

# **Diagnostic Parameters for Body Packers**

Vücut Paketçileri İçin Tanısal Parametreler

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#### **ABSTRACT**

**Aim:** We aimed to present our experience about the cases brought with the suspicion of body packing and our algorithm to diagnose those cases

**Material and Method:** Our study was conducted with 47 of 55 patients brought to the emergency department of our tertiary care hospital by the narcotic police from a major airport in our city with the suspicion of carrying a substance in their bodies.

Results: Computed tomography showed the presence and absence of capsules with 100% accuracy. No false positive or false negative results were obtained from any admitted patients. The power of computed tomography to detect both the presence and absence of a capsule is determined as p<0.001 according to the statistical analysis

**Conclusion:** In our study, it is seen that the most appropriate imaging method for diagnosing patients brought to the emergency room due to substance carrying in the body is abdominal noncontrast tomography. Blood tests do not give an absolute result about whether the patient carries substances. Considering all these results, non-contrast abdominal computed tomography is recommended for patients that are brought in with the suspicion of substance carrying in their bodies.

Keywords: body packer; computed tomography; diagnosis

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**Amaç:** Çalışmamızda madde taşıyıcılığı şüphesi ile getirilen olgularda elde etttiğimiz tecrübeyi ve uyguladığımız algoritmayı sunmayı amaçladık.

Materyal ve Metot: Çalışmamız, narkotik polisleri tarafından ilimizde önemli bir havalimanından üçüncü basamak hastanemizin acil servisine vücudunda madde taşıma şüphesiyle getirilen 55 hastadan 47'si ile gerçekleştirildi.

**Bulgular:** Bilgisayarlı tomografi kapsülün varlığını ve yokluğunu %100 doğruluk ile göstermiştir. Başvuran hastaların hiçbirisinde yanlış pozitif ya da yanlış negatif bir sonuç elde edilmemiştir. Bilgisayarlı tomografinin kapsül varlığını tespit etme gücünün

istatistiksel analizinde p<0,001 olarak tespit edilmiştir. Aynı şekilde kapsül yokluğunun tespitinin istatistiksel analizinde p<0,001 olduğu görülmektedir

Sonuç: Çalışmamızda acil servise vücutta madde taşıyıcılığı nedeni ile getirilen hastaların tanısının konması için en uygun görüntüleme yönteminin abdomen kontrastsız tomografi olduğu görülmektedir. Kan testleri bize hastanın madde taşıyıp taşımadığı konusunda mutlak bir sonuç vermemektedir. Tüm bu sonuçlar göz önünde alındığında; vücutta madde taşıyıcılığı şüphesiyle getirilen hastalara başvuru anından itibaren kontrastsız abdominal bilgisayarlı tomografi cekilmesini önermekteyiz.

Anahtar Kelimeler: vücut paketçisi; bilgisayarlı tomografi; tanı

## Introduction

The use of substances and illegal drugs is increasing all over the world and causes bigger problems day by day. Those who carry and smuggle drugs in their body cavities are called body packers. The first body packer case was published in 1973 and their numbers are still increasing worldwide<sup>1</sup>. The most commonly used body cavities for this purpose are the gastrointestinal tract (GIS) from the mouth to the anus, vagina, and ears, and latex gloves, plastic bags, condoms, aluminum foil, finger parts of surgical gloves, and balloon-like materials are used to pack and store the chemicals inside the body<sup>2,3</sup>. In this way, many illegal substances such as cocaine, heroin, cannabis, amphetamines and ecstasy could be transported<sup>1</sup>.

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Back in time, careless packing of packages caused puncture and exposure, causing mortality and morbidity for the carrier. Today, drug packs are machine-produced and therefore appear in uniform sizes and weights. These new packs contain high volumes of medication compressed in several latex layers. In the past, mortality rates of up to 56% have been reported, and the introduction of these latest manufactured packs has reduced the likelihood of rupture, thus reducing morbidity and mortality rates<sup>4–7</sup>.

Although there is an increase in substance types transported in body packing and improvements in the way of transportation, it still could hardly be detected in customs and airports. And also; with the lack of technology to detect body packing and the ability to smuggle large volumes of drugs at the same time, body packing has become a huge phenomenon<sup>8</sup>. This new packing technique is not always visible (radio-opaque) on abdominal radiographs and that is creating difficulties in terms of diagnosis for healthcare professionals. Delays in diagnosis or misdiagnosis lead to retardation in the treatment processes of patients; in addition, in case of misdiagnosis, emergency clinicians face legal problems because both the undetected transported substance reaches the market and the misdiagnosed case is innocently exposed to forensic processes<sup>9</sup>.

