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## What is the optimal nutritional assessment for covid-19 patients on critical care ?

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**Date of request:** 27th November, 2020  
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## A. Original Research

1. **Association of bioelectric impedance analysis body composition and disease severity in COVID-19 hospital ward and ICU patients: The BIAC-19 study.**  
   Moonen Hanneke Pierre Franciscus Xaverius Clinical nutrition (Edinburgh, Scotland) 2020;:No page numbers.

BACKGROUNDThe current severe acute respiratory syndrome coronavirus 2 pandemic is unprecedented in its impact. It is essential to shed light on patient characteristics that predispose to a more severe disease course. Obesity, defined as a BMI>30 kg/m2, is suggested to be one of these characteristics. However, BMI does not differentiate between fat mass and lean body mass, or the distribution of fat tissue. The aim of the present study was to assess the body composition of COVID-19 patients admitted to the ward or the ICU and identify any associations with severity of disease.METHODSWe performed an observational cross-sectional cohort study. Bioelectric impedance analysis was conducted amongst all confirmed COVID-19 patients admitted to the ward or ICU of our hospital in the Netherlands, between April 10 and 17, 2020. Body water measurements and derived values were recalculated to dry weight, using a standard ratio of extracellular water to total body water of 0.38. Data were compared between the ward and ICU patients, and regression models were used to assess the associations between baseline characteristics, body composition, and several indicators of disease severity, including a composite score composed of mortality, morbidity, and ICU admission.RESULTSFifty-four patients were included, of which 30 in the ward and 24 in the ICU. The mean age was 67 years (95%-CI 64-71), and 34 (63%) were male. Mean BMI was 29.7 (95%-CI 28.2-31.1) kg/m2 and did not differ between groups. Body composition values were not independently associated with disease severity. In multiple logistic regression analyses, a low phase angle was associated with COVID-19 severity in the composite score (OR 0.299, p = 0.046).CONCLUSIONWe found no significant associations between body composition, including fat mass, visceral fat area, and fat-free mass, and disease severity in our population of generally overweight COVID-19 patients. A lower phase angle did increase the odds of severe COVID-19. We believe that factors other than body composition play a more critical role in the development of severe COVID-19.

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1. **Body Composition Findings by Computed Tomography in SARS-CoV-2 Patients: Increased Risk of Muscle Wasting in Obesity.**  
   Gualtieri Paola International journal of molecular sciences 2020;21(13):No page numbers.

Obesity is a characteristic of COVID-19 patients and the risk of malnutrition can be underestimated due to excess of fat: a paradoxical danger. Long ICU hospitalization exposes patients to a high risk of wasting and loss of lean body mass. The complex management precludes the detection of anthropometric parameters for the definition and monitoring of the nutritional status. The use of imaging diagnostics for body composition could help to recognize and treat patients at increased risk of wasting with targeted pathways. COVID-19 patients admitted to the ICU underwent computed tomography within 24 hours and about 20 days later, to evaluate the parameters of the body and liver composition. The main results were the loss of the lean mass index and a greater increase in liver attenuation in obese subjects. These could be co-caused by COVID-19, prolonged bed rest, the complex medical nutritional therapy, and the starting condition of low-grade inflammation of the obese. The assessment of nutritional status, with body composition applied to imaging diagnostics and metabolic profiles in COVID-19, will assist in prescribing appropriate medical nutritional therapy. This will reduce recovery times and complications caused by frailty.

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1. **Body composition on low dose chest CT is a significant predictor of poor clinical outcome in COVID-19 disease - A multicenter feasibility study.**  
   Kottlors Jonathan European journal of radiology 2020;132:109274.

