

REVIEW ARTICLE

CURRENT CONCEPTS

Body Packing — The Internal Concealment of Illicit Drugs

Stephen J. Traub, M.D., Robert S. Hoffman, M.D., and Lewis S. Nelson, M.D.

IN 1973, TWO PHYSICIANS FROM TORONTO ADMITTED A PATIENT IN WHOM a small-bowel obstruction developed 13 days after he had swallowed a condom filled with hashish.¹ The condom was surgically removed, and the first reported “body packer” recovered uneventfully. The transportation of illicit drugs by internal concealment has since evolved into an important means of international cocaine and heroin smuggling, with accounts of body packing reported in virtually every large city in the United States and every country in the developed world.

Body packers may also be called “swallowers,” “internal carriers,” “couriers,” or “mules.” The term “body stuffing,” occasionally and inappropriately used synonymously with body packing, refers to the swallowing of relatively small amounts of loosely wrapped drug because of the fear of arrest. This distinct clinical entity has been reviewed elsewhere.² In addition to transporting cocaine and heroin, body packers may smuggle amphetamines,³ 3,4-methylenedioxyamphetamine (“ecstasy”),^{4,5} marijuana,⁶ or hashish.¹ Occasionally, they ingest more than one type of drug.⁷ Body packers usually carry about 1 kg (2.2 lb) of drug, divided into 50 to 100 packets of 8 to 10 g each (0.3 to 0.4 oz), although persons carrying more than 200 packets have been described.^{8,9} Each packet of cocaine, heroin, or amphetamine contains a life-threatening dose of drug.

Federal agencies report that body packing has increased recently, possibly because the increased border security since the events of September 11, 2001, has made conventional smuggling more difficult.¹⁰ Alternatively, more body packers may be detected simply as a result of increased airport security. New York’s Kennedy International Airport reported 193 body-packing arrests during the seven months from October 2001 to April 2002, as compared with 202 during the entire preceding year.¹⁰

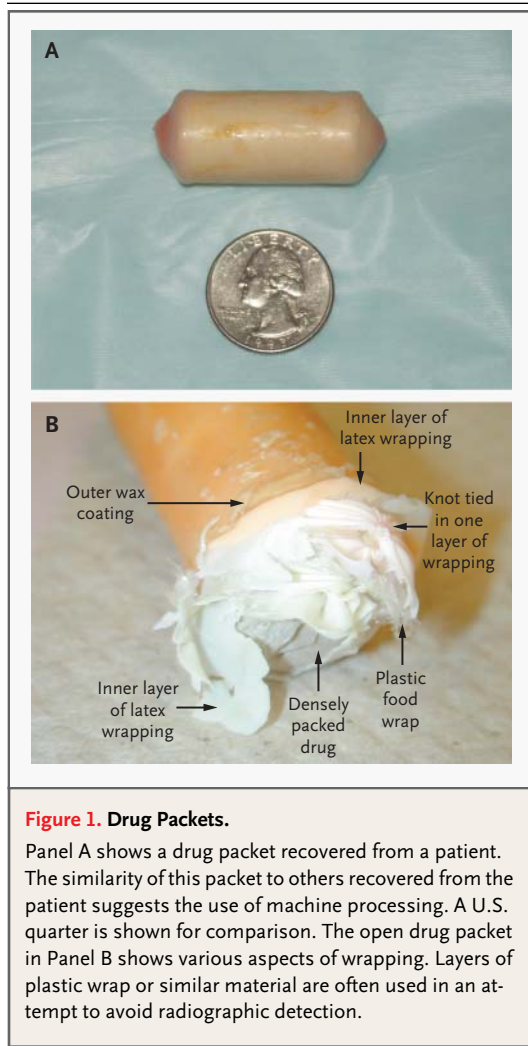
Although early body packers were predominantly young men, the practice now crosses demographic groups. The use of children as body packers has been reported in separate incidents involving two boys, 12 and 16 years old. Each was unaccompanied, and neither raised the suspicion of U.S. Customs Service officials. One child presented to health care providers after failing to rendezvous with his handlers; the other was discovered unconscious after a heroin packet ruptured.¹¹ The use of pregnant women as body packers has also been described.¹² Compensation may be in the form of cash (several thousand dollars per trip)¹³ or safe passage into a foreign country. In addition, family members or personal property may be held as collateral to ensure the body packer’s cooperation.

