# Body composition modifies response to EPO in a large latinamerican hemodialysis patients cohort

***Adrián Marcos Guinsburg, Marcelo Ferder, Cristina Marelli***
Fresenius Medical Care Latinamerica

## Background

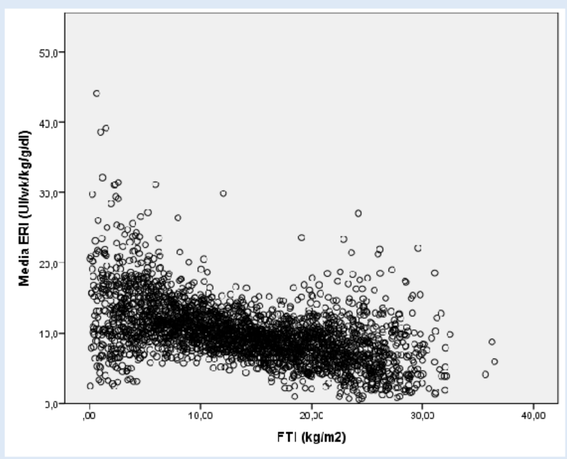
Response to erythropoiesis stimulating agents (ESA) in hemodialysis patients is variable and affected by several known factors (iron status, inflammation, dialysis dose, BMI, bone disease).
In this study we aimed to assess the effect of body composition measured by bioimpedance spectroscopy (BCM, Body Composition Monitor, Fresenius) on EPO resistance.

## Methods

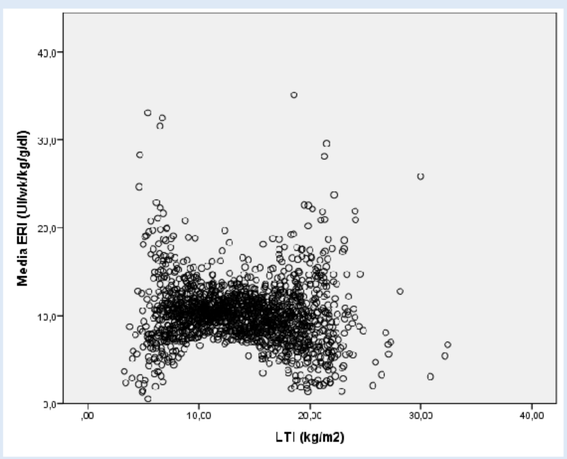
Patients from Fresenius Medical Care Latin America database (EuCliD) in who body composition has been assessed using BCM were selected.
EPO resistance index (ERI) was calculated as EPO weekly dose (UI/week) / weight (kg) / Hb level (g/dl). Lean Tissue Index (LTI, lean tissue mass/height² (kg/m²)) and Fat Tissue Index (FTI, fat tissue mass/height² (kg/m²)) were measured by BCM. Others factors affecting EPO resistance were collected and included in the multivariate analysis for adjustment (table 1). Pearson was used for simple correlations, and multivariate linear regression analysis to test for independent associations.

## Results

After selection, 21,672 patients were included (Argentina [7,616], Brazil [3,730], Chile [4,169], Colombia [5,951] and Ecuador [206]).
Patients characteristics (mean ± SD): age 57.9 ± 15.6 years, gender (male) 58.8%, diabetes prevalence (DBT) 24.5%, BMI 26.1 ± 4.7 kg/m2, FTI 12.6 ± 5.6 kg/m2, LTI 12.6 ± 3.1 kg/m2, ERI 10.4 ± 7.2 IU/wk/kg/g/dl, native fistula as vascular access 76%, graft 6.8%, uncuffed catheter 5.6%, cuffed catheter 11.6%.
In univariate analysis, ERI was inversely correlated with LTI and FTI:




ERI vs FTI




ERI vs LTI

Similarly in multivariate analysis, ERI was associated independently and inversely to LTI and FTI, controlling for several variables related to EPO resistance:

| | Beta | p |
|---|---|---|
| **Age** | -0.103 | < 0.0001 |
| **BMI** | 0.701 | < 0.0001 |
| **FTI** | -1.155 | < 0.0001 |
| **LTI** | -0.659 | < 0.0001 |
| **Alb** | -0.125 | < 0.0001 |
| **PTHi** | 0.032 | NS |
| **PCR** | -0.006 | NS |
| **TSAT** | -0.133 | < 0.0001 |
| **Kt/Vsp** | -0.072 | 0.003 |
| **Vascular access** | 0.003 | NS |
| **Gender** | -0.153 | < 0.0001 |

Multivariate regression analysis

## Conclusion

Response to EPO in hemodialysis patients is modified by body composition. LTI and FTI measured by BCM shows an independent and beneficial effect, confirming previous publications with no BCM data available[1]. This protective effect may reflect a better nutritional status or, in patients with higher FTI, a reduced distribution volume of hemoglobin due to the lower percentage of water in fat.
Further controlled studies are necessary to confirm these findings.

1. [Kotanko et al, Blood Purif 2008;26:82–89]

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ADRIAN GUINSBURG
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