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Body packers and body stuffers: cocaine intoxications reported to French poison centers (January 1, 2020—December 31, 2024)

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ABSTRACT

Introduction: Cocaine use has increased significantly over the past three decades. This study aimed to analyze cases of cocaine intoxication involving body packing and body stuffing, focusing on symptomatology, treatment, and clinical outcomes.

Methods: A retrospective analysis was performed of cases of cocaine poisoning recorded in the French national poison center database over a five-year period (2020–2024). Extracted data included demographics, amount and route of cocaine concealment, number of pellets, clinical presentation, management, outcomes, location of arrest, and packaging type. An ordinal logistic regression was conducted to identify factors associated with poisoning severity, using the Poisoning Severity Score as the dependent variable.

Results: Among 2,534 cases of cocaine intoxication, 146 involved body packers or body stuffers: 73 body packers and 73 body stuffers. The male-to-female ratio for body packers was 3.3:1, and for body stuffers, it was 72:1, with only one female. The median age of body packers was 25.5 years (range: 17–62 years) and for body stuffers, 28.2 years (range: 16–58 years). Body packers ingested between one and 190 pellets, while body stuffers ingested between one and ten pellets, each containing cocaine 1–15 g. Symptoms included gastrointestinal, cardiovascular, neurological, and respiratory effects. One death occurred among body packers, and two among body stuffers. Age was a significant predictor of severity, with older individuals at higher risk of severe outcomes.

Discussion: Cocaine intoxication in body packers and stuffers presents serious health risks. Body packers ingested larger quantities with more secure packaging, while body stuffers ingested smaller amounts but used less secure methods, often due to law enforcement urgency. Despite differences in ingestion patterns, both groups showed similar symptoms, with older body packers more likely to experience severe effects.

Conclusion: While severe complications were rare, cocaine intoxication in both body packers and stuffers can be fatal, highlighting ongoing public health risks related to cocaine trafficking and the need for timely medical intervention.

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Introduction

In France, cocaine consumption has undergone significant changes in recent years. Once primarily associated with affluent social circles and nightlife settings, its use has expanded across diverse demographics, including younger users and professionals. While traditionally regarded as a recreational substance, cocaine is increasingly used for performance enhancement. This shift is accompanied by a growing normalization of use and a reduction in social stigma [1,2].

Several factors contribute to this trend. Cocaine, a tropane alkaloid extracted from the leaves of *Erythroxylum coca* [3], has experienced a sharp increase in global production. Over the last 30 years, its manufacturing has reached unprecedented levels, with an estimated 2,500 tons produced in 2022, predominantly in South America (Colombia, Peru, Bolivia). According to the French Observatory of Drugs and Drug Addiction [4], cocaine seizures reached 27.7 tons in recent years, a stark increase from 1.8 tons in 1990. Concurrently, trafficking networks have expanded, utilizing sophisticated smuggling

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methods via maritime and air routes, making the drug more widely available in urban and rural areas. While purity has significantly increased, prices have decreased slightly in multiple regions, leading to improved accessibility. Global estimates suggest approximately 30 million users, and cocaine-related mortality rates are rising [4–6].

Geopolitical crises, such as the COVID-19 pandemic and the ongoing conflict in Ukraine, have disrupted trafficking routes. The pandemic initially impacted global cocaine flows, but by 2021, illicit trafficking rebounded, prompting route diversification into Africa, Asia, and Eastern Europe. The Ukraine war in 2022 further disrupted established corridors, shifting routes via the Balkans and increasing use of Eastern European Union borders. However, criminal organizations have demonstrated rapid adaptability by identifying alternative pathways and increasing transactions via darknet markets [4]. In response to intensified customs controls, traffickers have developed increasingly sophisticated concealment methods [5].

A major risk associated with cocaine trafficking involves individuals who internally transport the drug, commonly categorized as body packers and body stuffers.

