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Digestive endoscopic removal of cocaine pellets: evaluation of the safety

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Abstract:

Background and study aims: The removal of cocaine pellets by endoscopy is the subject of much debate, due to the supposed risk of rupture. This study aims to evaluate the safety of digestive endoscopic removal of cocaine pellets.

Patients and methods: This is a monocentric, observational, retrospective study conducted at the Cayenne Hospital in French Guiana from July 2015 to May 2023. We included patients in whom digestive endoscopy was performed for delayed evacuation despite conservative treatment defined by the persistence of pellets on imaging from the 3rd day of hospitalization. Endoscopy was performed only if presence of pellets at low risk of rupture (type 4 according to the classification by Pidoto in 2002). We collected demographic, imaging, endoscopic and follow-up data.

Results: We included 111 patients, 75% were male. The median age was 25 [20-33] years. Imaging was performed in 99% of cases. On the imagery prior to endoscopy, pellets were found mainly in the stomach (28%), right colon (28%), left colon (30%) and sigmoid (31%). Median time to endoscopy was 3 days [2.5-4]. The median number of pellets extracted endoscopically was 1 [1-4]. The material used was mainly endoscopic baskets (60%). No patient presented any pre or post-endoscopic complications. No pellet ruptured during extraction. There was no sign of cocaine intoxication during or after endoscopy. The success rate of pellet removal was 92% during the first endoscopy and 100% during the 2nd endoscopy.

Conclusions: Endoscopic removal of micro-industrially-produced cocaine pellets seems to be safe and effective method. Endoscopy therefore has a place in the management of these patients.

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Introduction:

In recent decades, there has been a significant increase in intracorporeal drug transport [1–3]. Three methods of intracorporeal transport have been described: body packing, body stuffing and body pushing [2,4].

The most widely used classification of drug packaging was established in 1983 by McCarroon and Wood, and divides packaging into 3 categories [5]. Type 1 corresponds to less resistant packaging (condoms, balloons) with a high risk of rupture. Type 2 corresponds to very compact powder, wrapped in multiple layers of latex, with a low risk of rupture. Type 3 corresponds to hard paste, wrapped in non-radiopaque packaging. In 2002, Pidoto et al. described type 4, exclusively for cocaine transport, where the pellets are micro-industrially prepared [6]. Type 4 is currently found mainly in French Guiana, with reinforced packaging and a very low risk of breakage.

Body-packing was first described in 1973 [7]. In the following years, surgery was recommended as the first-line treatment. Today, the European Society of Gastrointestinal Endoscopy (ESGE) and the American Society of Gastrointestinal Endoscopy (ASGE), recommend close clinical monitoring of asymptomatic body drug carriers, and surgery only in cases of suspected pellet rupture (acute signs of intoxication), failed progression or signs of digestive obstruction [8]. Indeed, several patient cohorts have demonstrated the safety of conservative management [2, 9–11]. Endoscopic removal of pellets is not recommended [8]. Fear of rupture of drug pellets is supported only by small or old series [12]. To our knowledge, no published study has assessed the safety of endoscopic removal of type 4 pellets.

Due to its geographical location (between Surinam and Brazil) and its European status, French Guiana is a major transit point for cocaine to Europe. A report estimates that 15% of the cocaine consumed in France is transported by body packers from French Guiana [13]. The number of arrests at the international airport is increasing, from 150 between 2015 and 2019 to more than 400 a year in 2022 and 2023. The Cayenne Hospital has then established a dedicated pathway for managing body packers through the emergency department [14]. Endoscopic treatment of pellets is part of this management.

The primary objective of our study was to evaluate the safety of endoscopic pellet removal by describing the cases managed at the Cayenne Hospital Center. The secondary objective was to evaluate the efficacy of endoscopic pellet removal.

Methods:

Study design and population

It was a monocentric study conducted at the gastroenterology department in the Cayenne Hospital. The study was observational, retrospective and based on data collected from the computerized records of patients followed over the period from July 2015 to May 2023.

Inclusion and exclusion criteria

The inclusion criteria were: all patients with cocaine pellet extraction.

Exclusion criteria were: presence of another drug or absence of pellets found at endoscopy.

Given our primary objective, which was to assess the safety of cocaine pellet removal, we excluded all patients for whom no pellet was found at endoscopy. We excluded all patients carrying other drug than cocaine, in order to have a homogeneous group.

Cocaine pellet classification

We use the McCarron and Pidoto classification[5,6,15].