It has been shown that approximately 1 kg of substance can be transported by body packing. In these cases, it has been observed that cocaine is divided in 1–3 g containing packages placed in the carrier and transported in this way. Toxidrome could be fatal, when even 1–3 gr packages are punctured or exploded. Therefore, early detection of the carrier is important in terms of reducing mortality and morbidity<sup>10</sup>.

The number of cases brought to the emergency services with the suspicion of carrying packages in their bodies is increasing. A definitive universal diagnostic algorithm is still not available today neither to detect the presence of any package in the body nor the treatment needs. Each clinic in this field has arranged an algorithm according to its own functioning and is trying to implement this algorithm. In addition to many laboratory tests and imaging tests, substance analyses are also used in clinics to determine the substance carrier<sup>11–14</sup>. In our study, we aimed to present our experience and the algorithm we applied in cases brought with the suspicion of substance carrying.

## **Material and Method**

#### Ethical Considerations

Ethics committee approval was obtained from Basaksehir Cam and Sakura City Hospital Ethics Committee (Ethics committee no: 2021.09.184). The entire study was performed in accordance with the Declaration of Helsinki.

# Study Setting

The study was conducted retrospectively between 15 July 2020 and 15 July 2021. This study was carried out with 47 patients who met the study criteria from 55 patients who were brought to the emergency department of our tertiary level hospital by the narcotic police from a big airport in our city on suspicion of carrying substances in their bodies.

## Study Population

The study was conducted in the emergency medicine clinic of a tertiary-level hospital. Our hospital provides health services to all patients brought from the airport on the European side of our city and to patients brought to our hospital by the security forces with the suspicion of carrying substances in their bodies.

Among all the patients brought by the security forces on suspicion of carrying substances in their bodies, those with missing data in the hospital automation system were excluded from the study.

#### Data Collection

The study was started after obtaining approval from the ethics committee. In the study, patients brought to the emergency room with the suspicion of substance transport in the body were scanned from the hospital automation system (Hospital Information Management Systems-HIMS). All forensic cases admitted to the hospital were screened, and all the patients admitted to the hospital because of body packing were included in the study. Of the 55 patients, 8 patients with missing data were excluded from the study and overall 47 patients were included in the study.

Demographic characteristics of the patients (age, gender, comorbid disease), presence of packages in their bodies, laboratory parameters, outcomes (discharge, hospitalization and death status), detection of packages in non-contrast abdominal computed tomography

(CT) and plain abdominal X-ray, hours of admission were obtained from patient files and hospital automation system and recorded in the previously created study form. The forms were numbered and archived. After the study was completed, data was transferred to the digital environment and statistical analysis was performed.

# Statistical Analysis

Statistics were performed using the IBM Statistical Package for Social Sciences (SPSS) program version 23.0 for Windows® statistical program (IBM Inc. Chicago, IL, USA). Number, percentage, mean, standard deviation, median, minimum, and maximum values were used in the presentation of descriptive data. The conformity of the data to the normal distribution was evaluated with the Kolmogorov-Smirnov Test. Pearson chi-square test and Fisher's Exact test were used to compare categorical data. T-Test was used to compare two independent numerical data and Kruskal Wallis Test was used to compare triple numerical data. p<0.05 was accepted as statistically significant.

## Results

Forty-seven cases were included in the study. 87.2% of these cases were male and the mean age was 34.93±8.89 years. All but 2 of the cases were discharged after follow-up. According to the clinical evaluation, 70.2% of the cases were found to have substance capsules, whereas no capsules have been found in 29.8% of the cases. Computed tomography imaging was performed for all cases, and as a result of the imaging, a foreign body image suggesting the presence of a capsule was observed in 74.5% of the cases (Table 1).

