



## Comparison of diagnostic value of multidetector computed tomography and X-ray in the detection of body packing

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### ABSTRACT

**Objective:** Radiologists and other clinicians are facing an increasing number of illegal drug-related medical conditions. We aimed to draw attention to this growing global problem and to highlight some of the important points related to diagnosis and follow-up of body packing. We compare the diagnostic performance of unenhanced multidetector CT (MDCT) and abdomen X-ray for the detection of drug-filled packets.

**Materials and methods:** Sixty-seven suspects, who underwent both CT and X-ray examinations, have been included in the study. All MDCT and X-ray images were independently and retrospectively reviewed by two observers with different degrees of experience in abdomen imaging. Fifty-two of them were identified as body packers finally. Interobserver agreement, sensitivity, specificity, positive and negative predictive value were calculated.

**Results:** Two types of packets with different characteristics were identified in all body packers. Type 1 packets (solid-state drug) were found in 41 patients and type 2 packets (liquid cocaine) in 11 patients. All statistical analyses concern the detection of any packets. That is, the whole evaluation has been performed per patient. Sensitivity/specificity values of type 1 and type 2 packets for MDCT were 100–98%/100–100% and 100–100%/100–100%, respectively. Besides, sensitivity/specificity values of type 1 and type 2 packets for X-ray were 93–90%/100–91% and 64–45%/73–71%, respectively. In addition, interobserver agreements for detection of any packets were excellent ( $\kappa = 0.96$ ) and good ( $\kappa = 0.75$ ) for interpretation of MDCT and X-ray, respectively.

**Conclusion:** Unenhanced MDCT is a fast, accurate and easily used diagnostic tool with high sensitivity and specificity for the exact diagnosis of body packing.

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## 1. Introduction

Body packing was first described in 1973 by Dr. Deitel and Dr. Syed, whose 21-year-old male patient developed small intestinal obstruction after swallowing a condom filled with hashish [1]. Body packers are also referred to as “swallowers”, “couriers”, “internal carriers” or “mules” [2]. The term “body stuffers”, which is often inaccurately used in this context, actually refers to individuals who attempt to conceal a hastily packaged drug by swallowing it when confronted by law enforcement officials [2]. As opposed to body packers, body stuffers swallow smaller packets (8–10 mm)

containing smaller amounts of drugs, resulting in a low diagnostic effectiveness of abdominal X-ray in these cases. For this reason, CT is mandatory when diagnosing body stuffers [3].

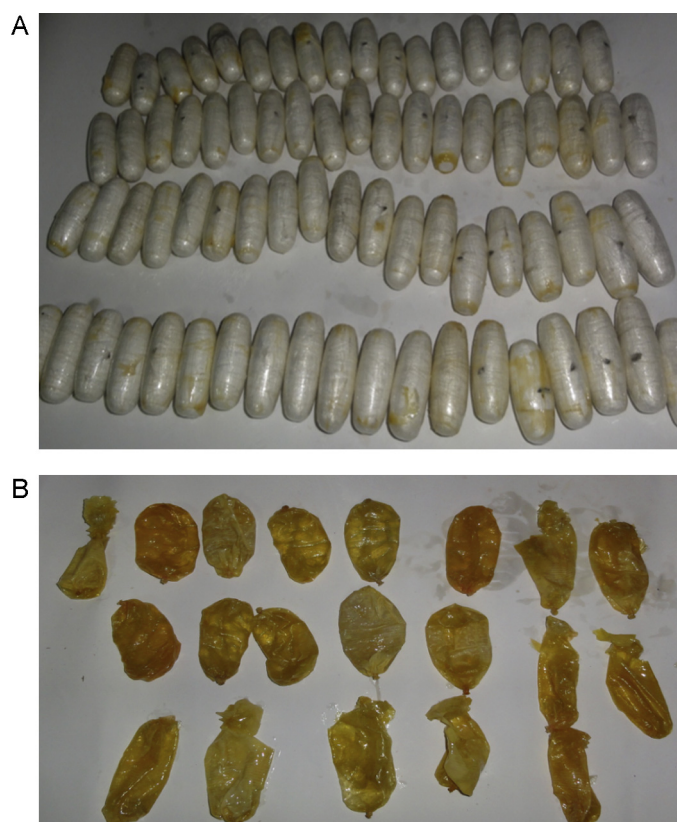
Body packing is widely used to smuggle marijuana, hashish and other cannabis products, heroin, cocaine, and less frequently, synthetic drugs and hallucinogens [4]. In general, the packets are swallowed and sometimes hidden in body cavities, such as the rectum or the vagina [5]. The average body packer can fill their gastrointestinal system with 40–80 packets over several hours prior to travel. Especially during long-haul flights, parasympatholytic drugs are used to inhibit intestinal peristalsis and, thus, to delay defecation [4,6]. Moreover, when the point of destination is reached, laxatives or enemas are utilized to help evacuate the packets [5].

As packets may leak or burst while in the gastrointestinal lumen, body packers are at risk of sudden fatal overdose [7]. This condition was termed “body packer syndrome” in 1980 by Wetli and Mittleman [8]. Since then, complications like gastric obstruction

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**Fig. 1.** Examples of evacuated type 1 solid drug filled packets (A) and type 2 liquid cocaine filled packets (B).

