos multicéntricos sobre las intoxicaciones agudas atendidas en los Servicios de Urgencias Hospitalarios (SUH). Los criterios de inclusión de los mismos son heterogéneos, variando en ellos el concepto de intoxicación, la edad de los pacientes incluidos, los tóxicos registrados, los criterios de ingreso, etc. Pocos estudios han analizado además la aplicación de las técnicas de descontaminación digestiva en urgencias, y la aplicabilidad/seguimiento de las recomendaciones de la *European Association of Poison Centres and Clinical Toxicologist/American Academy of Clinical Toxicology*.

**Material y método:** Estudio prospectivo multicéntrico nacional transversal de las intoxicaciones agudas atendidas en 24 Servicios de Urgencias hospitalarias españoles, de 1 año de duración (septiembre 2005-agosto 2006). Se realizaron cortes para la recogida de datos cada cinco días, comenzando a las 08:00 horas, durante 24 horas. Se analizaron los pacientes cuya vía de exposición al tóxico fue la digestiva, recogiendo los datos referentes a sus características demográficas, intervalo asistencial, asistencia recibida previa al hospital, tipo (intencionalidad) de la intoxicación, sintomatología al ingreso, tratamiento de rescate digestivo efectuado y destino del paciente.

**Resultados:** Se registraron 2.245 casos, con una edad media de 35,77 años (ST 15,75) y una ligera preponderancia del sexo masculino (59,6%). El 51,2% acudieron directamente al hospital y un tercio se asistieron inicialmente por los Sistemas de Emergencias Médicas. El 35,6% de los pacientes acudieron a urgencias antes de una hora y el 78,2% antes de 4 horas. Presentaban síntomas al ingreso el 18,7% de los pacientes. Se realizó algún tipo de descontaminación digestiva en el 29,84% de la muestra. Las técnicas más utilizadas fueron el carbón a dosis única o repetidas (45,98%), seguido con igual porcentaje por el sondaje naso u orogástrico (45,22%). El carbón activo a dosis única fue globalmente la técnica más empleada (41,2%), aplicándose al 12,3% del total de intoxicados. El 58,84% fueron dados de alta directamente desde Urgencias antes de 12 horas. En un 21,45% la observación se prolongó hasta las 24 horas. El 14,1% ingresaron (2,3% en UVI, 3,5% en planta convencional, 3,7% psiquiatría y 4,6% trasladados a otros centros).

**Conclusiones:** Por primera vez en España, el carbón activo pasa a ser el método de descontaminación digestiva más usado en la intoxicación aguda digestiva, mejorándose además los intervalos de asistencia en los SUH. [*Emergencias* 2008; 20: 15-26]

**Palabras clave:** Intoxicaciones agudas. Técnicas de descontaminación digestiva. Carbón activo.