

学位論文審査の結果の要旨

審査区分 課・論	第699号	氏名	Yankel Carolina Sena Sanchez
審査委員会委員	主査氏名	下村 剛	印
	副査氏名	榎本 正志	印
	副査氏名	下田 恵	印
論文題目 Physiological 18F-FDG uptake in the normal adult anal canal: evaluation by PET/CT (正常成人肛門管における生理的 18F-FDG 取り込み : PET/CT による評価)			
論文掲載雑誌名 Annals of Nuclear Medicine			
論文要旨 Despite their benefit for detecting primary tumors, data for normal 18F-fluoro-2-deoxy-d-glucose (FDG) uptake in the anal canal are insufficient. The authors used positron emission tomography-computed tomography (PET/CT) to determine the uptake of FDG in the normal adult anal canal (AC) and to evaluate its clinical significance compared with that of anal cancer The authors conducted a retrospective study of PET/CT images in the anal region, of 201 consecutive patients without symptoms or pathology taken from January 2015 to August 2019, after excluding two patients (one each with Crohn's disease and hemorrhoid). These patients were included in the normal group, and data of eight patients with anal cancer were collected from January 2011 to August 2019 for comparison. FDG uptake was quantitatively evaluated (compared with the maximum standardized uptake value [SUVmax] to the SUVmax values of liver and distal rectum) and qualitatively (compared with background) in early and delayed phases. Normal grade 3 uptake was qualitatively defined as FDG uptake higher than the surrounding muscles. In the normal group, mean anal canal SUVmax of early phase was: 2.26 (range 1.00-6.30), and delayed phase: 2.52 (range 1.00-8.80). Their ratios to liver SUVmax were early: 0.74 (range 0.24-2.25), and delayed: 0.81 (range 0.23-2.32); ratios to rectal SUVmax were early: 0.87 (range 0.30-1.89), and delayed: 0.90 (range 0.30-1.27). Qualitatively, 25 patients (15.4%) had normal grade 3 uptake during the early and delayed phases. In contrast, qualitative data showed that all patients with anal cancer exhibited high FDG uptake in the anal canal. The mean early- and delayed-phase values of SUVmax of the anal canal and anal cancer group were 11.09 (range 5.40-17.73) and 14.23 (range 6.70-22.85), respectively. There was a significant difference between the mean-early and -delayed anal SUVmax values of the normal grade 3 and anal cancer groups. Furthermore, the ratios to liver SUVmax were significantly different between the two groups. The normal uptake of AC FDG in adults can be qualitatively (visually) high and could be misleading. Radiologists should always guide themselves to measure the SUVmax and compare it with the SUVmax of the liver, which could help differentiate between normal and pathological conditions of AC. 本研究は、正常成人肛門管において、FDG の取り込みが視覚的・質的に高くなることもあり誤診に繋がる可能性があるが、その鑑別において、SUVmax および肝臓の SUVmax との比が病的状態との区別に有用であることを示唆した。 このため、審査員の合議により本論文は学位論文に値するものと判定した。			