MacCarron describe 3 type :

Type1 are highly susceptible to leakage or rupture. These packages contain loosely packed drug covered with 2 to 4 layers of wrapping, usually made of a condom tied at one end, folded back over itself, and tied again at the opposite end;

Type 2 are characterized by a larger size and consist of a bundle of tightly packed drug covered with 5 to 7 layers of tubular latex or latex gloves and tied tightly with a knot at each end;

Type 3 are similar to type 2 packages, but they are wrapped in aluminum foil and over wrapped with 3 to 5 layers of tubular latex securely tied at both ends.

Pidoto describe type 4:

Type 4 are industrial packages used for cocaine only, prepared by dissolving cocaine hydrochloride in an alcohol-water solution and placing the resulting dense paste in a specific device and, when hardened, packed in tubular latex. Preparation is completed by covering the package with colored paraffin or fiberglass.

Body packers management

Body packers were managed according to the establishment's protocol: Plain radiography to confirm the presence of pellets and initial medical examination (check of vitals, questioning about the type, number of pellets, date of ingestion/insertion, physical examination, ECG, blood test, urine test). The medical examination specifically aims to detect any complications (signs of cocaine impregnation, occlusive syndrome). Asymptomatic patients with confirmed pellets on imaging were transferred to the secure unit, and held in hospital custody for 96 hours (legal duration of police custody) until the pellets have been completely evacuated. During their stay in the secure unit, patients were monitored by a paramedical team, under the supervision of a doctor. They were fasting and a conservative medical treatment with Poly Ethylene Glycol (PEG) at a rate of 4 liters per day was started.

Pregnant women did not undergo imaging (with rare exceptions), but were managed in the same way for the rest.

Endoscopy management

In our clinical experience, and as reported by previous studies in our center, almost 90% of people have a complete evacuation of pellet after 2 days. In view of this and of the current quality of the packaging (micro-industrial pellet with very low risk of rupture), after discussion with the different actors involved in the management of body packers, it has been decided to carry out an endoscopy to extract the pellets in the event of prolonged stagnation if the patient has consented. Day 0 was the date of admission. Delayed evacuation was defined as the persistence of pellet in the stomach and/or colon to

day 3. Endoscopic extraction was discussed and performed after inspecting the pellets already evacuated and checking their solidity, in the absence of hemodynamic repercussions or surgical abdomen. In our center, endoscopy was performed on general anesthesia, or on sedation with Midazolam 5mg and morphine hydrochloride 5mg, or under local anaesthesia with lidocaine (for Upper Gastrointestinal Endoscopy (UGE)) or without sedation. UGE was mainly performed under general anesthesia but a few number was under sedation as well as both colonoscopy and UGE; and colonoscopy alone was performed without sedation. If extraction fails, the examination was then performed under general anesthesia if the first was not. In the event of failure due to an excessive number of colonic pellets, PEG treatment was again administered.

Pregnant women are also involved in cocaine trafficking, which complicates treatment because of the risk of foetal irradiation. They conceal the pellets extra corpore and in corpore, usually by vaginal or rectal insertion. In the absence of imaging, it is not possible to know whether they have pellets in the digestive tract, or to assess their quantity. It was decided to propose endoscopy systematically (UGE and colonoscopy) after 24-48h of PEG and 2 stools without pellets, and with their consent.

The safety of endoscopic removal was defined as the absence of pellet breakage during the examination, the integrity of the packaging observed after pellet removal, the absence of clinical signs of post-endoscopy cocaine impregnation, and the absence of need for resuscitation following endoscopy.

Efficacy was defined by the achievement of digestive vacuity after endoscopy, attested by low-dose CT imaging. In the case of CT scan performed prior to endoscopy with accurate pellet counts, there was no post-extraction control if pellet counts were concordant.

Data collection

For each patient, the following demographic data were collected: age, sex, current pregnancy, imaging, endoscopy and follow-up data. Data collection (anonymous) was carried out by a single investigator from consultation of the computerized patient record. The data was collected in a standardized Excel spreadsheet.

Statistical analysis

The characteristics of the patients were presented as medians [interquartile range [IQR] for continuous variables], and as numbers (percentages) for categorical data. All statistical analyses were performed using Stata 13.0 (StataCorp, College Station, TX).

Ethical and regulatory approval

The typology of this study corresponds to Research Not Involving the Human Person (RnIPH). All data were collected from the medical records of patients in the gastroenterology department. These data were pseudonymized and processed by medical staff in the gastroenterology department (principal investigator or any person under his responsibility). The study was therefore an internal research study, in accordance with the Commission nationale de l'informatique et des libertés. In addition, participants were collectively informed by posters in the emergency department. Any opposition by patients to taking part in the study was taken into account. The study was registered in the hospital's data processing register with the Cayenne Hospital's Data Protection Officer.