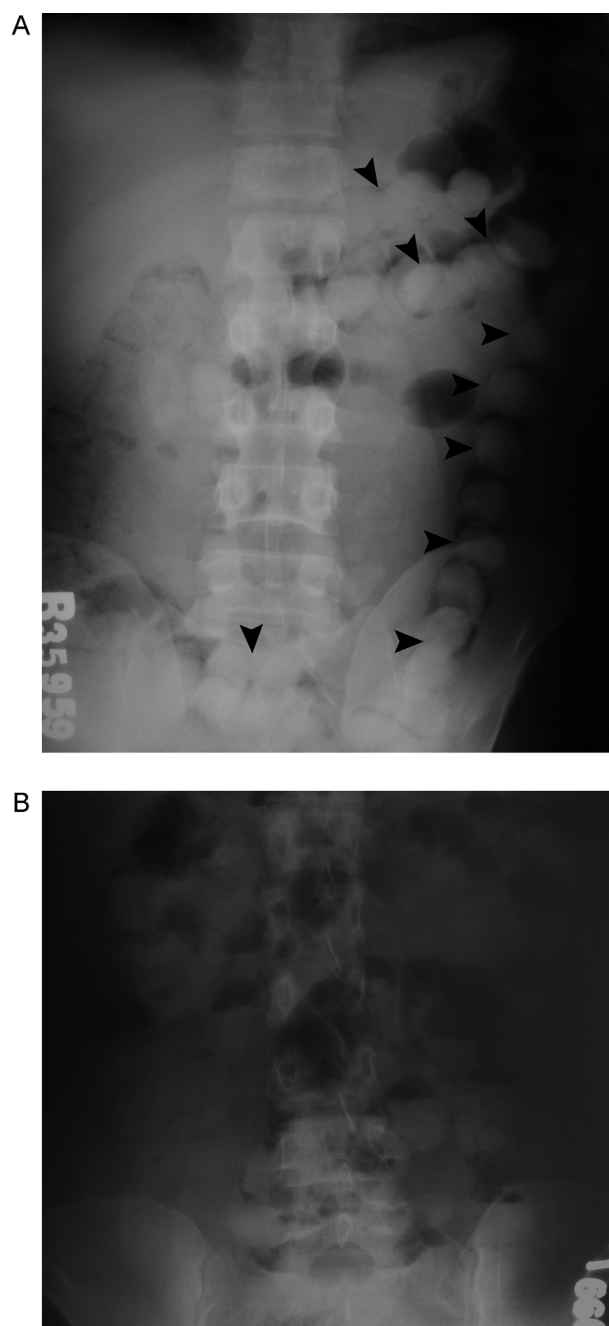
[9], intestinal obstruction [1,10,11], small intestine perforation [12] and colonic perforation [13] have been reported. As illegal drug smugglers may give unreliable clinical history, radiological imaging plays an important role in detecting and locating packets as well as follow-up [14]. Abdominal radiography, ultrasonography, multidetector computed tomography (MDCT) and magnetic resonance imaging (MRI) are methods that may be used for diagnosis and follow-up of body packing. However, the optimal imaging method for the diagnosis of body packing still remains controversial [3]. An accurate diagnosis requires joint evaluation of clinical findings, laboratory investigation and imaging results.

In this retrospective study, we aimed to describe diagnostic computed tomography (CT) findings in body packing cases and to compare tomographic and radiographic examination in terms of diagnostic accuracy.

## 2. Patients and methods

### 2.1. Patients

Our hospital has the most experience with body packing cases among medical establishments in Turkey. All individuals suspected of internal concealment of illicit drugs and apprehended at the two international airports of Istanbul are brought to us for diagnosis and management. Permission for this retrospective study was obtained from the hospital ethics committee. Included in this study were 67 suspected body packers who were brought to our hospital by the narcotics police between January 2010 and May 2012. The 67 patients we included happened to have both CT and radiography performed, while a much higher number of patients we omitted only had X-rays taken, with no CT scans available. First, an initial plain abdomen X-ray is performed. Then, sixty-seven suspects



**Fig. 2.** (A) An abdominal radiograph showing multiple ovoid, uniformly shaped intraintestinal type 1 packets (arrowheads). These packets has been correctly identified as type 1 packet by two observers. (B) Plain radiograph of the abdomen of 27-year-old woman who ingested liquid cocaine filled packets. Note that the type 2 packets are not easily distinguished from bowel content in contrast to type 1 packets. This case was misdiagnosed by two observers.

underwent abdominal CT examinations. Finally, fifty-two of them were identified as body packers. The average age of those diagnosed as body packers was  $33 \pm 9$  years, (range: 20–57 years). Out of 52 patients, 38 were male and 14 were female (male-to-female ratio: 2.7).

After clinical and laboratory investigation, radiological imaging and treatment, patients were kept under surveillance until all packets were retrieved. Afterwards, they were discharged and turned over to the police. The number of packets and the total weight of the drugs inside were recorded. The contents of the packets were analyzed in a criminal laboratory.

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