Drug packets, which previously varied in size and construction,¹⁴ are now well crafted,¹⁵ with a precision that suggests the use of an automated process (Fig. 1A). First, the drug is densely packed into a latex sheath, such as a condom or balloon. This layer is tied at the open end, covered with several other layers of latex, and sealed with a hard wax coating (Fig. 1B). Aluminum foil, plastic food wrap, carbon paper, or other materials may be incorporated to alter the radiodensity, in an attempt to limit the risk of detection.¹⁶

From the Department of Emergency Medicine, New York University School of Medicine, Bellevue Hospital Center, and the New York City Poison Control Center — both in New York (S.J.T., R.S.H., L.S.N.); and Beth Israel Deaconess Medical Center and Harvard Medical School, Boston (S.J.T.). Address reprint requests to Dr. Traub at the Division of Toxicology, Department of Emergency Medicine, Beth Israel Deaconess Medical Center, Boston, MA 02215, or at straub@bidmc.harvard.edu.

N Engl J Med 2003;349:2519-26.

Copyright © 2003 Massachusetts Medical Society.



Although most body packers swallow packets, insertion of packets into the rectum^{4,17-19} and vagina^{5,17} has been reported. Constipating agents, such as diphenoxylate or loperamide, are frequently used.^{14,20} Transit times may be as brief as one or two days or as long as two to three weeks.²¹ After entering the country of destination, body packers use laxatives, cathartics, or enemas to help pass their cargo rectally.¹⁷

When entering the United States, travelers “reasonably suspected” of body packing may be detained. Customs officials may identify suspects through observation, noting persons with shaking hands, excessive perspiration, or clothing that disguises their body contours; inconsistencies in statements; intelligence gathered by other law-enforcement officers; or the use of specially trained dogs.

In most jurisdictions, suspects may be held for 24 to 48 hours for the initial investigation, although Customs officials usually consult the U.S. Attorney’s office if they wish to hold suspects for more than 8 hours.²² The initial investigation may involve an abdominal radiograph (obtained and read by an on-site physician at a large international airport or at a local medical facility) or an observation period during which the suspect’s bowel movements are monitored until several packet-free stools have been passed.²²

INTERACTIONS WITH HEALTH CARE PROVIDERS

Body packers usually present to health care providers for one of three reasons: drug-induced toxic effects, intestinal obstruction, or medical assessment after detention or arrest. The circumstances under which the patient presents will direct the clinical assessment, laboratory evaluation, and subsequent management. Children should be evaluated in a manner similar to that used for adults, although children’s protective services should immediately be consulted.

HISTORY TAKING

A detailed history should be obtained, including information about the drug packets (the type of drug, the number of packets, and the nature of the wrapping) and gastrointestinal symptoms (pain, bloating, vomiting, obstipation, and constipation). Body packers generally know the number of packets they carry, in order to determine when passage is complete. However, they are often dishonest historians. In rare cases, patients may be unable to provide a history owing to profound drug-induced toxic effects. Body packing should be suspected in anyone with signs of drug-induced toxic effects after a recent arrival on an international flight or when there is no history of recreational drug use.

PHYSICAL EXAMINATION

Vital signs, mental status, pupil size, bowel sounds, and skin findings may help identify drug-induced toxic effects in a body packer if a package leaks or ruptures. Heroin overdose causes sedation, miosis, and diminished bowel sounds, which generally precede the onset of lethal respiratory depression. Cocaine overdose causes anxiety, dilated pupils, diaphoresis, tachycardia, and hypertension, followed by hyperthermia, seizures, and cardiovascular col-

lapse. Since the packets tend to leak before they rupture, signs and symptoms related to a specific drug should be sought early in the evaluation to identify impending catastrophic effects.

The abdominal examination may reveal distention or palpable packets.¹⁸ Gentle rectal²³ and vaginal examinations may also disclose packets. The remainder of the physical examination is generally not helpful.

DIAGNOSTIC TESTING

RADIOGRAPHIC EVALUATION

Patients suspected of being body packers require radiographic evaluation (Table 1). An initial study such as plain radiography or ultrasonography may be used as a screening tool or for a rapid confirmation of the diagnosis when the index of suspicion is high. Contrast-enhanced abdominal computed tomography (CT) or barium-enhanced radiography provides a more definitive answer when a strong suspicion of body packing exists.