Results

Over the study period, 1110 patients were admitted for suspicion in corpore drug transport. 144 patients underwent digestive endoscopy for pellet extraction. Cocaine pellets were found in 111 patients, who were included in the analyses. Thirty three exclus patients: 3 carrying cannabis and 30 with endoscopic examinations finding no pellets. Of these 30 patients, 20 were pregnant women in whom no imaging was performed prior to endoscopy. 10 patients had endoscopy with no pellets found, and had had at least one imaging prior to endoscopy. Among them, there were 2 false positives on the CT scan, 3 patients with errors in counting the number of pellets by the police, 2 patients with gastric pellets which had progressed into the small intestine at the time of the UGE and 3 patients who had hidden expelled pellets resulting in a counting error. One hundred and eleven patients were included in the analysis (Fig.1).

Eighty-three patients were men (75%) and twenty-eight women (25%), with a median age of 25 years [20-33] (Table 1).

Six patients (21% of women population, 5% the population) were pregnant.

Of the 111 patients, 110 had had at least one imaging. One pregnant woman did not have initial imaging, while 5 others did (pregnancy was not known before). At least one pellet was found on imaging prior the endoscopy in all patients. The type of imaging, the time between imaging and endoscopy, the number of pellets and the location are shown in table 1. The delay time between imaging and endoscopy was 6 hours [3-15]. Time depended on availability of endoscopy and/or operating room and police team. The pellets were located mainly in the sigmoid (31%), left colon (30%), right colon (28%) and stomach (28%).

Thirty-three patients (30%) had gastroduodenal pellets on imaging. All benefited from a UGE+/- colonoscopy. Pellets were found in the stomach/duodenum in 29 patients (88%), in the colon in 3 patients (10%) and not found at gastroscopy and colonoscopy in 1 patient for whom the pellet had progressed into the small intestine at the time of endoscopy.

Eighty-one patients had at least one colorectal pellet on pre-endoscopy imaging. One did not have a colonoscopy because the (rectal) pellet was expelled before the endoscopy. All the rest had a colonoscopy (99%) and the pellets were found in all of them.

None of the patients had pellets in the small intestine (except for the duodenum) on pre-endoscopy imaging.

No patient without pellet on pre-endoscopy imaging underwent endoscopy.

The median time between hospitalization and endoscopy was 3 days [2.5-4].

Of the 111 patients, 82 underwent endoscopy for delayed evacuation according to our definition (74%). Twenty nine underwent early endoscopy, including 2 for pregnancy, 7 for gastric stagnation >24h, 6 for caecal stagnation >24h and 14 for 1-3 colonic pellets with difficulty in taking PEG and tolerating fasting.

Forty patients underwent UGE and 89 colonoscopy, 18 of whom had both examinations. Upper gastrointestinal endoscopy was performed under general anaesthesia in 23 patients (58%), including 12 (52%) with spontaneous ventilation and 11 (48%) with intubation; under sedation in 13 patients (32%) and under local anaesthesia with lidocaine in 4 patients (10%). Another eighty-nine patients underwent colonoscopy: 18 (20%) under general anaesthesia, 27 (30%) under sedation and 44 (50%) without sedation. During endoscopy, pellets were located mainly in the sigmoid (35%), cecum (26%) and stomach (25%). The median number of pellets removed was 1 [1-4] (Fig.2 and 3).

The equipment used was mainly an endoscopic basket and a polypectomy loop, with type 4 pellets in 100% of cases.

Fifty-nine patients (54%) underwent post-endoscopy imaging. Of the 51 patients who did not undergo post-endoscopy imaging, 4 were pregnant women, and 39 patients had undergone CT imaging prior to endoscopy, enabling an accurate count of the number of pellets remaining to be evacuated endoscopically.

No patient presented any per or post-endoscopic complications. No pellets ruptured or cracked. One patient was hospitalized in intensive care prior to endoscopy for symptoms (palpitations, sweating, tachycardia, psychomotor agitation) suggestive of acute cocaine intoxication due to pellet rupture, with a positive urine test. Endoscopy was performed after medical and surgical discussion. The extracted pellets were found to be intact. No other patient was admitted to intensive care after the endoscopy. No patient showed post-endoscopy acute cocaine intoxication.