PURPOSELow-dose computed tomography (LDCT) of the chest is a recommended diagnostic tool in early stage of COVID-19 pneumonia. High age, several comorbidities as well as poor physical fitness can negatively influence the outcome within COVID-19 infection. We investigated whether the ratio of fat to muscle area, measured in initial LDCT, can predict severe progression of COVID-19 in the follow-up period.METHODWe analyzed 58 individuals with confirmed COVID-19 infection that underwent an initial LDCT in one of two included centers due to COVID-19 infection. Using the ratio of waist circumference per paravertebral muscle circumference (FMR), the body composition was estimated. Patient outcomes were rated on an ordinal scale with higher numbers representing more severe progression or disease associated complications (hospitalization/ intensive care unit (ICU)/ tracheal intubation/ death) within a follow-up period of 22 days after initial LDCT.RESULTSIn the initial LDCT a significantly higher FMR was found in patients requiring intensive care treatment within the follow-up period. In multivariate logistic regression analysis, FMR (p < .001) in addition to age (p < .01), was found to be a significant predictor of the necessity for ICU treatment of COVID-19 patients.CONCLUSIONFMR as potential surrogate of body composition and obesity can be easily determined in initial LDCT of COVID-19 patients. Within the multivariate analysis, in addition to patient age, low muscle area in proportion to high fat area represents an additional prognostic information for the patient outcome and the need of an ICU treatment during the follow-up period within the next 22 days. This multicentric pilot study presents a method using an initial LDCT to screen opportunistically for obese patients who have an increased risk for the need of ICU treatment. While clinical capacities, such as ICU beds and ventilators, are more crucial than ever to help manage the current global corona pandemic, this work introduces an approach that can be used for a cost-effective way to help determine the amount of these rare clinical resources required in the near future.

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1. **Challenges of Maintaining Optimal Nutrition Status in COVID-19 Patients in Intensive Care Settings**  
   Minnelli N. Journal of Parenteral and Enteral Nutrition 2020;44(8):1439-1446.

The coronavirus disease 2019 (COVID-19) pandemic has threatened patients, healthcare systems, and all countries across the globe with unprecedented challenges and uncertainties. According to the latest literature, most patients with COVID-19 have mild symptoms that do not require hospital admissions, and only a small percentage of those hospitalized require intensive care. In the intensive care unit (ICU), a registered dietitian nutritionist (RDN) assists the critical care team by formulating, executing, and monitoring the nutrition strategies and interventions to meet the unique requirements of extremely sick patients. However, because of the novelty of COVID-19, the situation is fluid and guidelines continue to be developed and updated. This article discusses the interim guidelines available for the nutrition support of ICU COVID-19 patients and the challenges the critical care team and RDN may face from a nutrition standpoint.<br/>Copyright &#xa9; 2020 American Society for Parenteral and Enteral Nutrition

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1. **COVID-19 is associated with clinically significant weight loss and risk of malnutrition, independent of hospitalisation: A post-hoc analysis of a prospective cohort study.**  
   Di Filippo Luigi Clinical nutrition (Edinburgh, Scotland) 2020;:No page numbers.

BACKGROUND & AIMSCoronavirus disease 2019 (COVID-19) may associate with clinical manifestations, ranging from alterations in smell and taste to severe respiratory distress requiring intensive care, that might associate with weight loss and malnutrition. We aimed to assess the incidence of unintentional weight loss and malnutrition in COVID-19 survivors.METHODSIn this post-hoc analysis of a prospective observational cohort study, we enrolled all adult (age ≥18 years) patients with a confirmed diagnosis of COVID-19 who had been discharged home from either a medical ward or the Emergency Department of San Raffaele University Hospital, and were re-evaluated after remission at the Outpatient COVID-19 Follow-Up Clinic of the same Institution from April 7, 2020, to May 11, 2020. Demographic, anthropometric, clinical and biochemical parameters upon admission were prospectively collected. At follow-up, anthropometrics, the mini nutritional assessment screening and a visual analogue scale for appetite were assessed.RESULTSA total of 213 patients were included in the analysis (33% females, median age 59.0 [49.5-67.9] years, 70% overweight/obese upon initial assessment, 73% hospitalised). Sixty-one patients (29% of the total, and 31% of hospitalised patients vs. 21% of patients managed at home, p = 0.14) had lost >5% of initial body weight (median weight loss 6.5 [5.0-9.0] kg, or 8.1 [6.1-10.9]%). Patients who lost weight had greater systemic inflammation (C-reactive protein 62.9 [29.0-129.5] vs.48.7 [16.1-96.3] mg/dL; p = 0.02), impaired renal function (23.7% vs. 8.7% of patients; p = 0.003) and longer disease duration (32 [27-41] vs. 24 [21-30] days; p = 0.047) as compared with those who did not lose weight. At multivariate logistic regression analysis, only disease duration independently predicted weight loss (OR 1.05 [1.01-1.10] p = 0.022).CONCLUSIONSCOVID-19 might negatively impact body weight and nutritional status. In COVID-19 patients, nutritional evaluation, counselling and treatment should be implemented at initial assessment, throughout the course of disease, and after clinical remission. CLINICALTRIALS.GOV REGISTRATIONNCT04318366.