Initial Radiographic Studies

Several specific signs on the abdominal radiograph may suggest the presence of body packing: multiple radiodense foreign bodies (Fig. 2A), a "rosette-like finding" formed by air trapped in the knot where a condom is tied,^{19,26} and a "double-condom" sign,^{14,26,27} in which air trapped between layers of latex makes them more visible. The last finding may also suggest a loss of integrity of the packing material.²⁸

The results of several large series^{14,18-20,23,29,30} suggest that plain abdominal radiography has a sensitivity of 85 to 90 percent. False positive studies may be due to bladder stones,³¹ inspissated stool,²⁹ or

intraabdominal calcifications.³² The reasons for false negative studies are less well established but may be due to the reader's inexperience²³ or the technical quality of the study. It is notable that the findings on screening abdominal radiographs were interpreted as negative in two patients who subsequently passed 106 packets²⁴ and 135 packets.¹⁴

The speed and safety of ultrasonography make it appealing for the initial evaluation of body packers, but there are scant data in support of its use. Two small studies^{26,33} indicate a high correlation between ultrasound readings and findings on plain abdominal radiography. Specific ultrasound findings include hyperechogenic linear or round structures with acoustic shadowing.²⁶

Advanced Radiographic Studies

Contrast-enhanced CT easily identifies drug packets, which typically appear as foreign bodies surrounded by a small amount of gas (Fig. 2B). CT is more sensitive than plain radiography.^{24,34} Sufficient assessment of sensitivity is lacking, however, and a single false negative study has been reported.²⁵ CT has been used experimentally to identify the contents of packets on the basis of differences in the Hounsfield units (cocaine has a value of -219 Hounsfield units, and heroin a value of -520), although this approach has not been validated in clinical practice.³⁵

Contrast-enhanced abdominal radiography identifies drug packets as filling defects within the contrast medium. In one series, both the false positive and false negative rates were only 4 percent.²⁰ The comparative value of CT and barium-enhanced radiography has not yet been determined. Since barium may interfere with the subsequent performance of CT, CT may be the preferred initial choice.

Table 1. Radiographic Approaches to the Identification of Body Packing.

Study	Indications	Sensitivity	Comments
Plain abdominal radiography	Screening test	85–90%	Sensitivity for finding small numbers of packets may be lower May miss substantial numbers of packets ^{14,24}
Ultrasonography	Screening test	Not established	Has the potential to be very useful Large studies needed
Computed tomography	Used if equivocal results obtained on initial screening test Used to document that gastrointestinal tract is clear	Not established	Large studies lacking One false negative study reported ²⁵
Contrast-enhanced abdominal radiography	Used if equivocal results obtained on initial screening test Used to document that gastrointestinal tract is clear	96%	Reported sensitivity based on one study ²⁰

URINE TOXICOLOGY TESTING

Some authors favor urine toxicology testing as an initial screening tool.⁹ Because of its poor sensitivity (37 percent in one large study³⁰), however, we do not recommend urine toxicology testing as part of the routine evaluation.

MANAGEMENT**SYMPTOMATIC HEROIN POISONING**

Body packers who present with opioid poisoning can usually be treated conservatively with a continuous infusion of the opioid antagonist naloxone hydrochloride (Narcan, Dupont Merck). Naloxone should be given in increments of 2 to 5 mg until there is a clinical response; the dose that elicited a response should then be given hourly as a continuous infusion. Because of the enormous amount of drug released when a packet ruptures, very high doses may be necessary. In rare cases, opioid poisoning may cause acute lung injury, which is not reversed by the administration of naloxone. Acute lung injury is treated with supplemental oxygen or intubation as needed. Once their condition has been stabilized, body packers with symptomatic heroin poisoning can be treated in the same fashion as asymptomatic body packers (discussed below).

SYMPTOMATIC COCAINE POISONING

Since no drug sufficiently antagonizes the lethal effects of cocaine, immediate surgical removal of packets is indicated if the packets leak. Temporizing measures may include the administration of benzodiazepines for agitation and seizures, the administration of hypertonic sodium bicarbonate and lidocaine for ventricular dysrhythmias, and the administration of phentolamine or sodium nitropruside for severe hypertension. β -Adrenergic antagonists and mixed α - and β -adrenergic antagonists, such as labetalol, are absolutely contraindicated.³⁶ A more comprehensive discussion of the management of severe cocaine-induced toxic effects can be found elsewhere.³⁷

SYMPTOMATIC POISONING WITH OTHER DRUGS

Uncommonly, drugs other than heroin or cocaine may have toxic effects after the packets leak or rupture. Marijuana and hashish cause a depressed mental status that is not generally life-threatening; treatment is supportive. Amphetamines (including "ecstasy") may cause a clinical syndrome identical to that induced by cocaine; the approach to phar-