最終試験  
の結果の要旨  
~~学力の確認~~

審査区分 ①・論	第 <b>699</b> 号	氏名	Yankel Carolina Sena Sanchez
審査委員会委員		主査氏名	下村 剛 <span style="float: right;">①</span>
		副査氏名	齋木 正志 <span style="float: right;">印</span>
		副査氏名	下田 恵 <span style="float: right;">①</span>
<p>学位申請者は本論文の公開発表を行い、各審査委員から研究の目的、方法、結果、考察について以下の質問を受けた。</p> <ol style="list-style-type: none"> <li>1. Would you please tell me how the FDG uptake of normal anal canal and anal canal cancer is now described in common radiological textbooks, especially PET-CT textbooks ?</li> <li>2. What kind of inspections or investigations do you think are necessary to resolve this this study's limitation?</li> <li>3. Visual grading is classified into three grades. Was this judgement done by multiple researchers? Who did this grading?</li> <li>4. In early phase, the percentage of grade 3 in normal group is described as 15.4%, but the calculation is wrong. It is correctly 12.4%. It should be corrected.</li> <li>5. Is it possible that the lung cancer has metastasized to this anal canal in Fig.3?</li> <li>6. Is there any patient with anal canal cancer who showed the lower SUVmax than that of normal grade 3 patients ?</li> <li>7. How do you think chemotherapy affects FDG uptake ?</li> <li>8. Could you tell me what is the new findings of this article ?</li> <li>9. The normal anal canal FDG uptake is visally high, it may be definitely lower than that of anal canal cancer, in addition considering the quantitative evaluation result, normal grade 3 is not misleading, isn't it ?</li> <li>10. How do glucose transporters act in the anal canal of patients with high physiological 18F-FDG uptake?</li> <li>11. Does the fact that the number of significant digits of the SUVmax values reported in the paper is larger than the SUVmax values reported by Kidd et al. reflect the high precision of the data?</li> <li>12. What is the most important index to distinguish between normal and abnormal anal canal?</li> </ol> <p>これらの質疑に対して、申請者は概ね適切に回答した。よって審査委員の合議の結果、申請者は学位取得有資格者と認定した。</p>			

(注) 不要の文字は2本線で抹消すること。

## 学 位 論 文 要 旨

氏名 Yankel Caroliona Sena Sanchez

論 文 題 目

Physiological 18F-FDG uptake in the normal adult anal canal:  
evaluation by PET/CT

.....(正常成人肛門管における生理的 18F-FDG 取り込み : PET/CT による評価).....

要 旨

**objectives**

Despite their benefit for detecting primary tumors, data for normal 18F-fluoro-2-deoxy-d-glucose (FDG) uptake in the anal canal are insufficient. Here we used positron emission tomography-computed tomography (PET/CT) to determine the uptake of FDG in the normal adult anal canal (AC) and to evaluate its clinical significance compared with that of anal cancer

**Material and methods**

We conducted a retrospective study of PET/CT images in the anal region, of 201 consecutive patients without symptoms or pathology taken from January 2015 to August 2019, after excluding two patients (one each with Crohn's disease and hemorrhoid). These patients were included in the normal group, and data of eight patients with anal cancer were collected from January 2011 to August 2019 for comparison. FDG uptake was quantitatively evaluated (compared with the maximum standardized uptake value [SUVmax] to the SUVmax values of liver and distal rectum) and qualitatively (compared with background) in early and delayed phases. Normal grade 3 uptake was qualitatively defined as FDG uptake higher than the surrounding muscles.

## **results**

In the normal group, mean anal canal SUVmax of early phase was: 2.26 (range 1.00–6.30), and delayed phase: 2.52 (range 1.00–8.80). Their ratios to liver SUVmax were early: 0.74 (range 0.24–2.25), and delayed: 0.81 (range 0.23–2.32); ratios to rectal SUVmax were early: 0.87 (range 0.30–1.89), and delayed: 0.90 (range 0.30–1.27). Qualitatively, 25 patients (15.4%) had normal grade 3 uptake during the early and delayed phases. In contrast, qualitative data showed that all patients with anal cancer exhibited high FDG uptake in the anal canal. The mean early- and delayed-phase values of SUVmax of the anal canal and anal cancer group were 11.09 (range 5.40–17.73) and 14.23 (range 6.70–22.85), respectively. There was a significant difference between the mean-early and -delayed anal SUVmax values of the normal grade 3 and anal cancer groups. Furthermore, the ratios to liver SUVmax were significantly different between the two groups.

## **Conclusion**

The normal uptake of AC FDG in adults can be qualitatively (visually) high and could be misleading, we should always guide ourselves to measure the SUVmax and compare it with the SUVmax of the liver, which could help differentiate between normal and pathological conditions of AC.