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1. **Fat mass affects nutritional status of ICU COVID-19 patients.**  
   De Lorenzo A. Journal of translational medicine 2020;18(1):299.

BACKGROUND: Obesity and steatosis are associated with COVID-19 severe pneumonia. Elevated levels of pro-inflammatory cytokines and reduced immune response are typical of these patients. In particular, adipose tissue is the organ playing the crucial role. So, it is necessary to evaluate fat mass and not simpler body mass index (BMI), because BMI leaves a portion of the obese population unrecognized. The aim is to evaluate the relationship between Percentage of Fat Mass (FM%) and immune-inflammatory response, after 10 days in Intensive Care Unit (ICU). METHODS: Prospective observational study of 22 adult patients, affected by COVID-19 pneumonia and admitted to the ICU and classified in two sets: (10) lean and (12) obese, according to FM% and age (De Lorenzo classification). Patients were analyzed at admission in ICU and at 10th day. RESULTS: Obese have steatosis, impaired hepatic function, compromise immune response and higher inflammation. In addition, they have a reduced prognostic nutritional index (PNI), nutritional survival index for ICU patients. CONCLUSION: This is the first study evaluating FM% in COVID-19 patient. We underlined obese characteristic with likely poorly prognosis and an important misclassification of obesity. A not negligible number of patients with normal BMI could actually have an excess of adipose tissue and therefore have an unfavorable outcome such as an obese. Is fundamental personalized patients nutrition basing on disease phases.

1. **Identifying Critically-ill Patients With COVID-19 Who Will Benefit Most From Nutrition Support Therapy: Validation of the NUTRIC Nutritional Risk Assessment Tool**  
   2020;:https://clinicaltrials.gov/ct2/show/NCT04274322.

Brief Summary: There was an interaction between mortality, nutritional intake and the Nutrition Risk in Critically ill (NUTRIC) score suggesting that those with higher NUTRIC scores benefited the most from increasing nutritional intake. Yet limited data were in Chinese patients. The current outbreak of novel coronavirus, named COVID-19, was first reported from Wuhan, China on Dec ember 31 , 2019. There are about 16% patients need ICU admission. The objective of this study is to validation of the "NUTRIC" nutritional risk assessment tool in Chinese ICU patients diagnosed as COVID-19. Detailed Description: Heyland et al. previously proposed a novel scoring tool, the Nutrition Risk in Critically ill (NUTRIC) score, which is the first nutritional risk assessment tool developed and validated specifically for intensive care unit (ICU) patients. Many other risk scores and assessment tools exist to quantify nutrition risk but none have been specifically designed for ICU patients. Indeed, they generally consider all critically ill patients to be at high nutritional risk. However, the recognition that not all ICU patients will respond the same to nutritional interventions was the critical concept behind the NUTRIC score. There was an interaction between mortality, nutritional intake and NUTRIC score suggesting that those with higher NUTRIC scores benefited the most from increasing nutritional intake. However, the inferences about the validity of the NUTRIC score are limited in Chinese patients because of no data. The current outbreak of novel coronavirus was first reported from Wuhan, China on Dec ember 31 , 2019 . This virus was named as 2019 nCoV by World Health Organization ( on Jan uary 12 , 2020). Following the advice of the Emergency Committee, the WHO declared the outbreak of 2019 nCoV a Public Health Emergency of International Concern . Patients show fever and / or respiratory symptoms, with the imaging characteristics of pneumonia, and other symptoms include hemoptysis muscle pain, headache, confusion, chest pain, and diarrhea. About 16% patients need ICU admission. The objective of this study is to validation of the "NUTRIC" nutritional risk assessment tool in Chinese ICU patients diagnosed as COVID-19. This is a single-center, prospective cohort study of ICU patients with COVID-19. Data for all variables of the NUTRIC score will be collected. These include age, APACHE II score, SOFA score, number of co-morbidities, days from hospital admission to ICU admission. A logistic model including the NUTRIC score, the nutritional adequacy and their interaction will be estimated to assess if the NUTRIC score modified the association between nutritional adequacy and 28-day mortality.

1. **Malnutrition Care During the COVID-19 Pandemic: Considerations for Registered Dietitian Nutritionists**  
   DeepaHanduPhD Journal of the Academy of Nutrition and Dietetics 2020;:1.

