Iron deficiency anemia – development of a predictive model for gastrointestinal malignancy (Minho Model)

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Aims: Iron deficiency anemia (IDA) may be the only sign of gastrointestinal (GI) malignancy. Identification of predictive factors of GI malignancy could help the physician to establish patients’ priority to endoscopic assessment, contributing to an earlier diagnosis.

Methods: Retrospective cohort study of 344 patients submitted to endoscopic assessment for IDA. Included adult patients with IDA and excluded patients with GI or extra-GI bleeding, total gastrectomy, exclusively vegetarian diet or insufficient medical records.

Results: Included 121 patients with mean age of 68.5±17.0 years and 54.5% females. GI malignancy was identified in 14.9% of patients (12 gastric and 6 colonic). A statistically significant association was found between the presence of GI malignancy and age (75.2±12.9 vs 67.2±17.4, p=0.048), male gender (72.2% vs 40.8%, p=0.013), GI symptoms (61.1% vs 11.7%, p<0.001), weight loss (61.1% vs 5.8%, p<0.001), need for hospitalization (88.9% vs 49.5%, p=0.002), iron seric levels and transferrin saturation (19.7±10.1 mg/L vs 30.4±18.9 mg/L, p=0.009 and 6.1±4.1% vs 9.2±6.3%, p=0.029, respectively). On multivariable analysis, weight loss (OR, 33.318; 95% CI, 4.060-273.437), GI symptoms (OR, 43.114; 95% CI, 3.764-493.839), transferrin saturation (OR, 0.634; 95% CI, 0.457-0.881) and need for hospitalization (OR, 51.474; 95% CI, 2.004-1321.828) showed a significant association with the diagnosis of GI malignancy. A predictive model was created, with a Nagelkerke $R^2$ of 64.5% and a classificatory efficacy of 93.3%, with a sensitivity of 66.7%, specificity of 98.0%, positive predictive value of 85.3% and negative predictive value of 94.3%.

Conclusions: In patients with IDA the diagnosis of GI malignancy is established in a significant percentage of patients. We have determined a model (Minho Model) that predicts with 93.3% of classificatory efficiency the probability of a patient having GI malignancy based on their seric iron, transferrin saturation, presence of gastrointestinal symptoms and/or weight loss and need for hospitalizations. This model requires prospective validation but results are promising.