

Detection of Intestinal Drug Containers: Clinical and Radiological Features

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Body packers, also known as “swallowers,” “internal carriers” or “couriers,” are a recognized means of international drug smuggling, mainly for cocaine and heroin. The first case reported in the medical literature, in 1973, described a patient who had swallowed a condom filled with hashish and presented 13 days later with a small bowel obstruction [1]. This worldwide problem has been increasing for more than 30 years [2]. To thwart this phenomenon, several non-invasive tests are being explored, but with limited success. Plain abdominal X-ray film, computed tomography and abdominal ultrasound have been reported to be effective tools for the detection of intestinal drug containers [2]. The role of urine toxicology testing as an initial screening tool is still controversial due its poor sensitivity.

We present a case of a 41 year old male drug “body packer” who suffered cardiopulmonary arrest due to heroin leakage and overdose intoxication. We discuss the imaging approaches to the identification of body packing and emphasize the efficacy of the multi-detector computed tomography as a diagnostic tool.

PATIENT DESCRIPTION

A 41 year old man, a known drug abuser, presented in our emergency room with complaints of general weakness, fatigue and pre-syncope. On presentation, he appeared pale and sedated. During the anamnesis he collapsed and the monitor showed asystole. He underwent cardiopulmonary resuscitation according to ACLS (Advanced Cardiac Life Support) principles. After his pulse was restored he remained in a comatose state and ventilator-dependent. His blood pressure was 80/40 mmHg, his pulse was irregular with 115 beats/minute, respiration rate was 8/minute, and temperature was 37.1°C. Physical examination revealed diminished bowel sounds and pupil myosis with no response to light. Laboratory tests were normal except for opiates detected in the urine.

A non-contrast-enhanced head CT scan performed at the time of his admission showed no evidence of acute intracranial hemorrhage or mass effect. The patient was admitted to the cardiac intensive care unit. Treatment with naloxone, an opiate intoxication antagonist, resulted in severe withdrawal symptoms including diaphoresis, tachycardia and hypertension, followed by hyperthermia and seizures. A plain abdominal radiograph revealed multiple radiopaque foreign bodies within the lumen of the stomach and bowel, suggestive of body-packing [Figure A]. For further investigation an intravenous contrast-enhanced CT scan of the abdomen was performed, which revealed multiple sausage-shaped foreign bodies

of various densities within the lumen of the stomach and large bowel, consistent with heroin packages. Air trapped between layers of latex was identified in some packages [Figures B and C]. This finding may suggest a loss of integrity of the packing material. The patient was given lactulose and an electrolyte lavage solution and was under observation for passage of the drug containers during defecation [Figure D]. Each intestinal package contained white powder, identified as heroin. A few months later the patient died due to pneumonia, severe septic shock and multi-organ failure.

COMMENT

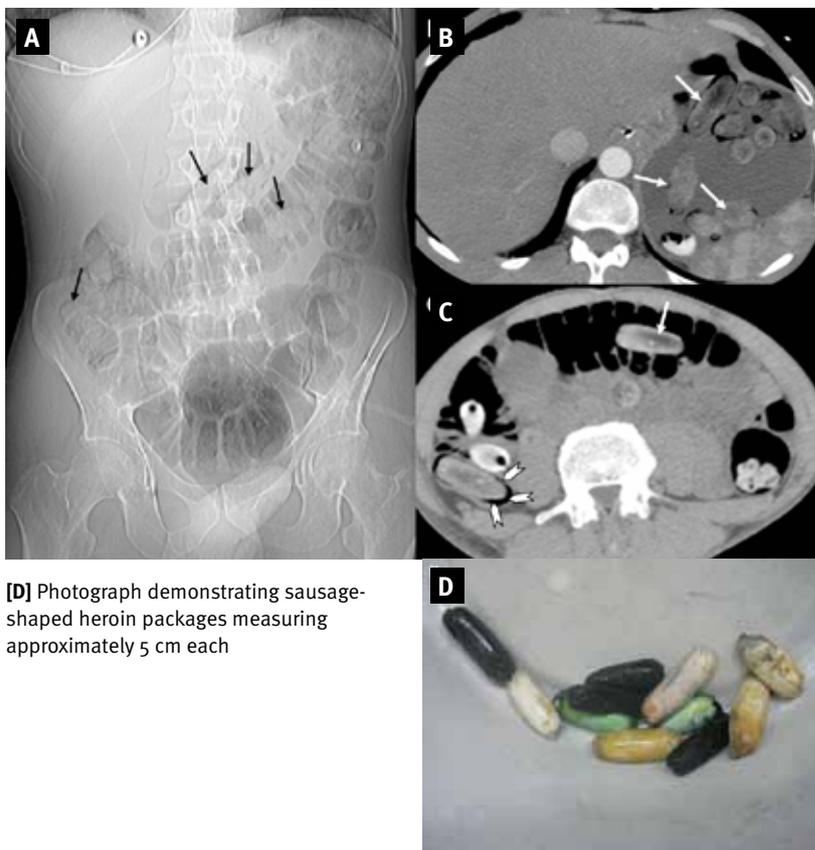
Drug smuggling by internal concealment is a worldwide problem. Body packing is mainly used for carrying heroin, cocaine, amphetamines and cannabis. The packets are most often latex condoms. These packets can be internally concealed by swallowing or insertion into the rectum or vagina.