Abstract Recent evidence examining adults infected with coronavirus disease 2019 (COVID-19) has indicated a significant impact of malnutrition on health outcomes. Individuals who have multiple comorbidities, are older adults, or who are malnourished, are at increased risk of being admitted to the intensive care unit and of mortality from COVID-19 infections. Therefore, nutrition care to identify and address malnutrition is critical in treating and preventing further adverse health outcomes from COVID-19 infection. This document provides guidance and practice considerations for registered dietitian nutritionists providing nutrition care for adults with suspected or confirmed COVID-19 infection in the hospital, outpatient, or home care settings. In addition, this document discusses and provides considerations for registered dietitian nutritionists working with individuals at risk of malnutrition secondary to food insecurity during the COVID-19 pandemic.

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1. **Nutrition of the COVID-19 patient in the intensive care unit (ICU): a practical guidance.**  
   Thibault Ronan Critical care (London, England) 2020;24(1):447.

Five to 10% of the coronavirus SARS-CoV-2-infected patients, i.e., with new coronavirus disease 2019 (COVID-19), are presenting with an acute respiratory distress syndrome (ARDS) requiring urgent respiratory and hemodynamic support in the intensive care unit (ICU). However, nutrition is an important element of care. The nutritional assessment and the early nutritional care management of COVID-19 patients must be integrated into the overall therapeutic strategy. The international recommendations on nutrition in the ICU should be followed. Some specific issues about the nutrition of the COVID-19 patients in the ICU should be emphasized. We propose a flow chart and ten key issues for optimizing the nutrition management of COVID-19 patients in the ICU.

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1. **Nutrition Support in the ICU-A Refresher in the Era of COVID-19.**  
   Micic Dejan The American journal of gastroenterology 2020;115(9):1367-1370.

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1. **Nutritional Assessment of Hospitalized Patients With COVID-19 (DenutCOVID)**  
   2020;:https://clinicaltrials.gov/ct2/show/NCT04503525.

Brief Summary: The nutritional consequences of the infection by the SARS-CoV-2 are as follows: A severe respiratory infection induces an inflammatory syndrome and hypercatabolism, as well as an increase in energy expenditure related to ventilatory work; nutritional requirements (calories and protein) are therefore increased. Food intake is often reduced by several factors: anorexia secondary to infection, respiratory discomfort, anosmia, ageusia, obesity, stress, confinement, organizational problems limiting meal assistance. Then, it is important to asses the nutritional status of COVID patients hospitalized in conventional COVID units (excluding intensive care).

1. **Nutritional evaluation and management in patients with Covid-19 following hospitalization in intensive care units**  
   Hoyois A. Clinical Nutrition ESPEN 2020;40:503.

Rationale: Among hospitalized patients with COVID 19 pneumonia, up to 32% may require admission in intensive care units (ICU). The aim of this prospective cohort study is to assess nutritional parameters in patients with COVID 19 following ICU. <br/>Method(s): All patients with COVID 19 requiring ICU stay (minimum 14 days) with mechanical ventilation were included after ICU discharge. Recorded parameters at the time of post-ICU rehabilitation unit (PIRU) admission included demographics, body mass index (BMI), weight loss (%), Hand Grip Test (kg), nutrition therapy modalities, and albumin dosage (gr/l). Quantitative parameters were expressed in median and range. <br/>Result(s): Until May 5<sup>th</sup>2020, 11 patients were included (age 58(33-75) years old, and 5 men (45%)). BMI at ICU admission was 25.7 (22.2-33.3) kg/m2. Duration regarding ICU stay and ventilation were respectively 29 (25-39) and 22 (13-28) days. Three patients (27%) required extracorporeal membrane oxygenation and tracheostomy was performed in 5 (45%). During ICU stay, enteral nutrition was administered to all patients through a naso-gastric tube; a percutaneous endoscopic gastrostomy was placed in the ICU in two patients. One patient required complementary parenteral nutrition. At the time of admission in the PIRU, BMI was 22.9 (19.1-32.9) kg/m2 and nutrition dosage was calculated at a median of 2553kcal/day (&gt;=28 kcal/kg/day) and 128 gr protein/day (&gt;=1.3 gr/kg/day). Weight loss since ICU admission was estimated at 8.3% (4.3%&gt;14%). Post-extubation dysphagia requiring texture adaptation was present in 5 patients (45%). Albumin levels were 30 (26-36) gr/L. Hand-grip was 12 (8-26) kg and 0 (0-20) kg for respectively men and women, reflecting significant sarcopenia <br/>Conclusion(s): Critical illpatients with COVID 19 pneumonia are malnourished and have severe sarcopenia following ICU stay despite adequate nutrition management. Optimal nutrition therapy remains crucial during the rehabilitation period. Disclosure of Interest: None declared<br/>Copyright &#xa9; 2020

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1. **Nutritional status assessment in patients with Covid-19 after discharge from the intensive care unit**  
   Haraj N.E. Clinical Nutrition ESPEN 2020;:No page numbers.