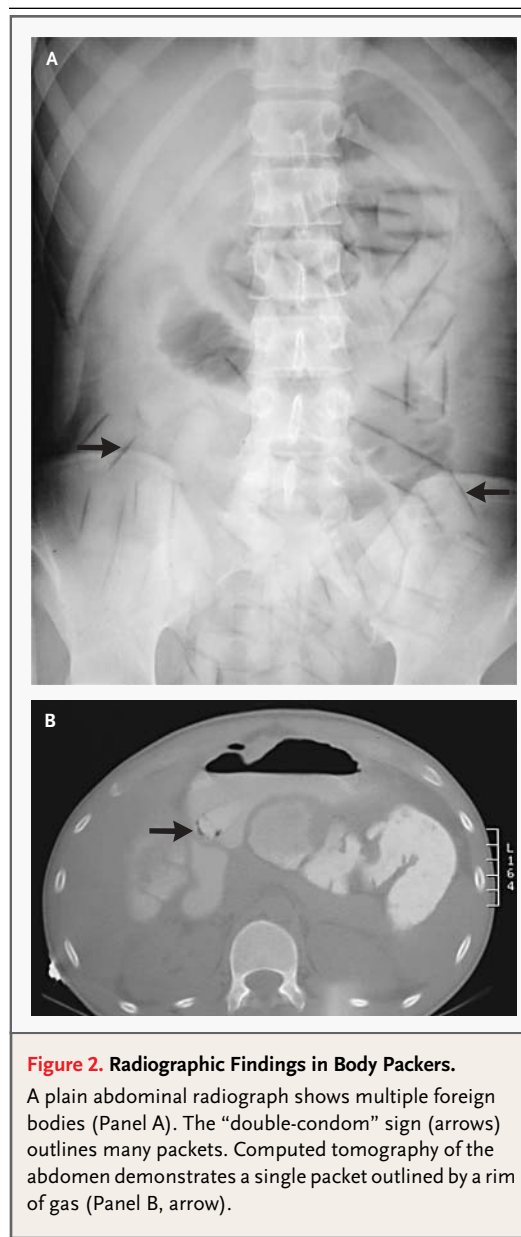


Figure 2. Radiographic Findings in Body Packers.

A plain abdominal radiograph shows multiple foreign bodies (Panel A). The "double-condom" sign (arrows) outlines many packets. Computed tomography of the abdomen demonstrates a single packet outlined by a rim of gas (Panel B, arrow).

macologic stabilization is similar to that used for cocaine, and prompt surgical removal of the packets is also indicated.

GASTROINTESTINAL OBSTRUCTION OR PERFORATION

Bowel obstruction^{14,23,38} is commonly reported in body packers; bowel perforation,³⁹ esophageal obstruction,^{40,41} and esophageal perforation⁴⁰ are less frequently noted. The number of packets ingested does not appear to correlate with the risk of these

complications. Prompt surgical intervention is indicated for these conditions.

ASYMPTOMATIC PATIENTS

Body packers who present to health care providers without any symptoms are usually in legal custody, but some may present because they fear packet rupture. Early surgery was once recommended for asymptomatic body packers, probably because of the high rate of rupture of packets with primitive wrapping.⁴² The current approach to care at many institutions, however, is to allow spontaneous passage of the packets during observation in the intensive care unit. Several large studies^{8,9,14,16,18,19,21,23,43} of such conservative management suggest that the rate of failure, defined as any indication for surgery, is only about 5 percent. This rate may actually be decreasing as packet production improves.¹⁵

DECONTAMINATION

ORAL AGENTS

Unless the patient is being prepared for immediate surgery, gastrointestinal decontamination should be attempted. Activated charcoal reduces the lethality of oral cocaine,⁴⁴ and 1 g per kilogram of body weight (up to 50 g) should be administered by mouth every four hours for several doses. The efficacy of naloxone limits the clinical importance of activated charcoal in heroin body packers.

Whole-bowel irrigation with a polyethylene glycol–electrolyte lavage solution results in a relatively gentle evacuation of the gastrointestinal tract and is safe for use in body packers.⁴⁵ We administer a polyethylene glycol–electrolyte lavage solution at a rate of 2 liters per hour in adults — a rate that frequently requires the use of a nasogastric tube. Whole-bowel irrigation should be continued until complete clearance of the gastrointestinal tract is documented. The use of oil-based laxatives, although occasionally recommended,^{16,20,43} should be avoided because they reduce the tensile strength and “burst” volume of latex products.⁴⁶ A massive gastrointestinal release of cocaine has been reported after the administration of oil-based laxatives.⁴⁷

AGENTS AFFECTING GASTROINTESTINAL MOTILITY

The combined use of the promotility agents erythromycin and metoclopramide was reported to be safe in the treatment of two body packers,⁴⁸ but further

data are necessary before this combination can be routinely recommended.

