

研究課題名

透析患者における CT で測定した骨格筋指数と栄養障害との関係について

研究責任者の氏名

矢島隆宏

研究の概要

目的: 先の研究で、透析患者においては、CT で測定した骨格筋指数が生体インピーダンス法で推定された骨格筋量と良好に相関することを報告しました。透析患者は、一般的に低栄養の状態にあり、栄養障害により骨格筋量は低下することが予想されます。そこで、先の研究で用いたデータをもとに、CT で測定した骨格筋指数と栄養障害との関連を明らかにすることを目的とします。

対象と方法: 2019 年 1 月から 2020 年 6 月の間に、当院外来にて維持透析患者さんの中で癌のスクリーニング検査の一環として腹部単純 CT を施行した患者さん連続 100 例を対象とします。第 3 腰椎の CT スライスで、骨格筋指数を測定します。栄養障害の指標としては、血清アルブミン値と体格指数(BMI)から計算される、geriatric nutritional risk index (GNRI)を用います。まず、両者の相関関係を明らかにします。次に、単変量解析にて、骨格筋指数と関連のある背景因子を明らかにします。さらに、多変量解析にて、骨格筋指数と GNRI との間に独立した関連があるか否か調べます。既報より、GNRI 91.2 未満を栄養障害があると定義した時の骨格筋指数のオッズ比を求めます。

研究に関する記録は、研究終了後 5 年間保存した後に消去します。なお、研究の成果に関しては、学会発表や論文投稿する予定です。住所、氏名などの個人情報が公開されることは一切ありません。

利用する情報の項目

身長、体重、年齢、性別、身長と体重(ドライウエイト)、既往歴、血液検査データ、CT 所見など

利用するものの範囲

医師: 矢島隆宏

連絡先

松波総合病院 腎臓内科 矢島隆宏

TEL: 058-388-0111

FAX: 058-388-4711

Eur Spine J

. 2019 Aug;28(8):1758-1766. doi: 10.1007/s00586-018-5776-9. Epub 2018 Oct 10.

The use of CT Hounsfield unit values to identify the undiagnosed spinal osteoporosis in patients with lumbar degenerative diseases

Da Zou 1 2, Weishi Li 3, Chao Deng 1, Guohong Du 1, Nanfang Xu 1

Affiliations Expand

PMID: 30306332 DOI: 10.1007/s00586-018-5776-9

Abstract

Purposes: Our purpose was to use computed tomography (CT) Hounsfield unit (HU) values to identify the undiagnosed spinal osteoporosis in patients with lumbar degenerative diseases.

Methods: A total of 334 patients with lumbar degenerative diseases were retrospectively reviewed and divided into two groups according to the degree of lumbar degenerative changes in preoperative lumbar CT images. Patients who had at least three vertebrae with severe degeneration at L1-L4 were placed in the degenerative group, and others were placed in the control group. HU value of trabecular bone in middle axial CT image of vertebral body, T-score and bone mineral density (BMD) at L1-L4 and hips were measured. CT HU thresholds for osteoporosis were obtained from control group and then applied to identify undiagnosed spinal osteoporosis.

Results: There were 182 patients in the degenerative group and 152 patients in the control group. CT HU value had a positive correlation with T-score and BMD of lumbar spine in both groups ($P < 0.001$), while the correlation coefficients at L1-L4 were higher in the control group (> 0.7) than in the degenerative group (< 0.7). T-score and BMD of lumbar spine were higher in the degenerative group ($P < 0.05$), while CT HU value, T-score and BMD of hips had no significant difference between two groups. According to the linear regression equations of vertebral T-score and CT HU value in the control group, the thresholds matching T-score of -2.5 were 110, 100, 85 and 80HU for L1, L2, L3 and L4, respectively. Defining CT osteoporosis as $L1 \leq 110\text{HU}$ or $L2 \leq 100\text{HU}$ or $L3 \leq 85\text{HU}$ or $L4 \leq 80\text{HU}$ was 88.5% (69/78) specific and 60.8% (45/74) sensitive for distinguishing DXA osteoporosis of lumbar spine in the control group. The rate of undiagnosed spinal osteoporosis was higher in the degenerative group than in the control group according to CT HU thresholds (38.7% vs. 11.5%, $P < 0.05$).

Conclusions: Degenerative changes in the lumbar spine can increase BMD and T-score provided

by lumbar DXA, leading to an underestimation of vertebral osteoporosis. Thresholds for osteoporosis based on CT HU values can be used as a complementary method to identify undiagnosed spinal osteoporosis in patients with lumbar degenerative diseases. These slides can be retrieved under Electronic Supplementary Material.

Keywords: CT Hounsfield unit value; Dual-energy X-ray absorptiometry; Lumbar degenerative disease; Osteoporosis.

PubMed Disclaimer

Similar articles

Could Computed Tomography Hounsfield Unit Values of Lumbar Vertebrae Detect Osteoporosis?

Hocaoglu E, Inci E, Vural M.

Curr Med Imaging. 2021;17(8):988-995. doi: 10.2174/1573405617999210112193545.

PMID: 33438545

Correlation between Forearm Bone Mineral Density Measured by Dual Energy X-ray Absorptiometry and Hounsfield Units Value Measured by CT in Lumbar Spine.

Pu HY, Chen Q, Huang K, Wei P.

Z Orthop Unfall. 2024 Jun;162(3):247-253. doi: 10.1055/a-1984-0466. Epub 2023 Jan 31.

PMID: 36720241 English.

What is the role of CT-based Hounsfield unit assessment in the evaluation of bone mineral density in patients undergoing 1- or 2-level lumbar spinal fusion for degenerative spinal pathologies? A prospective study.

Viswanathan VK, Shetty AP, Rai N, Sindhiya N, Subramanian S, Rajasekaran S.

Spine J. 2023 Oct;23(10):1427-1434. doi: 10.1016/j.spinee.2023.05.015. Epub 2023 Jun 2.

PMID: 37271374

Measurement Techniques and Utility of Hounsfield Unit Values for Assessment of Bone Quality Prior to Spinal Instrumentation: A Review of Current Literature.

Zaidi Q, Danisa OA, Cheng W.

Spine (Phila Pa 1976). 2019 Feb 15;44(4):E239-E244. doi: 10.1097/BRS.0000000000002813.

PMID: 30063528 Review.

Alternatives to DEXA for the assessment of bone density: a systematic review of the literature and future recommendations.

Deshpande N, Hadi MS, Lillard JC, Passias PG, Linzey JR, Saadeh YS, LaBagnara M, Park P.

J Neurosurg Spine. 2023 Jan 6;38(4):436-445. doi: 10.3171/2022.11.SPINE22875. Print 2023

Apr 1.

PMID: 36609369 Review.