Introduction: The nutritional diagnosis and early nutritional management of COVID-19 patients must be integrated into the overall therapeutic strategy. The aim of our study is to assess the nutritional status of patients with COVID-19 after a stay in intensive care, to describe the prevalence of undernutrition, to determine the factors influencing undernutrition and to describe the nutritional management. Tools and methods: This is a descriptive observational study of adult patients admitted to the endocrinology service for additional care after a stay in intensive care during the period from April 17, 2020 to May 26, 2020. The assessment tool used was the Mini Nutritional Assessment (MNA). <br/>Result(s): Our study included 41 patients; the average age of the patients was 55 years, 51.2% had a severe or critical form of COVID-19, 75.6% stayed in intensive care, 12.2% had a loss of autonomy. The average BMI was 25.2 kg/m<sup>2</sup> (17-42 kg/m<sup>2</sup>), 42.5% were overweight, 61% had weight loss, 26.2% had weight loss greater than 10%, 14.6% of our patients were undernourished, 65.9% were at risk of undernutrition, 19.5% had hypoalbuminemia, 17.1% had hypoprotidemia, 19.5% hypocalcemia, 34.1% anemia, 12.2% hypomagnesemia and 51.2% had a deficiency in vitamin D. A positive correlation was found between poor nutritional status and a longer stay in intensive care (&gt;5 days) (p = 0.011) and lymphopenia (p = 0,02). <br/>Conclusion(s): Despite a personalized diet, 14.6% of patients presented undernutrition. Particular attention should be paid to patients with a long stay in intensive care.<br/>Copyright &#xa9; 2020 European Society for Clinical Nutrition and Metabolism

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1. **The modified NUTRIC score can be used for nutritional risk assessment as well as prognosis prediction in critically ill COVID-19 patients.**  
   Zhang Ping Clinical nutrition (Edinburgh, Scotland) 2020;:No page numbers.

BACKGROUND & AIMSIn the newly emerged Coronavirus Disease 2019 (COVID-19) disaster, little is known about the nutritional risks for critically ill patients. It is also unknown whether the modified Nutrition Risk in the Critically ill (mNUTRIC) score is applicable for nutritional risk assessment in intensive care unit (ICU) COVID-19 patients. We set out to investigate the applicability of the mNUTRIC score for assessing nutritional risks and predicting outcomes for these critically ill COVID-19 patients.METHODSThis retrospective observational study was conducted in three ICUs which had been specially established and equipped for COVID-19 in Wuhan, China. The study population was critically ill COVID-19 patients who had been admitted to these ICUs between January 28 and February 21, 2020. Exclusion criteria were as follows: 1) patients of ＜18 years; 2) patients who were pregnant; 3) length of ICU stay of ＜24 h; 4) insufficient medical information available. Patients' characteristics and clinical information were obtained from electronic medical and nursing records. The nutritional risk for each patient was assessed at their ICU admission using the mNUTRIC score. A score of ≥5 indicated high nutritional risk. Mortality was calculated according to patients' outcomes following 28 days of hospitalization in ICU.RESULTSA total of 136 critically ill COVID-19 patients with a median age of 69 years (IQR: 57-77), 86 (63%) males and 50 (37%) females, were included in the study. Based on the mNUTRIC score at ICU admission, a high nutritional risk (≥5 points) was observed in 61% of the critically ill COVID-19 patients, while a low nutritional risk (<5 points) was observed in 39%. The mortality of ICU 28-day was significantly higher in the high nutritional risk group than in the low nutritional risk group (87% vs 49%, P ＜0.001). Patients in the high nutritional risk group exhibited significantly higher incidences of acute respiratory distress syndrome, acute myocardial injury, secondary infection, shock and use of vasopressors. Additionally, use of a multivariate Cox analysis showed that patients with high nutritional risk had a higher probability of death at ICU 28-day than those with low nutritional risk (adjusted HR = 2.01, 95% CI: 1.22-3.32, P = 0.006).CONCLUSIONSA large proportion of critically ill COVID-19 patients had a high nutritional risk, as revealed by their mNUTRIC score. Patients with high nutritional risk at ICU admission exhibited significantly higher mortality of ICU 28-day, as well as twice the probability of death at ICU 28-day than those with low nutritional risk. Therefore, the mNUTRIC score may be an appropriate tool for nutritional risk assessment and prognosis prediction for critically ill COVID-19 patients.