ENDOSCOPY

Although successful endoscopic removal of packets from the stomach has been reported,³⁸ the risk of packet rupture during the procedure has led others to caution against it.⁴² 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. The patient in whom only one packet fails to pass the pylorus may be the exception; endoscopy in such a patient may be a reasonable alternative to surgery. Although heroin packets can be removed endoscopically in an intensive care unit in which naloxone is available, cocaine packets should be removed only in the operating room, with a surgical team prepared to intervene in the event of packet rupture.

SURGERY

Surgery is indicated for patients with acute cocaine poisoning or gastrointestinal obstruction or perforation. One or more enterotomies are made, preferably in the sterile portion of the gastrointestinal tract, and the intestinal contents are “milked” toward either the incisions or the anus.^{38,49} Bowel cleansing as a result of prior aggressive administration of polyethylene glycol–electrolyte lavage solution may obviate the need for colostomy in some cases. After surgical emptying of the gastrointestinal tract, a final radiographic study (abdominal CT or barium-enhanced radiography) should be performed to document that the gastrointestinal tract is clear, since packets may be missed during the intraoperative evaluation.⁵⁰

CONFIRMATION OF GASTROINTESTINAL DECONTAMINATION

Patients who are treated conservatively should be observed until all packets are believed to have been passed; at that time, a confirmatory imaging study is indicated. The timing of this study is controversial. If the patient is deemed a reliable historian, the packet count may be used. Otherwise, passing three packet-free stools during continuous whole-bowel irrigation therapy for 12 hours, with a negative abdominal radiograph, is a reasonable end point. Packet counts and packet-free stools should never be used as the sole determinant that all packets