Body packers are individuals who deliberately conceal pre-packaged drug pellets within body cavities, most commonly oral, rectal, vaginal, or, in rare cases, even auricular routes [7,8,9], to facilitate the smuggling of illicit substances across borders. These pellets are typically machine-manufactured and consist of multiple protective layers designed to prevent leakage and withstand passage through the gastrointestinal tract. In contrast, body stuffers are individuals who hastily swallow or insert drugs in an unplanned and improvised manner, usually in response to imminent arrest or law enforcement intervention. Unlike body packers, body stuffers often lack the time and resources to properly wrap the substances. As a result, the ingested materials are frequently poorly packaged, for example in loosely tied plastic bags, condoms, or makeshift wrappings, which increases the risk of rupture, toxicity, and clinical complications. It is important to underline that the term “pellet” refers to differently packaged substances in body packers versus body stuffers [10–13]. The distinction between these two groups is critical, as the risk of severe intoxication is significantly heightened in the event of package rupture, particularly with high-purity cocaine or when adulterated with fentanyl or ketamine.

Despite the clinical significance of drug concealment, existing literature primarily consists of case reports [14–17], with limited case series available [18]. The present study aims to systematically analyze body packers and body stuffers with regard to clinical

symptomatology, the severity of intoxications following rupture, and the efficacy of detection methods. Given the lack of standardized guidelines for the management of body packers and body stuffers [19–24], this study will further evaluate and compare various treatment strategies, with the goal of optimizing medical interventions.

The increasing prevalence of body packing, in which individuals internally transport illicit drugs, poses significant challenges for both law enforcement and medical professionals. Cocaine smuggling via this method has become more sophisticated, particularly with advancements in drug packaging techniques designed to evade detection. Historically, body packers carried drugs in simple wrappings such as condoms or finger stalls from gloves (Type 1 packages), but traffickers have since developed more advanced methods. Type 2 packages involve compressed cocaine wrapped in multiple layers of heat-resistant material, sometimes reinforced with aluminum layers, while Type 3 packages consist of industrial crafted multi-layer wrappings, often made from latex or synthetic materials, heat-sealed or resin coated, making them less visible on radiographic imaging. Type 4 packages are made of hard plastic; these packages could contain liquid cocaine [25]. This evolution in drug packaging has significantly reduced the effectiveness of conventional airport security scans, necessitating the use of advanced imaging techniques such as magnetic resonance imaging for more reliable detection [26].

The financial incentives for body packing are substantial, as the price of cocaine in Europe is considerably higher than in South America. A body packer can earn approximately 3,000 United States dollars for transporting 1 kg of cocaine [5,6]. Due to the high risks involved, drug organizations often assign supervisors to monitor couriers throughout the journey to ensure the safe delivery of the drugs. An emerging tactic in smuggling operations is the use of pregnant women as body packers, as radiographic screening is contraindicated in pregnancy, making detection more difficult [27,28].

From a medical perspective, body packing carries significant health risks. The quantity of ingested cocaine varies, with individual packets ranging from 1 g to 15 g, and total loads often exceeding 1 kg. In an attempt to delay the natural excretion of the packets, some body packers consume opioids, which can lead to severe bowel obstruction. Upon arrival at their destination, traffickers often administer laxatives to accelerate drug retrieval. While most packets pass through the gastrointestinal tract without incident, the most severe complication occurs when a packet ruptures

inside the body. The sudden release of cocaine into the system can lead to acute toxicity, with symptoms including hypertension, seizures, agitation, and potentially fatal cardiovascular collapse. Given that the amount of cocaine contained in a single packet often exceeds the lethal dose of 1.2 g [29], immediate medical intervention is critical in these cases.

Detection of body packers relies not only on medical imaging but also on behavioral observation. Airline personnel, particularly flight attendants, are trained to recognize suspicious passengers. One key indicator is a refusal to eat or drink throughout the flight, which raises suspicion and may prompt authorities to conduct further investigation upon landing. Imaging studies remain the primary method of confirming body packing. Radiographic imaging is traditionally the first-line diagnostic tool but is increasingly ineffective due to the use of Type 4 drug packets. In cases for which radiography results are inconclusive, magnetic resonance imaging has proven to be a more sensitive and reliable alternative [30,31].

Methods

An initial analysis of data from 2022 and 2023 identified a total of 26 cases involving body packers and body stuffers. Based on this observation, we conducted a retrospective study using data from the French national poison center database SICAP (système d'information des Centres AntiPoison) covering a five-year period, from January 1, 2020, to December 31, 2024. All cases of cocaine-related intoxication within this timeframe were extracted.