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1. **The Prognostic Nutritional Index is associated with mortality of COVID-19 patients in Wuhan, China.**  
   Wang R. Journal of clinical laboratory analysis 2020;34(10):e23566.

BACKGROUND: Declared as pandemic by WHO, the coronavirus disease 2019 (COVID-19) pneumonia has brought great damage to human health. The uncontrollable spread and poor progression of COVID-19 have attracted much attention from all over the world. We designed this study to develop a prognostic nomogram incorporating Prognostic nutritional index (PNI) in COVID-19 patients. METHODS: Patients confirmed with COVID-19 and treated in Renmin Hospital of Wuhan University from January to February 2020 were included in this study. We used logistic regression analysis to find risk factors of mortality in these patients. A prognostic nomogram was constructed and receiver operating characteristics (ROC) curve was drawn to evaluate the predictive value of PNI and this prognostic model. RESULTS: Comparison of baseline characteristics showed non-survivors had higher age (P < .001), male ratio (P = .038), neutrophil-to-lymphocyte ratio (NLR) (P < .001), platelet-to-lymphocyte ratio (PLR) (P < .001), and PNI (P < .001) than survivors. In the multivariate logistic regression analysis, independent risk factors of mortality in COVID-19 patients included white blood cell (WBC) (OR 1.285, P = .039), PNI (OR 0.790, P = .029), LDH (OR 1.011, P < .015). These three factors were combined to build the prognostic model. Area under the ROC curve (AUC) of only PNI and the prognostic model was 0.849 (95%Cl 0.811-0.888) and 0.950 (95%Cl 0.922-0.978), respectively. And calibration plot showed good stability of the prognostic model. CONCLUSION: This research indicates PNI is independently associated with the mortality of COVID-19 patients. Prognostic model incorporating PNI is beneficial for clinicians to evaluate progression and strengthen monitoring for COVID-19 patients.

1. **Visceral fat shows the strongest association with the need of intensive care in patients with COVID-19.**  
   Watanabe Mikiko Metabolism: clinical and experimental 2020;111:154319.

BACKGROUNDObesity was recently identified as a major risk factor for worse COVID-19 severity, especially among the young. The reason why its impact seems to be less pronounced in the elderly may be due to the concomitant presence of other comorbidities. However, all reports only focus on BMI, an indirect marker of body fat.AIMTo explore the impact on COVID-19 severity of abdominal fat as a marker of body composition easily collected in patients undergoing a chest CT scan.METHODSPatients included in this retrospective study were consecutively enrolled among those admitted to an Emergency Department in Rome, Italy, who tested positive for SARS-Cov-2 and underwent a chest CT scan in March 2020. Data were extracted from electronic medical records.RESULTS150 patients were included (64.7% male, mean age 64 ± 16 years). Visceral fat (VAT) was significantly higher in patients requiring intensive care (p = 0.032), together with age (p = 0.009), inflammation markers CRP and LDH (p < 0.0001, p = 0.003, respectively), and interstitial pneumonia severity as assessed by a Lung Severity Score (LSS) (p < 0.0001). Increasing age, lymphocytes, CRP, LDH, D-Dimer, LSS, total abdominal fat as well as VAT were found to have a significant univariate association with the need of intensive care. A multivariate analysis showed that LSS and VAT were independently associated with the need of intensive care (OR: 1.262; 95%CI: 1.0171-1.488; p = 0.005 and OR: 2.474; 95%CI: 1.017-6.019; p = 0.046, respectively).CONCLUSIONSVAT is a marker of worse clinical outcomes in patients with COVID-19. Given the exploratory nature of our study, further investigation is needed to confirm our findings and elucidate the mechanisms underlying such association.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=d8a646b630055484174ac2021cc4a242)

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**Word documents**  
Select Edit from the menu, the Find and type in your term in the search box which is presented. The search function will locate the first use of the term in the document. By pressing 'next' you will jump to further references.