Table 1. Frequency values of demographics and disease data of cases

Parameter		n (%)
Number of cases		47 (100,0)
Sex	Female	6 (12,8)
	Male	41 (87,2)
Outcome	Discharge	45 (95,7)
	Admission	1 (2,1)
	Mortality	1 (2,1)
Capsule seen on CT	No	12 (25,5)
	Yes	35 (74,5)

Table 2. Evaluation of the changes in the laboratory levels of the cases according to the presence of capsules

Parameter	All cases Mean $\pm$ SD	No capsules Mean $\pm$ SD	Capsule seen Mean $\pm$ SD	p
WBC (x10 <sup>3</sup> /mm <sup>3</sup> )	10.80±2.72	10.50±2.58	10.83±2.80	0.710
PLT (x10 <sup>3</sup> /mm <sup>3</sup> )	265.62±73.63	271.07±47.64	260.30±83.94	0.656
HGB (mg/dL)	15.46±1.57	14.97±1.30	15.68±1.60	0.151
MPV	10.11±0.99	9.89±0.90	10.19±1.01	0.355
Percentage of Neutrophil	75.64±6.81	73.57±7.46	76.06±6.90	0.276
Percentage of Lymphocyte	17.83±5.82	20.27±6.18	17.13±5.88	0.106
Neutrophil/Lymphocyte Ratio	5.40±5.41	3.96±1.30	5.90±6.23	0.259
CPR (mg/dL)	6.52±11.30	3.47±2.90	7.70±13.15	0.243
Glucose (mg/dL)	108.87±24.44	98.21±26.85	116.70±28.83	0.046
Urea (mg/dL)	31.78±8.42	29.86±7.16	31.99±9.13	0.442
Creatinine (mg/dL)	0.96±0.55	0.72±0.16	1.07±0.60	0.037
Sodium (mEq/L)	138.36±2.75	138.57±2.24	138.21±2.92	0.683
Potassium (mEq/L)	4.28±0.37	4.22±0.26	4.36±0.49	0.320
ALT (IU/mm³)	109±555.51	23.50±7.11	139±648.61	0.509
AST (IU/mm³)	149.89±835.55	22.86±7.09	196.64±975.44	0.511
Lactate (mg/dL)	1.51±0.85	1.30±0.40	1.63±0.96	0.231
рН	7.36±0.03	7.37±0.01	7.36±0.03	0.703
HCO <sub>3</sub>	26.38±3.33	25.38±2.33	26.86±3.55	0.161
PCO <sub>2</sub>	45.71±5.53	43.51±4.68	46.80±5.53	0.058

Independet T test is used.

The results of laboratory tests were compared between cases with and without capsules. According to the statistical analysis of complete blood count, biochemistry and blood gas tests, except for the glucose and creatinine results of the patients, the significance level was determined as p>0.05 which refers to no statistical significance. Comparison results of glucose and creatinine values of patients with and without packages revealed the significance level as p<0.05. The creatinine and glucose values of the cases carrying packages were found to be higher (Table 2).

Computed tomography results demonstrated the presence or absence of the capsule with 100% accuracy. No false positive or false negative result was obtained in any of the patients according to the statistical analysis regarding the power of CT to detect the presence of capsule, significance level determined as p<0.001. Likewise, the detection of the absence of a capsule was found to be p<0.001 according to the statistical analysis (Table 3).

It has been observed that substance carriers were mostly male patients. Except for 2 cases, all of the other cases were discharged after completing their follow-up period in the emergency department. The cases in which no package was detected were discharged after being followed up in the emergency department for an average of 1–2 hours. The cases with packages were followed up in the emergency room for approximately 24–36 hours and were discharged after all packages were released. While one of the 2 patients is discharged after hospitalization; mortality was observed in 1 patient (Table 3). Detection of capsules with CT was found to be significant.

Considering the duration of stay in the emergency room, patients with capsules in their bodies stayed longer than patients without capsules. The duration of stay in the emergency department of the patients without was  $3\pm1$  hours, while the duration of stay in the emergency department was  $56\pm10$  hours for the patients with capsules.

## **Discussion**

Those who carry substances and contraband drugs in their body cavities are called body packers. Substance transport in the body is an increasing problem all over the world. The first case was described in 1973. Since 1973, the substances carried in the body are being packed better and better. Capsule covers are produced from special materials so that they could not be opened mechanically and could not be detected while passing through the x-ray device. As the transported capsules are not radiopaque, detection is difficult. This situation leads to medical and medicolegal problems related to patients. In this study, we aim to share our experiences from our clinic.

Generally, young men are chosen for the transportation of substances. The reason for this is thought to be the absence of comorbid diseases and better physical capacity of carriers. In the literature, it was seen that young male cases were selected as well according to several publications<sup>15,16</sup>. In addition to this situation, there are also studies in the literature reporting the use of pregnant and pediatric cases<sup>17,18</sup>. In our study, 87.2% of the cases brought to the emergency department were male. In this context, the data of our study were similar to the publications in the literature. Among the cases brought with this suspicion, we thought that professionals should be more careful about young male cases.