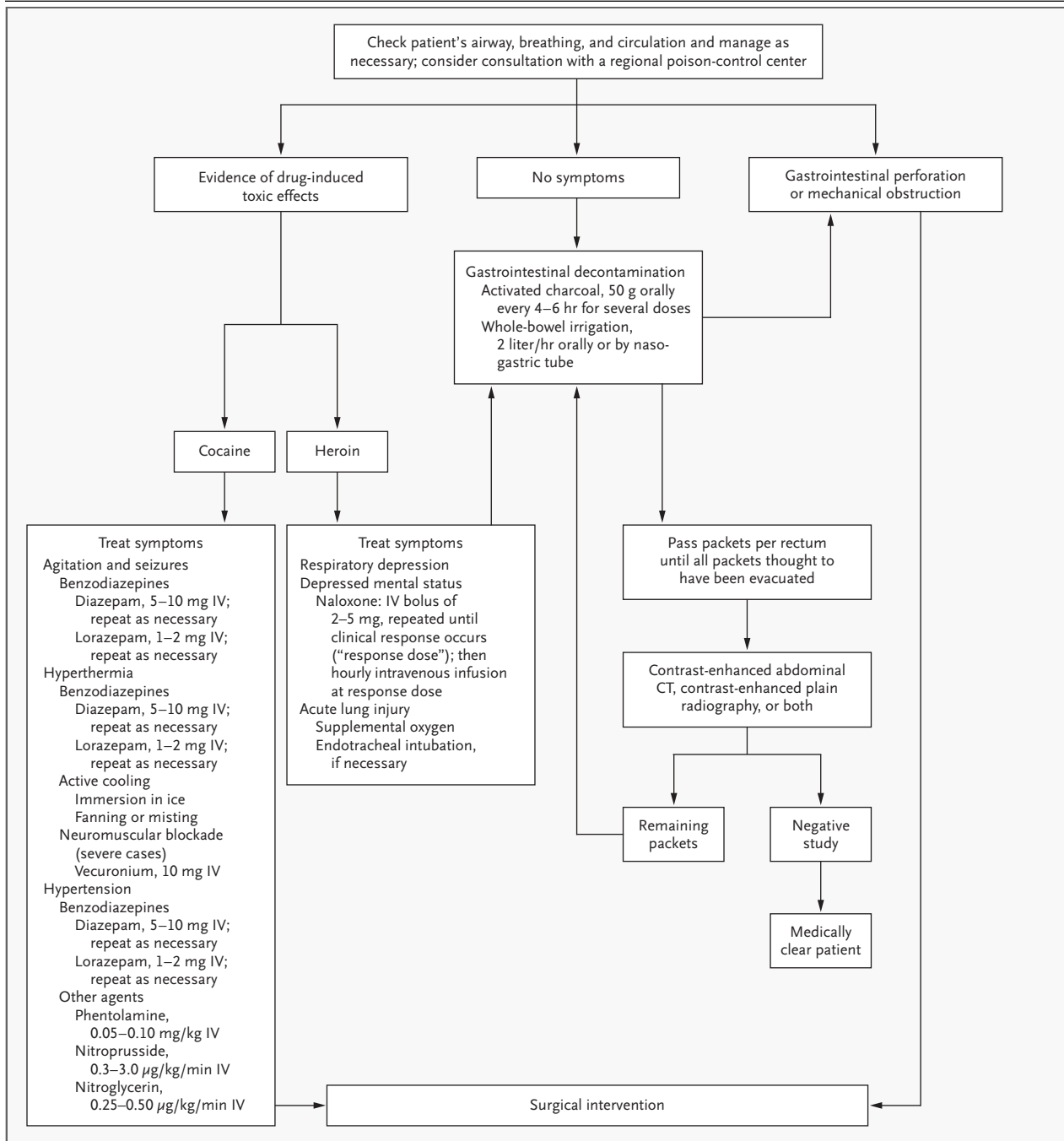


Figure 3. Algorithm for the Treatment of Body Packers.

Consultation with a medical toxicologist or a regional poison-control center is also advised. IV denotes intravenous, and CT computed tomography.

have been passed, since delayed rupture of retained bags has been reported.⁴¹ Similarly, CT or barium-enhanced radiography should be used to confirm the passage of all packets, since plain abdominal radiography is not sufficiently sensitive.

The care of body packers is challenging and may tax the most competent physician. A treatment algorithm has been devised¹¹ (Fig. 3), but it may not be appropriate for all patients. Consultation with a medical toxicologist or regional poison-control center is advised.

ETHICAL ISSUES

Body packers in legal custody may refuse to undergo invasive (i.e., rectal) examinations and radiography, but they cannot insist on being medically cleared and discharged. Appropriate management is admission for observation. In the unlikely event that a physician were served with a court order to forcibly examine or treat a body packer, hospital legal counsel would most likely seek injunctive relief on the grounds that the physician was the patient's advocate, not an agent of the state.

Caring for a body packer who is not yet in legal custody poses a dilemma. Should law-enforcement

officials be contacted, either to protect the medical staff or to take control of such a large quantity of drugs? There are no reports of in-hospital violence during attempts to recover drugs from body packers, and in the absence of a credible threat of violence, there is insufficient concern to override patient confidentiality. Most institutions have policies to address the issue of illicit drugs that are confiscated from patients; they usually involve the use of hospital security to confiscate the drugs and the use of the pharmacy to dispose of them. Conceptually, body packers are no different from other patients, and the therapeutic alliance between physician and patient should not be sacrificed solely on the basis of the amount of illicit drugs involved. Other problems may arise, and we strongly suggest the involvement of hospital-based legal counsel and the hospital ethics committee to help find a satisfactory resolution.

We are indebted to the following people for their expertise and suggestions in the preparation of the manuscript: Special Agent Christopher Trojan, Department of Justice Drug Enforcement Administration, New York Field Division; Lachlan Furrow, M.D., and Catherine Mahoney, J.D., Beth Israel Deaconess Medical Center, Boston; and Assistant Port Director Patrick O'Malley and Chief Inspector Matthew Farrell, U.S. Customs and Border Protection, Port of Boston.

