

Evaluation of a pain scale to predict hospital admission in patients with sickle cell disease

Haematologica 2007; 88:(4)e52-e53

We recorded 80 acute clinical events in patients with sickle cell disease (SCD) in order to evaluate the accuracy of pain as a predictor of hospital admission. The presence of pain was a good discriminator of necessity of admission and we concluded that a pain scale is a good predictor of the need for hospital admission among patients with SCD. The most prevalent complication of SCD is vaso-occlusive crisis (VOC). This complication is an important cause of hospital use and admission.¹ Decisions about hospital admission are often difficult and admission is usually recommended for patients who require continuing treatment with parental narcotics or who cannot adequately take fluid orally.² We hypothesized that utilization of a numerical rating scale (NRS), a well known and tested instrument to assess acute pain,³ could help physicians to decide about admission of patients with VOC. A receiver operating curve (ROC), a powerful evaluator of a diagnostic tests performance,⁴ was generated for the pain score. From January through December 2001 we prospectively evaluate all patients with SCD who were seen at the University Hospital – Universidade Federal do Rio de Janeiro - because of clinical acute events. Patients enrolled had hemoglobin SS, SC or SS-(beta)-thalassemia phenotype on electrophoretic analysis of the hemoglobin. At entry, the following clinical variables were recorded: age, presence, localization and intensity of pain, fever (axillary temperature equal or greater than 38.0o C), duration of symptoms at home and medications. The intensity of pain was assessed at the first visit, before any analgesia was administered, and every 24 hours, with the patient rating pain on a 0 (no pain) to 10 (worst pain ever experienced) scale. Categorical variables were assessed using the chi-squared or Fisher's exact test. The accuracy of the pain scale in discriminating patients to be admitted was measured using the area under a receiver operating curve (ROC) and the 95% confidence interval was determined. Sensitivities, specificities and positive and negative predictive values were calculated according to standard methods. Statistical analyses were performed using EPI-INFO, version 6.0 (CDC – Atlanta) and SPSS for WINDOWS, version 10.01. Forty-five adolescents and adults with SCD comprised the study population. The median age of the patients was 23 years (ranging from 13 to 53 y.o.). We recorded 80 distinct clinical acute events that resulted in 49 hospital admissions (61.3%). In 65 events, pain was present and the relative risk for hospital admission was 2.03 (95% CI: 0.97 – 4.24; p=0.01). The average pain score was 7.4 (range 1 to 10). Forty-four patients with pain were hospitalized and 21 were sent home. The average pain score was 8.5 for admitted patients and 5.1 for patients who were sent home (p < 0.001). The mean hospital stay was 9.0 days and pain intensity did not correlate with hospital stay. The ROC curve is graphically represented in Figure 1. The pain score was a good discriminator of necessity of admission with ROC area of 0,881 (95% CI: 0.788 – 0.974). Considering 6.5 as a cutoff point, we found a sensitivity of 0.886, specificity of 0.762, positive predictive value of 0.886 and negative predictive value of 0.760. The number of pain episodes per year (*pain rate*) correlates with early death in adult patients with sickle cell disease⁵ however the reproducibility of both the conscious experience of pain with subjective pain scales, remains criti-

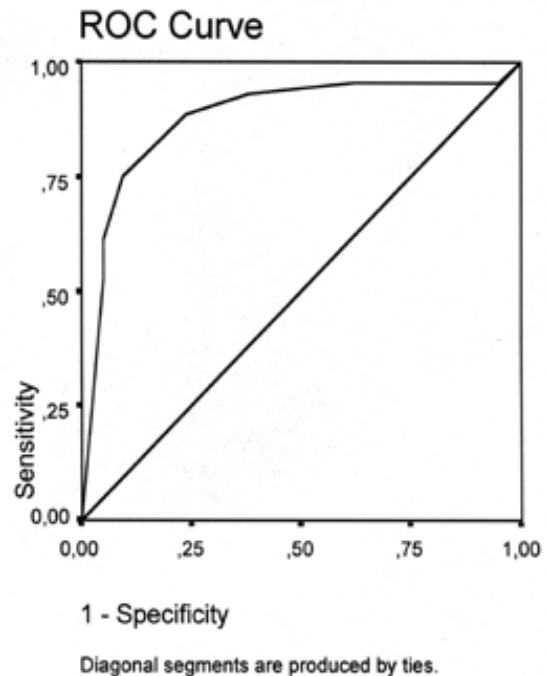


Figure 1. ROC: accuracy of pain score to predict hospital admission.

cal.⁶ In our analysis, we demonstrated that the NRS constitutes a useful criterion to predict hospital admission. Study of children at an emergency department demonstrated that both pain and fever are factors associated with hospital admission.⁷ Beiter *et al*,⁸ demonstrated that an initial pain score greater than 70 (of a possible of 100) clearly predicted the patients who would not have adequate resolution of pain without an IV opioid. We were also able to find that adult and adolescent patients with pain but not fever had more chance of being admitted. Our high admission rate is consistent with most emergency departments where sickle cell crises is not approached applying a day hospital regimen.⁹ The decision to admit a patient with sickle cell disease requires multi-modal evaluation of severity of anemia, presence of infection, priapism, acute chest syndrome, acute stroke or another life-threatening complication.² Nevertheless, the NRS seems to be a reliable and simple parameter for predicting hospital admission in patients with VOC. Therefore, hospital admission should be considered for patients with a pain score equal or greater than 6.5 seen at an emergency department but the final decision for hospitalization should combine other relevant clinical parameters.

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Key words: sickle cell disease, vaso-occlusive crisis, pain scale, ROC curve.

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