Key variables examined included the sex and age of the individuals, the quantity of ingested cocaine and the number of pellets, the route of concealment (oral, rectal, vaginal), clinical symptoms, medical management, outcomes, location of arrest, and the type of packaging used. Additional relevant factors were also assessed to provide a comprehensive overview of these cases.

Descriptive statistical analysis was performed using the `tableone` package in R to summarize the baseline characteristics of the included individuals. This included the generation of Table 1, which provides frequencies, percentages, medians, and standard deviations as appropriate for categorical and continuous variables.

To evaluate the factors influencing the severity of poisoning, we conducted an ordinal logistic regression analysis with the Poisoning Severity Score as the dependent variable. The Poisoning Severity Score is an ordinal scale ranging from 0 (no symptoms) to 4 (fatal poisoning) [32]. The independent variables included age (continuous), sex (binary: female/male), and group

Table 1. Clinical characteristics and management of body packers and body stuffers (2020–2024).

	Body packers (n = 73)	Body stuffers (n = 73)	Overall (n = 146)
Age (year)			
Median [range]	25.5 [17.5–62.0]	28.2 [16.0–58.9]	26.5 [16.0–62.0]
Missing	1	5	6
Sex			
Female	17 (23.3%)	1 (1.4%)	18 (12.3%)
Male	56 (76.7%)	72 (98.6%)	128 (87.7%)
Route			
Oral	70 (95.9%)	69 (94.5%)	139 (95.2%)
Oral, rectal	1 (1.4%)	0	1 (0.7%)
Oral, rectal, vaginal	1 (1.4%)	0	1 (0.7%)
Rectal	0	4 (5.5%)	4 (2.7%)
Vaginal	1 (1.4%)	0	1 (0.7%)
Symptoms			
Gastrointestinal	15 (21%)	17 (23%)	32 (22%)
Cardiovascular	8 (11%)	19 (26%)	27 (18%)
Neurological	6 (8%)	19 (26%)	25 (17%)
Total	28 (38%)	43 (59%)	71 (49%)
None	45 (62%)	30 (41%)	75 (51%)
Number of packages			
Median [range]	80.0 [4.00–190]	2.00 [1.00–10.0]	32.0 [1.00–190]
Missing	6	28	34
Treatment			
Observation	36 (49%)	36 (49%)	72 (49%)
Whole bowel irrigation	26 (36%)	15 (21%)	41 (28%)
Activated charcoal	0	1 (1.4%)	1 (0.7%)
Intravenous hydration	2 (2.6%)	0	2 (1.4%)
Endoscopic retrieval	1 (1.4%)	0	1 (0.7%)
Surgical intervention (gastrostomy)	5 (7%)	0	5 (3%)
Cardiopulmonary resuscitation	1 (1.4%)	1 (1.4%)	2 (1.4%)
Missing	2	21	23
Imaging			
Plain radiographs	26 (35.6%)	20 (27.4%)	46 (31.5%)
Computed tomography scans	7 (9.6%)	13 (17.8%)	20 (13.7%)
Missing	19 (26%)	7 (9.6%)	26 (17.8%)

(body packer versus body stuffer). The model used a logit link function with flexible thresholds to estimate the cumulative odds of a higher Poisoning Severity Score category. The analysis was performed using the `clm()` function from the `ordinal` package in R, which is specifically designed for cumulative link models. Observations with missing data were excluded from the analysis ($n = 10$).

All analyses were performed using RStudio (version 2024.12.1) with R (version 4.4.3), utilizing additional packages such as `dplyr`, `ggplot2`, and `ggstatsplot` for data wrangling and visualization.

Results

A total of 2,534 cocaine intoxications were recorded. Of these, 2,388 cases were excluded due to being classic cocaine intoxications, cases involving children, or suspected suicide attempts. After applying these exclusion criteria, 146 cases were included in the final analysis: 73 body packers and 73 body stuffers. Among the body packers, 56 were male and 17 were female,

resulting in a male-to-female ratio of 3.3:1. In the body stuffer group, 72 were male and only one was female, corresponding to a sex ratio of 72:1. The median age of body packers was 25.5 years (range: 17.5–62 years), while body stuffers had a median age of 28.2 years (range: 16.0–58.9 years). Regarding the number of ingested packets, body packers had a median of 80.0 packets (range: 4–190), whereas body stuffers had a median of two packets (range: 1–10). In most cases, the packages were ingested orally: 70 cases among body packers and 69 among body stuffers. Among body packers, additional routes included combined oral and rectal (one case), combined oral, rectal, and vaginal (one case), and exclusively vaginal (one case). Four body stuffers concealed the packages rectally. The highest number of ingested packets was 190 (oral), and the highest number of vaginally concealed pellets was 30.