REFERENCES

- Deitel M, Syed AK. Intestinal obstruction by an unusual foreign body. *Can Med Assoc J* 1973;109:211-2.
- June R, Aks SE, Keys N, Wahl M. Medical outcome of cocaine bodystuffers. *J Emerg Med* 2000;18:221-4.
- Watson CJE, Thomson HJ, Johnston PS. Body-packing with amphetamines — an indication for surgery. *J R Soc Med* 1991;84:311-2.
- Krishnan A, Brown R. Plain abdominal radiography in the diagnosis of the "body packer." *J Accid Emerg Med* 1999;16:381.
- Horrocks AW. Abdominal radiography in suspected 'body-packers.' *Clin Radiol* 1992;45:322-5.
- Dassel PM, Punjabi E. Ingested marijuana-filled balloons. *Gastroenterology* 1979;76:166-9.
- Gill JR, Graham SM. Ten years of "body-packers" in New York City: 50 deaths. *J Forensic Sci* 2002;47:843-6.
- Gherardi RK, Baud FJ, Leporc P, Marc B, Dupeyron JP, Diamant-Berger O. Detection of drugs in the urine of body-packers. *Lancet* 1988;1:1076-8.
- Bulstrode N, Banks F, Shrotria S. The outcome of drug smuggling by 'body-packers' — the British experience. *Ann R Coll Surg Engl* 2002;84:35-8.
- Claffey M. Stampede of drug mules at Kennedy: after 9/11 lull, heroin & ecstasy busts soar. *New York Daily News*. May 5, 2002:5.
- Traub SJ, Kohn GL, Hoffman RS, Nelson LS. Pediatric "body-packing." *Arch Pediatr Adolesc Med* 2003;157:174-7.
- Greenberg MI, Shrethra M. Management of the pregnant body packer. *J Toxicol Clin Toxicol* 2000;38:176-7. abstract.
- The Chicago swallows — today is a good day to die. *Washington, D.C.: U.S. Customs News*, June 1997. (Accessed December 1, 2003, at <http://www.customs.gov/hot-new/pressrel/1997/0612-01.htm>.)
- McCarron MM, Wood JD. The cocaine 'body-packer' syndrome: diagnosis and treatment. *JAMA* 1983;250:1417-20.
- Pidoto RR, Agliata AM, Bertoline R, Nainini A, Rossi G, Giani G. A new method of packaging cocaine for international traffic and implications for the management of cocaine body-packers. *J Emerg Med* 2002;23:149-53.
- Aldrighetti L, Paganelli M, Giacomelli M, Villa G, Ferla G. Conservative management of cocaine-packet ingestion: experience in Milan, the main Italian smuggling center of South American cocaine. *Panminerva Med* 1996;38:111-6.
- Wetli CV, Mittelman RE. The "body-packer syndrome" — toxicity following ingestion of illicit drugs packaged for transportation. *J Forensic Sci* 1981;26:492-500.
- Utecht MJ, Stone AF, McCarron MM. Heroin body packers. *J Emerg Med* 1993;11:33-40.
- Beerman R, Nunez D Jr, Wetli CV. Radiographic evaluation of the cocaine smuggler. *Gastrointest Radiol* 1986;11:351-4.
- Marc B, Baud FJ, Aelion MJ, et al. The cocaine body-packer syndrome: evaluation of a method of contrast study of the bowel. *J Forensic Sci* 1990;35:345-55.
- Jones OM, Shorey BA. Body-packers: grading of risk as a guide to management and intervention. *Ann R Coll Surg Engl* 2002;84:131-2.
- Personal Search Review Commission. Report on personal searches by the United States Customs Service and independent advisor's report. Washington, D.C.: U.S. Customs Service, 2000.
- Caruana DS, Weinbach B, Goerg D, Gardner LB. Cocaine-packet ingestion: diagnosis, management, and natural history. *Ann Intern Med* 1984;100:73-4.
- Hartoko TJ, Demey HE, De Schepper AMA, Beaucourt LE, Bossaert LL. The body packer syndrome — cocaine smuggling in the gastro-intestinal tract. *Klin Wochenschr* 1988;66:1116-20.
- Hahn IH, Hoffman RS, Nelson LS. Contrast CT scan fails to detect the last heroin packet. *J Toxicol Clin Toxicol* 1999;37:644-5. abstract.