In terms of efficacy, endoscopy was successful for 101 patients (92%). There were 9 reports of failed extractions, due to poor tolerance of colonoscopy, large number of pellets (10 to 16 pellets) in 7 patients or difficulty in passing through the esophageal orifice in the 2 patients who underwent endoscopy without general anesthesia. All patients who underwent a 2nd endoscopy had successful pellet extraction.

Discussion

Our study included 111 patients and presents the largest cohort to date. No per or post-endoscopic complications were observed. The efficacy of pellet extraction was high (92% after the first endoscopy and 100% after the second endoscopy). These results were in agreement with previous studies carried out at the Cayenne hospital [16]. All the pellets were type 4 according to the classification of McCarron and Pidoto [5, 6].

The population studied was similar to that found in the literature. The ages were equivalent (median age 25 years) [17], as was the sex distribution (sex ration M/F 4/1) [3, 10].

The recommendations for the expulsion of cocaine pellets are based on conservative management. Several studies recommend the use of laxative and close monitoring [2, 9-11, 18]. This management is effective and the complication rate is low (less than 5%). A non-hospital management is suggested in some study [18]. However, complete expulsion can take a long time, from 3 to 5 days [19-21].

Endoscopy is not recommended in patient management mostly for fear of rupture during extraction. Some fatal outcome has been reported [12]. However, in this case, the drug was contained in a crude packaging (condom). Nowadays, the drug is mostly transported in micro-industrial packaging, with a

low risk of breakage [2]. Recent studies have demonstrated the outcome of endoscopy for drug-type foreign bodies. A prospective study compared the outcome of patients undergoing endoscopic extraction of drug baggies (less resistant than type 4 pellets) versus those receiving medical treatment [22]. Length of hospital stay and complication rate were lower in the endoscopic group. The drug baggies were exclusively intragastric, and mainly heroin and methamphetamine. Another study report in 2022 a successful endoscopic extraction of an intragastric heroin baggie [23]. In a letter to the editor, a team mentioned endoscopy for heroin baggie extraction, but also raised the question of endoscopy for cocaine pellets with a trained team and after medico-surgical discussion [24]. Endoscopy has been purposed as an alternative to surgery in case of gastric stagnation for a single pellet in an asymptomatic patient [1].

The mean time to endoscopy in Cayenne hospital is 3 days. This is the cut-off point chosen to define stagnation and may lead to endoscopy. This choice was made for several reasons :

- In our clinical experience, and as reported by previous studies in our center [14, 16], almost 90% of people have a complete evacuation of pellet after 2 days.
- Transporting drugs (cocaine) in digestive tract is not harmless. In a study of 581 body packers in France, the average hospital stay was 5 days [19]. Some patients had a longer stay (up to 18 days) without pellet rupture. The question that may arise is how long a person can be left with cocaine in the digestive tract, in complete safety, without risk of rupture. There are no robust data in the literature on this subject. In some studies, surgical management was proposed after 5 days of pellet stagnation [25, 26].
- The team of gastroenterologists at Cayenne Hospital is trained for this type of procedure.
- Type 4 pellets, with a low risk of ruptures, is the most common in French Guyana.
- In some countries, asymptomatic body packers are treated outside hospital in detention facilities under medical supervision [3, 18]. In France, body packers are monitored in hospital [14, 16, 19]. French Guiana is suffering from the scourge of cocaine trafficking and the number of body packers continues to rise, leading to saturation of the judicial, prison, medical, police and customs systems [13]. The duration of police custody in France is 96 hours and in French Guiana not all body packers are incarcerated at the end of this period, which can complicate matters for those who have not finished expelling and who will not be incarcerated: return home with intracorporeal drugs or hospitalisation in a conventional ward among patients who are not involved in drug trafficking.

For all these reasons, we have set a threshold of 3 days for the proposal and performance of an endoscopy.

However, 26% of patients underwent early endoscopy on day 1 or day 2 because of pregnancy, gastric or caecal stagnation more than 24h or when they had difficulty tolerating the fast or refused to drink PEG (if only a small number (less than 3) of pellets remained).

The management of pregnant women with body packers is delicate [27]: they should not benefit from imaging, which does not allow us to know the evolution of pellet expulsion. In our center, it was agreed to carry out an upper and lower digestive endoscopy to check vacuity, after 2 stools without pellets, if

the patients agreed. This attitude is questionable, especially as it leads to normal endoscopies without pellets. Consideration is currently being given to improving management in pregnant women.