## B. Search History

|  | **Source** | **Criteria** | **Results** |
| --- | --- | --- | --- |
| 1. | Medline | (COVID-19).ti,ab | 64964 |
| 2. | Medline | (Coronavirus).ti,ab | 37636 |
| 3. | Medline | \*CORONAVIRUS/ | 3402 |
| 4. | Medline | (SARS-COV-2).ti,ab | 19950 |
| 5. | Medline | ("Severe acute respiratory syndrome coronavirus 2").ti,ab | 6992 |
| 6. | Medline | ("2019 Novel").ti,ab | 1004 |
| 7. | Medline | (1 OR 2 OR 3 OR 4 OR 5 OR 6) | 84340 |
| 8. | Medline | ("critical care").ti,ab | 28293 |
| 9. | Medline | \*"CRITICAL CARE"/ | 32316 |
| 10. | Medline | ("intensive care").ti,ab | 147410 |
| 11. | Medline | ("intensive therapy unit\*").ti,ab | 625 |
| 12. | Medline | ("intensive treatment unit\*").ti,ab | 66 |
| 13. | Medline | (ICU).ti,ab | 58777 |
| 14. | Medline | (ITU).ti,ab | 829 |
| 15. | Medline | (8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14) | 199303 |
| 16. | Medline | (7 AND 15) | 4228 |
| 17. | Medline | ("nutrition\* assessment\*").ti,ab | 5451 |
| 18. | Medline | \*"NUTRITION ASSESSMENT"/ | 7567 |
| 19. | Medline | ("Subjective Global Assessment").ti,ab | 1486 |
| 20. | Medline | (Anthropometr\*).ti,ab | 55048 |
| 21. | Medline | (dynamometry).ti,ab | 1856 |
| 22. | Medline | ("skinfold measurement\*").ti,ab | 624 |
| 23. | Medline | ("Body composition").ti,ab | 36372 |
| 24. | Medline | ("Waist-Hip Ratio").ti,ab | 4265 |
| 25. | Medline | ("waist circumference").ti,ab | 27731 |
| 26. | Medline | ("mid arm" ADJ2 circumference).ti,ab | 934 |
| 27. | Medline | ("Hand grip strength").ti,ab | 1723 |
| 28. | Medline | (17 OR 18 OR 19 OR 20 OR 21 OR 22 OR 23 OR 24 OR 25 OR 26 OR 27) | 120744 |
| 29. | Medline | (16 AND 28) | 11 |
| 30. | Medline | (Assessment\* ADJ2 Nutrition\*).ti,ab | 8004 |
| 31. | Medline | ("modified Nutrition Risk in the Critically ill").ti,ab | 15 |
| 32. | Medline | (mNUTRIC).ti,ab | 30 |
| 33. | Medline | (30 OR 31 OR 32) | 8025 |
| 34. | Medline | (16 AND 33) | 4 |
| 35. | EMBASE | (COVID-19).ti,ab | 63913 |
| 36. | EMBASE | (Coronavirus).ti,ab | 37657 |
| 37. | EMBASE | \*CORONAVIRUS/ | 3551 |
| 38. | EMBASE | (SARS-COV-2).ti,ab | 19473 |
| 39. | EMBASE | ("Severe acute respiratory syndrome coronavirus 2").ti,ab | 6791 |
| 40. | EMBASE | ("2019 Novel").ti,ab | 1095 |
| 41. | EMBASE | (35 OR 36 OR 37 OR 38 OR 39 OR 40) | 84810 |
| 42. | EMBASE | ("critical care").ti,ab | 48542 |
| 43. | EMBASE | \*"CRITICAL CARE"/ | 48868 |
| 44. | EMBASE | ("intensive care").ti,ab | 217044 |
| 45. | EMBASE | ("intensive therapy unit\*").ti,ab | 782 |
| 46. | EMBASE | ("intensive treatment unit\*").ti,ab | 128 |
| 47. | EMBASE | (ICU).ti,ab | 121293 |
| 48. | EMBASE | (ITU).ti,ab | 2491 |
| 49. | EMBASE | (42 OR 43 OR 44 OR 45 OR 46 OR 47 OR 48) | 325156 |
| 50. | EMBASE | (41 AND 49) | 4483 |
