

## 腹部超音波検査から肝腎間隙の脂肪層計測による内臓脂肪量評価の試み

西 憲文<sup>1</sup> 日高 好博<sup>1</sup> 石山 重行<sup>1</sup> 中島さおり<sup>1</sup>  
原口 誠<sup>1</sup> 徳重 浩一<sup>2</sup> 宮原 広典<sup>2</sup>

## 抄 録

**目的**：生活習慣病と内臓肥満の重複が動脈硬化を進展させ、そのリスクを高めると言われている。内臓脂肪蓄積の評価にはCT検査（以下 Fat scan）での評価が一般的である。しかし、放射線の被曝、コスト面で健診などの多人数に施行するのは難しい。一方、超音波検査は被曝の問題もなく簡便な方法で内臓脂肪蓄積の様々な報告がなされている。今回、腹部超音波検査の肝腎間隙脂肪層（以下 perirenal fat；PRF）に着目し検討を行った。**対象と方法**：対象は2018年に人間ドックを受診し、腹部超音波検査と Fat Scan を施行した478名（男333名、女145名、平均年齢58.3 ± 11.7歳、平均BMI 24.6 ± 3.2）。腹部超音波検査の肝腎画像からPRFを計測し Fat scan と比較検討した。また、問診票から内臓脂肪蓄積の関係について検討した。**結果と考察**：全対象者の平均は腹部超音波検査のPRFで5 ± 5.5（1-7 中央値3）mm、Fat scanでの内臓脂肪面積は110 ± 51 cm<sup>2</sup>となった。腹部超音波検査のPRFと Fat scan との相関係数は0.66（p値<0.001）と正の相関を認めた。Fat scanで測定した内臓脂肪蓄積とされる100 cm<sup>2</sup>をカットオフとし、腹部超音波検査のPRFとROC解析を行うと閾値は3 mmとなった。AUC:0.855（95% CI 0.821 - 0.889）、感度81%、特異度81%、および陽性的中率80%、陰性的中率82%であった。超音波検査で肝腎間隙脂肪層が3 mm以上あれば内臓脂肪蓄積100 cm<sup>2</sup>以上を推測できると考えられた。**結論**：腹部超音波検査でPRFを計測することで、健康診断やスクリーニング検査で内臓脂肪蓄積を推測でき診断の一助になる。

## An attempt to assess visceral fat accumulation by measuring fat content in the hepato-renal gap on abdominal ultrasound

Norifumi NISHI, RMS<sup>1</sup>, Yoshihiro HIDAKA<sup>1</sup>, Shigeyuki ISHIYAMA, RMS<sup>1</sup>, Saori NAKASHIMA, RMS<sup>1</sup>, Makoto HARAGUCHI<sup>1</sup>, Kouichi TOKUSHIGE<sup>2</sup>, Hironori MIYAHARA<sup>2</sup>

## Abstract

**Purpose**: The overlap between lifestyle-related diseases and visceral obesity is said to increase the risk of developing atherosclerosis. The assessment of visceral fat accumulation is commonly carried out by computed tomography scan (fat scan). However, due to radiation exposure and the cost of the test, it is difficult to perform this test on a large number of people. On the other hand, abdominal ultrasonography is a simple method without the problem of radiation exposure, and various reports on visceral fat accumulation have been published. In the present study, we focused on the perirenal fat (PRF) of the hepato-renal gap on abdominal ultrasonography. **Subjects and Methods**: The subjects were 478 patients (male: 333, female: 145, mean age: 58.3 ± 11.7 years, mean BMI: 24.6 ± 3.2) who underwent physical examination in 2018 and underwent abdominal ultrasonography and fat scan. PRF was measured from hepatic and renal images of abdominal ultrasound and compared with fat scan. The relationship between PRF and visceral fat accumulation was also investigated using a health questionnaire. **Results and Discussion**: The mean PRF of all subjects was 5 ± 5.5 mm, and the mean visceral fat area (VFA) on fat scan was 110 ± 51 cm<sup>2</sup>. The correlation coefficient between PRF and VFA was 0.66 (p-value < 0.001), indicating a positive correlation. ROC analysis with PRF showed a threshold of 3 mm. The area under the curve was 0.855 (95% confidence interval: 0.821 - 0.889), the sensitivity was 81%, the specificity was 81%, the positive predictive value was 80%, and the negative predictive value was 82%. We considered that a fat layer of more than 3 mm in the hepato-renal gap on abdominal ultrasonography could estimate a visceral fat area of more than 100 cm<sup>2</sup>. In addition, when the influence of medications (blood pressure, blood glucose, lipid) was examined based on the questionnaire, there was no difference in body mass index and abdominal circumference, and the fat scan and PRF showed a large amount of visceral fat (accumulation). **Conclusion**: Measurement of the hepato-renal gap using abdominal ultrasonography can help to estimate and diagnose visceral fat accumulation in physical examinations and screening tests.

## Keywords

hepato-renal gap, perirenal fat, visceral fat, abdominal ultrasonography

<sup>1</sup>鹿児島厚生連病院医療技術部, <sup>2</sup>同消化器内科

<sup>1</sup>Department of Radiology and Laboratory, <sup>2</sup>Department of Gastroenterology, Kagoshima Kouseiren Hospital, 1-13-1 Yojiro, Kagoshima 890-0062, Japan

Corresponding Author: Norifumi NISHI (n.nishi.rt@gmail.com)

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