Endoscopic management in body packers needs further investigation. The type of management may depend on the location of the pellets. In some center, as at the Hôtel-Dieu in Paris, a low-dose CT scan is systematically performed. Patients with a gastric location are fasted and monitored in continuous care, otherwise a light diet is authorized [28]. In Cayenne hospital, patients undergo plain radiography at the admission. This exam can confirm the presence of pellets but does not give a precise description of their location. In fact, errors in gastric location, in particular, may occur. So, in Cayenne hospital everybody is fasted.

The ESGE recommends against endoscopic retrieval of drug packet. They recommend close observation in asymptomatic individuals who have concealed packets of drugs by swallowing ("body packing) and surgical referral in cases of suspected packet rupture, failure of packets to progress, or intestinal obstruction. But the role of endoscopy appears to be an alternative to surgery in asymptomatic patient [1], and reduce the duration of strict fasting and the length of observation in intensive care. In our study, endoscopy was conducted for gastric stagnation in 25% of cases.

Methods used to perform the endoscopy must be discussed. In the presence of a gastric pellet, endoscopy is generally performed under general anesthesia, but can also be performed under sedation with Midazolam and Morphine, depending on local protocol. There have been reports of failed passages through the esophageal orifice when UGE was done under sedation, which suggests that all examinations should be performed under general anesthesia. Moreover, a large number of colonic pellets was associated with extraction failure. This raises the question of defining a maximum number of pellets and systematically performing colonoscopy under general anesthesia for those with a high number of pellets.

The equipment used for removal was usually basket. However, the size of the pellets did not always allow this equipment to be used. For larger pellets we used large polypectomy loops.

In our experience the cocaine transported is generally in powder form, but a new form, liquid cocaine, is found in condoms [29]. We encountered one such case during a period outside the study: an endoscopic withdrawal was successfully performed. However, even greater vigilance is required in such situations.

To end, the limitation of this study is its retrospective nature, leading to memory bias, although this is partly remedied by the quality of the endoscopy reports (many details on indication and context).

Conclusion

Endoscopic removal of type 4 cocaine pellets was a safe method, with no complications in our study. The success rate of a first digestive endoscopy was 92% but this rate could be further improved by performing the endoscopy under general anesthesia (100% success rate at the second endoscopy). To our knowledge, with 111 studied patients, this is the largest real-life study of endoscopic removal of cocaine pellets in the body packers. These results will need to be confirmed by a larger prospective study based on a well-protocolized pellet-type follow-up medical record. Digestive endoscopy could be

an alternative to surgery in certain cases of body packers. Since this study we have improved the protocol for the endoscopic management of pellets. It will also be interesting to carry out a cost-effectiveness analysis of endoscopic management versus conservative medical treatment in countries where body packers are monitored exclusively in hospital. It will also be interesting to assess whether allowing food intake results in less recourse to endoscopy, explained by better intestinal motricity.

Table 1: Population characteristics

Population characteristics	Population (n=111)
Age	25 [20-33]
Sexe	
- Male	83 (75)
- Female	28 (25)
Pregnancy	6 (5)
Imagery before endoscopy	
- Abdominal plain radiography	104 (96)
- CTscan	53 (48)
- Abdominal plain radiography and CT scan	49 (44)
- Abdominal ultrasonography	2 (2)
Number of pellets on the imagery before endoscopy	1 [1-3]
Location of pellets on the imagery before endoscopy	
- Stomach	30 (28)
- Duodenum	2 (2)
- Ileon	3 (3)
- Caecum	11 (10)
- Right colon	31 (28)
- Transverse colon	16 (15)
- Left colon	31 (30)
- Sigmoid	34 (31)
- Rectum	16 (15)
Delay imagery-endoscopy (hours)	6 [3-15]
Delay before endoscopie (day)	3 [2.5-4]
Endoscopy	
- Upper gastro-intestinal endoscopy	40 (36)
- Colonoscopy	89 (80)
- Upper gastro-intestinal endoscopy and colonoscopy	18 (16)
Modality of the endoscopy	
- General anesthesia	32 (29)

- Sedation	32 (29)
- Without sedation	47 (42)
Number of pellets founded in endoscopy	1 [1-4]
Location of pellets in endoscopy	
- Stomach	28 (25)
- Caecum	26 (24)
- Right colon	12 (11)
- Transverse colon	14 (13)
- Left colon	23 (21)
- Sigmoid	39 (35)
- Rectum	22 (20)
Extraction material	
- Basket	66 (60)
- Polypectomy loop	42 (38)
- Manual	6 (5)
Data were expressed as median [IQR] or proportion (%).	
CT computed tomography	

Fig. 1: study flow chart

Fig.2: Gastric pellets, endoscopy after 48h

Fig.3: Colon pellets

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