| 51. | EMBASE | ("nutrition\* assessment\*").ti,ab | 8719 |
| 52. | EMBASE | \*"NUTRITION ASSESSMENT"/ | 7735 |
| 53. | EMBASE | ("Subjective Global Assessment").ti,ab | 2603 |
| 54. | EMBASE | (Anthropometr\*).ti,ab | 81223 |
| 55. | EMBASE | (dynamometry).ti,ab | 2768 |
| 56. | EMBASE | ("skinfold measurement\*").ti,ab | 712 |
| 57. | EMBASE | ("Body composition").ti,ab | 50869 |
| 58. | EMBASE | ("Waist-Hip Ratio").ti,ab | 6045 |
| 59. | EMBASE | ("waist circumference").ti,ab | 45088 |
| 60. | EMBASE | ("mid arm" ADJ2 circumference).ti,ab | 1443 |
| 61. | EMBASE | ("Hand grip strength").ti,ab | 2945 |
| 62. | EMBASE | (Assessment\* ADJ2 Nutrition\*).ti,ab | 11478 |
| 63. | EMBASE | ("modified Nutrition Risk in the Critically ill").ti,ab | 33 |
| 64. | EMBASE | (mNUTRIC).ti,ab | 46 |
| 65. | EMBASE | (51 OR 52 OR 53 OR 54 OR 55 OR 56 OR 57 OR 58 OR 59 OR 60 OR 61 OR 62 OR 63 OR 64) | 177696 |
| 66. | EMBASE | (50 AND 65) | 16 |
| 67. | CINAHL | (COVID-19).ti,ab | 22009 |
| 68. | CINAHL | (Coronavirus).ti,ab | 9407 |
| 69. | CINAHL | \*CORONAVIRUS/ | 708 |
| 70. | CINAHL | (SARS-COV-2).ti,ab | 3427 |
| 71. | CINAHL | ("Severe acute respiratory syndrome coronavirus 2").ti,ab | 1298 |
| 72. | CINAHL | ("2019 Novel").ti,ab | 309 |
| 73. | CINAHL | (67 OR 68 OR 69 OR 70 OR 71 OR 72) | 25963 |
| 74. | CINAHL | ("critical care").ti,ab | 22988 |
| 75. | CINAHL | \*"CRITICAL CARE"/ | 14935 |
| 76. | CINAHL | ("intensive care").ti,ab | 63901 |
| 77. | CINAHL | ("intensive therapy unit\*").ti,ab | 284 |
| 78. | CINAHL | ("intensive treatment unit\*").ti,ab | 19 |
| 79. | CINAHL | (ICU).ti,ab | 30476 |
| 80. | CINAHL | (ITU).ti,ab | 312 |
| 81. | CINAHL | (74 OR 75 OR 76 OR 77 OR 78 OR 79 OR 80) | 99445 |
| 82. | CINAHL | (73 AND 81) | 1291 |
| 83. | CINAHL | ("nutrition\* assessment\*").ti,ab | 2796 |
| 84. | CINAHL | \*"NUTRITION ASSESSMENT"/ | 0 |
| 85. | CINAHL | ("Subjective Global Assessment").ti,ab | 787 |
| 86. | CINAHL | (Anthropometr\*).ti,ab | 18711 |
| 87. | CINAHL | (dynamometry).ti,ab | 1092 |
| 88. | CINAHL | ("skinfold measurement\*").ti,ab | 145 |
| 89. | CINAHL | ("Body composition").ti,ab | 12647 |
| 90. | CINAHL | ("Waist-Hip Ratio").ti,ab | 1081 |
| 91. | CINAHL | ("waist circumference").ti,ab | 10321 |
| 92. | CINAHL | ("mid arm" ADJ2 circumference).ti,ab | 263 |
| 93. | CINAHL | ("Hand grip strength").ti,ab | 856 |
| 94. | CINAHL | (Assessment\* ADJ2 Nutrition\*).ti,ab | 3928 |
| 95. | CINAHL | ("modified Nutrition Risk in the Critically ill").ti,ab | 8 |
| 96. | CINAHL | (mNUTRIC).ti,ab | 19 |
| 97. | CINAHL | (83 OR 84 OR 85 OR 86 OR 87 OR 88 OR 89 OR 90 OR 91 OR 92 OR 93 OR 94 OR 95 OR 96) | 42314 |
| 98. | CINAHL | (82 AND 97) | 2 |

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