Body packers usually present to health care facilities for one of three reasons: drug-induced toxic effects, intestinal obstruction, or medical assessment after arrest. Packets leaking illicit drugs may induce signs and symptoms of systemic toxicity. Identification of these parameters is crucial for preventing impending catastrophe.

Clinical assessment and investigation depends on the presentation of each patient. Essential for the diagnosis and treatment are a detailed history (type of drug, number of packets, nature of the wrapping, gastrointestinal symptoms),

[A] Plain abdominal radiograph showing multiple sausage-shaped foreign bodies (arrows) within the lumen of the stomach and bowel suggestive of “body-packing”

[B and C] Axial contrast-enhanced CT images of the abdomen showing multiple sausage-shaped foreign bodies (arrows) of various densities within the lumen of the stomach and large bowel, consistent with heroin packages. Note the double-condom sign (arrowhead) in which air is trapped between layers of latex. This finding may suggest a loss of integrity of the packing material



[D] Photograph demonstrating sausage-shaped heroin packages measuring approximately 5 cm each

thorough physical examination (vital signs, mental status, pupil size, bowel sounds, skin findings, rectal and vaginal examination), and a high index of suspicion.

Radiographic evaluation is one of the most popular and effective diagnostic tests. It can be divided into two major categories: initial radiographic studies (plain radiography and ultrasonography), which may be used as a screening tool or for rapid confirmation of the diagnosis, and advanced radiographic studies (abdominal CT or contrast-enhanced abdominal radiography), which provide a more definitive answer if equivocal results are obtained on the

initial screening test and may be used for follow-up and for documenting the clearance of the gastrointestinal tract.

A plain abdominal X-ray may reveal several specific signs suggesting body packing: namely, multiple radiodense foreign bodies with unnatural uniformity, a “rosette-like finding” formed by air trapped in the knot where the condom is tied, and a “double-condom” sign where air trapped between layers of latex makes them more visible. The radiopacity varies: hashish is denser than stool, cocaine appears similar to stool, and heroin has a gaseous transparency. Plain abdominal radiography has a sensitivity of 85–90% [3].

The speed and safety of ultrasonography makes it appealing for the initial evaluation of body packers, but there are little data to support its use. According to one study the positive predictive value of an ultrasound examination was 97.6% and provided accurate information about the presence or absence of intestinal drug containers in 47 of 50 cases (94%) [4]. Contrast-enhanced abdominal radiography identifies drug packets as filling defects within the contrast medium.