Complications have decreased over the years due to the development of packing techniques for materials. In the study of Schaper et al., they reported that the mortality was very low which has been shown to be at 1.4%. Again, in that study, it was observed that

Table 3. Examination of the demographic data and disease data of the cases according to the presence of capsules

Parameter		No capsules n (%)	Capsules seen n (%)	p
Sex	Female	5 (83.3)	1 (16.7)	0.006 **
	Male	9 (22.0)	32 (78.0)	
Capsule on CT	None	12 (100.0)	0 (0.0)	<0.001*
	Present	0 (0.0)	35 (100.0)	
Outcome	Discharge	14 (31.1)	31 (68.9)	0.484
	Admission	0 (0.0)	1 (100.0)	
	Exitus	0 (0.0)	1 (100.0)	

<sup>\*</sup> Pearson Ki Kare Test.

<sup>\*\*</sup> Fisher's Exact Test.

less than 1% of the cases required laparotomy<sup>19</sup>. In our study, mortality was observed in 1 case due to rupture of the capsule; and due to the ileus clinic, that appeared in another case, the necessity of operation arose and surgery was performed. In our study, the incidence of complications was found to be very low, and the data of our study are similar to the literature.

When the laboratory tests of patients carrying substances in their bodies are examined, it was investigated whether a diagnostic evaluation can be made with blood parameters in patients with and without capsules, and it has been found that there were higher creatinine levels in patients with capsules, which we think is the cause of low oral intake. In addition, when the patients with and without capsules were compared, blood glucose levels were statistically higher in those carrying capsules. We think that high blood sugar may be related to stress hyperglycemia. Apart from these laboratory levels, no finding that could indicate the presence of capsule was found in other laboratory parameters. Examination of laboratory results was not found to be significantly diagnostic for cases without toxidrome clinic. For this reason, we think that performing laboratory tests on these patients will cause both time and financial loss. When the literature was scanned, no study was found on the blood tests of the cases carrying packages in the body. Regarding the analysis of substances in urine in the literature; it is stated that although it was used at first, it is no longer useful due to weak sensitivity<sup>20</sup>.

Detection of substance packages carried in the body is important for emergency clinicians to prepare treatment and forensic reports, as well as to assist investigations for security forces. In these patients, skipping existing drug packages or reporting non-existing drug capsules as false positives will lead to very serious medico-legal problems. In our clinic, non-contrast abdominal CT is used to evaluate the patients admitted with this suspicion. Abdominal CT without contrast is taken at the time of admission of the patients and the presence/absence of the package is determined according to the CT result. It is seen that non-contrast abdominal CT shows the package status with 100% success. When the literature is reviewed, publications are showing the use of plain abdominal radiography, abdominal CT, ultrasonography, magnetic resonance imaging for the detection of packages<sup>21–25</sup>. According to the study published by Maier et al. in 2017; they used abdominal CT because of its high diagnostic rate and ability to show even small amounts of substance packages<sup>20</sup>. Again, in a study by Shahnazi et al.; they stated that non-contrast abdominal CT should be preferred to direct radiography due to its higher sensitivity<sup>3</sup>. While in another study published by Hahn et al., they stated that 1 case was missed in abdominal CT with oral contrast<sup>26</sup>, Karhunen et al. reported that plain radiography had false negative and false positive results in their study<sup>23</sup>. Again, in a similar study, they stated that there may be more false negatives due to the gradually developing packing techniques<sup>27</sup>.

Patients brought in with the suspicion of carrying substances in their bodies are followed up in our emergency department and discharged in case of no complications. If these patients have capsules, they lead to long waiting times in emergency departments. In their study, Maier et al. reported that the average emergency department stay duration was 51.2 hours<sup>20</sup>. In our study, the duration of stay in the emergency room was 3±1 hours for the patients with no packages, and 56±10 hours for the patients with packages.

# Study Limitations

This study has several limitations. One of them is that the data used was obtained from retrospective scanning due to the retrospective conduction of the study. A second limitation is the small number of patients included in the study, and larger prospective, multicenter studies are needed.

## Conclusion

In our study, it is seen that the most appropriate imaging method for the diagnosis of patients brought to the emergency department due to substance carrying in their bodies is abdominal non-contrast tomography. The blood results do not give us an absolute result about whether the patient has substance or not. Considering all these results, we recommend non-contrast abdominal CT scan at the time of admission to patients brought in with the suspicion of carrying substances in their bodies.

## Conflict of Interest

No conflict of interest was declared by the authors.

#### Financial Disclosure

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