26. Hierholzer J, Cordes M, Tantow H, Keske U, Maurer J, Felix R. Drug smuggling by ingested cocaine-filled packages: conventional x-ray and ultrasound. *Abdom Imaging* 1995;20:333-8.
27. Pinsky MF, Ducas J, Ruggere MD. Narcotic smuggling: the double condom sign. *J Can Assoc Radiol* 1978;29:79-81.
28. McCleave NR. Drug smuggling by body-packers: detection and removal of internally concealed drugs. *Med J Aust* 1993;159:750-4.
29. Karhunen PJ, Suoranta H, Penttila A, Pitkaranta P. Pitfalls in the diagnosis of drug smuggler's abdomen. *J Forensic Sci* 1991;36:397-402.
30. Bogusz MJ, Althoff H, Erkens M, Maier R-D, Hofmann R. Internally concealed cocaine: analytical and diagnostic aspects. *J Forensic Sci* 1995;40:811-5.
31. Wilgoren J. Misdiagnosis led to man's handcuffing, suit claims. *New York Times*. December 6, 1998:62.
32. Traub SJ, Hoffman RS, Nelson LS. False-positive abdominal radiography in a body packer resulting from intraabdominal calcifications. *Am J Emerg Med* 2003;21:607-8.
33. Alzen G, Banning S, Gunther R. Sonographische Nachweisbarkeit von Betäubungsmitteln in elbehältnissen im gastrointestinaltrakt: Experimentelle Untersuchung beim hund. *ROFO Fortschr Geb Rontgenstr Nuklearmed* 1987;146:544-7.
34. Kersschot EAJ, Beaucourt LEA, Degryse HRM, De Schepper AMAP. Roentgenographic detection of cocaine smuggling in the alimentary tract. *ROFO Fortschr Geb Rontgenstr Nuklearmed* 1985;142:295-8.
35. Wackerle B, Rupp N, von Clarmann M, Kahn T, Heller H, Feuerbach S. Nachweis von Rauschgiftpackchen beim "body-packers" durch bildgebende Verfahren: Untersuchungen in vitro und in vivo. *ROFO Fortschr Geb Rontgenstr Nuklearmed* 1986;145:274-7.
36. Albertson TE, Dawson A, de Latorre F, et al. TOX-ACLS: toxicologic-oriented advanced cardiac life support. *Ann Emerg Med* 2001;37:Suppl:S78-S90.
37. Hollander JE, Hoffman RS. Cocaine. In: Goldfrank LR, Flomenbaum NE, Lewin NA, Howland MA, Hoffman RS, Nelson LS, eds. *Goldfrank's toxicologic emergencies*. 7th ed. New York: McGraw-Hill, 2002:1004-19.
38. Robinson T, Birrer R, Mandava N, Pizzi WE. Body smuggling of illicit drugs: two cases requiring surgical intervention. *Surgery* 1993;113:709-11.
39. Hutchins KD, Pierre-Louis PJB, Zaretski L, Williams AW, Lin RL, Natarajan GA. Heroin body-packing: three fatal cases of intestinal perforation. *J Forensic Sci* 2000;45:42-7.
40. Johnson JA, Landreneau RJ. Esophageal obstruction and mediastinitis: a hard pill to swallow for drug smugglers. *Am Surg* 1991;57:723-6.
41. Dunne JW. Drug smuggling by internal bodily concealment. *Med J Aust* 1983;2:436-9.
42. Suarez CA, Arango A, Lester JL III. Cocaine-condom ingestion: surgical treatment. *JAMA* 1977;238:1391-2.
43. Marc B, Baud FJ, Maison-Blanche P, Leporc P, Garnier M, Gherardi R. Cardiac monitoring during medical management of cocaine body packers. *J Toxicol Clin Toxicol* 1992;30:387-97.
44. Tomaszewski C, McKinney P, Phillips S, Brent J, Kulig K. Prevention of toxicity from oral cocaine by activated charcoal in mice. *Ann Emerg Med* 1993;22:1804-6.
45. Hoffman RS, Smilkstein MJ, Goldfrank LR. Whole bowel irrigation and the cocaine body-packer: a new approach to a common problem. *Am J Emerg Med* 1990;8:523-7.
46. White N, Taylor K, Lyszkowski A, Tullett J, Morris C. Dangers of lubricants used with condoms. *Nature* 1988;335:19.
47. Visser L, Sticker B, Hoogendoorn M, Vinks A. Do not give paraffin to packers. *Lancet* 1998;352:1352.
48. Traub SJ, Su M, Hoffman RS, Nelson LS. Use of pharmaceutical promotility agents in the treatment of body packers. *Am J Emerg Med* 2003;21:511-2.
49. Beck NE, Hale JE. Cocaine 'body-packers.' *Br J Surg* 1993;80:1513-6.
50. Olmedo R, Nelson L, Chu J, Hoffman RS. Is surgical decontamination definitive treatment of "body-packers"? *Am J Emerg Med* 2001;19:593-6.

Copyright © 2003 Massachusetts Medical Society.

JOURNAL INDEX

The index to volume 349 of the Journal will be available on February 19, 2004. At that time, it can be ordered in a printed and bound format or can be downloaded from www.nejm.org. To order a bound copy, please call 1-800-217-7874 from the United States and Canada (call 651-582-3800 from other countries, or e-mail info@reprintservices.com).