Abdominal CT, especially when performed with negative oral contrast agent (such as water), easily identifies drug packets, which typically appear as an “air-ring sign” – foreign bodies surrounded by a small amount of gas, or as an “onion sign” – a multilayer circular ring-like zone similar in appearance to an onion section. Intravenous contrast material is not really necessary for the detection of the drug packets on abdominal CT scan. In one study, 124 of 158 suspected body packers were conclusively diagnosed as concealing heroin internally. Abdominal-pelvic CT without a contrast agent was used on the 158 suspected body packers, and 124 were diagnosed as positive and 34 as negative. This established a 100% sensitivity, 100% specificity, 100% positive predictive value and 100% negative predictive value for conventional CT [5].

Management decisions depend on the physical findings, type of drug, location of packets within the gastrointestinal tract, and type and size of packets. If there is evidence of drug-induced toxic effects, consultation with a medical toxicologist or a regional poison control center is advised. Depending on the symptoms, systemic treatment must be applied as soon as possible. Toxicology tests on blood and urine combined with radiological information may help in recognition of the exact chemical compound of the illicit drug. When available, an antidote agent must be given.

In asymptomatic patients, the current approach is to allow spontaneous pas-

sage of the packets during observation in the intensive care unit. According to several large studies the failure rate of such conservative management, defined as any indication for surgery, is only about 5% [3]. This rate may decrease as packet production improves.

In both symptomatic (unless the patient is being prepared for immediate surgery) and asymptomatic patients, gastrointestinal decontamination should be attempted. Activated charcoal reduces the lethality of oral cocaine. Whole-bowel irrigation with electrolyte lavage solution results in gentle evacuation of the gastrointestinal tract and is safe for use in body packers. The use of an oil-based laxative is still under debate since it reduces the tensile strength and “burst” volume of latex products. Abdominal CT may also be used in the follow-up of body packer patients.

Packets that are accessible to the endoscopist most likely represent only

a fraction of the gastrointestinal burden, and the risk of rupture inherent in removing the packets usually outweighs the benefit. Therefore, endoscopy is preserved for patients with gastric outlet obstruction induced by only one packet embedded in the pyloric area [3].

Early surgery was previously recommended for asymptomatic body packers, probably because of the high rate of rupture of packets with primitive wrapping. Currently, surgery is indicated only for patients with acute cocaine poisoning or gastrointestinal obstruction or perforation. One or more enterotomies are performed, preferably in the sterile portion of the gastrointestinal tract, and the intestinal contents are “milked” toward either the incisions or the anus.

In conclusion, body packing should be suspected in any individual with signs of drug-induced toxic effects after a recent arrival at city terminals or when there is no history of recreational drug

use. Radiological evaluations, especially a CT scan, are essential for the diagnosis, management and follow-up.

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Capsule

An anatomically comprehensive atlas of the adult human brain transcriptome

Neuroanatomically precise, genome-wide maps of transcript distributions are critical resources to complement genomic sequence data and to correlate functional and genetic brain architecture. Hawrylycz et al. describe the generation and analysis of a transcriptional atlas of the adult human brain, comprising extensive histological analysis and comprehensive microarray profiling of ~900 neuroanatomically precise subdivisions in two individuals. Transcriptional regulation varies enormously by anatomical location, with different regions and their constituent cell types displaying robust molecular signatures that are highly conserved between individuals. Analysis of differential gene expression and gene co-expression relationships demonstrates that brain-wide variation strongly reflects the distributions of major cell classes such as neurons,

oligodendrocytes, astrocytes and microglia. Local neighborhood relationships between fine anatomical subdivisions are associated with discrete neuronal subtypes and genes involved with synaptic transmission. The neocortex displays a relatively homogeneous transcriptional pattern, but with distinct features associated selectively with primary sensorimotor cortices and with enriched frontal lobe expression. Notably, the spatial topography of the neocortex is strongly reflected in its molecular topography – the closer two cortical regions, the more similar their transcriptomes. This freely accessible online data resource forms a high-resolution transcriptional baseline for neurogenetic studies of normal and abnormal human brain function.

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Eitan Israeli

The surprising thing about young fools is how many survive to become old fools

Heinrich Heine (1797-1856), German poet, journalist, essayist and literary critic. He is best known outside Germany for his early lyric poetry, which was set to music in the form of Lieder (art songs) by composers such as Robert Schumann and Franz Schubert. He converted from Judaism to Christianity as a young man