Body packers were mainly arrested at airports, coming the most often from South America (23% from French Guyana). Body stuffers were primarily apprehended on the street during drug-related activity. Several others were arrested in prison, and a few were intercepted at airports or at their place of residence.

A total of 45 body packers (62%) and 30 body stuffers (41%) remained asymptomatic. Among symptomatic patients, both groups exhibited a range of symptoms. The body packer group primarily presented with gastrointestinal issues, with 15 patients (21%) reporting symptoms such as epigastric pain, abdominal pain, constipation, and buccal irritation. In contrast, the body stuffer group had a higher prevalence of cardiovascular and neurological symptoms. Specifically, 19 patients (26%) experienced cardiovascular issues like tachycardia, hypertension, and cardiac arrest, while 19 patients (26%) showed neurological symptoms such as coma, agitation, seizures, and loss of consciousness. Gastrointestinal symptoms were less prevalent in the body stuffer group, with 17 patients (23%) reporting them.

Imaging was performed in 26 body packers - seven plain radiographs and 19 computed tomography (CT) scans - with all results confirming the presence of drug packets. Among body stuffers, imaging was conducted in 20 cases - 13 plain radiographs and seven CT scans - of which four (three radiographs and one CT scan) yielded negative results.

Three patients suffered cardiorespiratory arrest: a 17-year-old female (body stuffer) and two men aged 41 (body packer) and 47 years (body stuffer). They were found in various settings, including on the street and in a police office. One male patient had seizures prior to the arrest. The female patient was known to have ingested 41 cocaine pellets, with evidence of capsule

rupture within the gastrointestinal tract. Cardiopulmonary resuscitation was unfortunately unsuccessful in all three cases. Another two male patients were successfully resuscitated; one experienced pulmonary complications but ultimately survived.

A total of 136 complete observations were included in the final model to reveal the influencing factors of the Poisoning Severity Score. The regression revealed that age was significantly associated with increased severity of poisoning (estimate = 0.0401, SE = 0.0166, $z=2.412$, $P=0.0159$), suggesting that higher age increases the odds of experiencing more severe symptoms. In contrast, sex (estimate = 0.8067, $P=0.2005$) and group (body stuffer versus body packer; estimate = 0.5621, $P=0.1155$) were not statistically significant predictors of Poisoning Severity Score.

These findings indicate that age is an important predictor of poisoning severity, whereas sex and group assignment (body packer versus body stuffer) did not show statistically significant effects within the present sample.

Figure 1 illustrates the predicted probabilities for each level of the Poisoning Severity Score (0–4) across patient ages, based on an ordinal logistic regression model. The graph reveals a clear age-related trend in poisoning severity.

At younger ages, particularly between 16 and 25 years, the predicted probability of being asymptomatic (Poisoning Severity Score of 0) is the highest among all categories. However, this probability gradually decreases with increasing age. Conversely, the likelihood of experiencing more severe symptoms (Poisoning Severity Score of 3 and Poisoning Severity Score of 4) increases with age. By approximately 60 years of age, the probability of falling into the highest severity categories exceeds that of the lower Poisoning Severity Score levels.

This trend suggests that age is a significant predictor of poisoning severity: younger individuals are more likely to remain asymptomatic, whereas older patients are more susceptible to severe or life-threatening symptoms. These findings are consistent with the results of the regression model, where age was identified as a statistically significant factor influencing the Poisoning Severity Score.

Treatment approaches differed between groups. Conservative management with clinical observation was applied in 36 cases across both groups. Twenty-six body packers and 15 body stuffers were treated with whole bowel irrigation; only one body stuffer received activated charcoal. Two body packers received intravenous hydration. One body packer underwent endoscopic retrieval of the packages. Five patients (all body packers) required surgical intervention, which involved

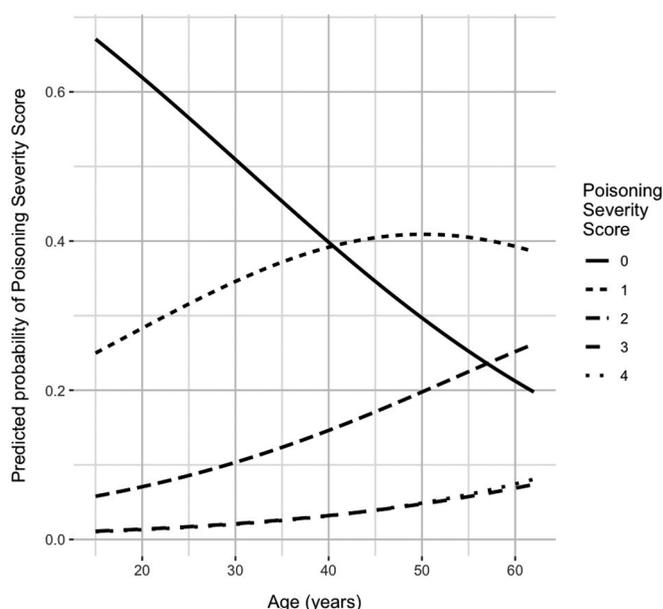


Figure 1. Predicted probability of Poisoning Severity Score by age in cocaine body packers and body stuffer reported to French poison centers, 2020–2024.

Table 2. Annual incidence of body packer and body stuffer cases (2020–2024).

	Body packers	Body stuffer	Total
2020	19	10	29
2021	14	4	18
2022	31	17	48
2023	8	24	32
2024	1	18	19
Total	73	73	146

a gastrostomy procedure to directly access the stomach and manually remove the cocaine packages. Respectively, 31, 35, 78, 114, and 125 cocaine packages were removed. Surgery was indicated after failure of conservative treatments in two cases. Urgent intervention was necessary for one patient due to adrenergic syndrome and in another due to suspicion of package rupture. The only female patient presented with seizures. All surgeries were successful, and no deaths occurred in these cases. For some cases, treatment details were unavailable.

Table 2 presents the annual number of body packer and body stuffer cases. The observed decline in body packer cases over time may be attributed to changes in packaging methods – particularly the emergence of less detectable Type 3 and Type 4 packages – as well as a possible decrease in case reporting to poison centers.

Discussion

This study offers a comparative overview of body packers and body stuffer, emphasizing demographic profiles, clinical presentations, and treatment outcomes.

While both groups differ in ingestion patterns and context, only age was identified as the key predictor of poisoning severity. Older individuals, regardless of group, were more likely to develop severe symptoms, underscoring the importance of age in risk assessment.

Body stuffer, mostly male and slightly older on average, typically ingested fewer but more poorly packaged pellets – often in response to law enforcement presence. Despite ingesting lower quantities, they experienced symptoms more frequently, likely due to insecure wrapping and spontaneous ingestion conditions.

In contrast, body packers carried significantly higher pellet loads with more secure packaging, often for planned trafficking. Nonetheless, both groups showed similar patterns in symptom types. Importantly, neither sex nor group assignment significantly predicted poisoning severity in our model.

Treatment strategies varied: body packers more often required invasive procedures due to obstruction or suspected leakage. Five surgical interventions were performed successfully, primarily via gastrostomy, with no fatalities. Most body packers and body stuffer were managed conservatively, but body packers were more frequently treated with whole bowel irrigation, likely due to the higher number of ingested pellets and better documentation. The apparent contrast in treatment approaches may partly be explained by the greater proportion of missing treatment data in the body stuffer group, limiting direct comparison.

The observed decline in body packer cases may reflect evolving trafficking methods or reporting

trends. These findings highlight the need for individualized clinical assessment and continued collaboration between medical teams and law enforcement.

Conclusions

This study highlights the complex interplay between demographic factors, ingestion method, and clinical outcome in drug body packing. Age stands out as a predictor of poisoning severity, whereas group classification and sex are less informative. Given the evolving nature of drug trafficking and the high stakes involved in packet rupture, continued research and clinical vigilance are paramount. Future investigations should aim to refine risk assessment tools and develop targeted management protocols based on individual risk profiles rather than group-based categorizations alone.

Data availability statement

The data that support the findings of this study are derived from the French national poison center database (SICAP) and are not publicly available due to privacy and confidentiality agreements. Access to these data may be granted upon reasonable request to the corresponding author and with permission from the French national poison center authorities.

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