Pre-hospital stroke scales to predict large vessel occlusion: a meta-analysis of diagnostic accuracy

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Background and purpose: The time sensitivity for pharmacological and mechanical arterial recanalization in acute ischemic stroke influences the choice of the reference hospital and the proper selection and identification of patients with high probability of a large vessel occlusion (LVO) in the prehospital setting are fundamental to rationalize this transportation. Aim of this analysis was to determine the diagnostic accuracy of a prehospital stroke scale detecting acute ischemic brain attack due to a LVO.

Methods: Studies were searched into MEDLINE, EMBASE and CINHAL databases between January 1990 and 31st January, 2017. We considered prospective and retrospective studies. The main measurements of the meta-analysis were the overall level of accuracy of prehospital stroke scales and single predictive values of these scores for LVO.

Results: 18 scoring systems were included in the analysis coming from 12 studies. A total of 9083 patients were considered (median age: 71 years). The pooled sensitivity was 0.77 (95%CI: 0.76 – 0.78) with an I^2: 95.8% and the pooled specificity was 0.65 (95%CI: 0.64 – 0.65) with I^2: 99.2%. The symmetric summary of the Receiving Operating Characteristic curve showed an overall accuracy of 0.73 (SE: 0.0147) with three scores with better results (VAN, NIH stroke scale and LAMS; Figure 2).

Conclusions: This meta-analysis suggests that some prehospital scoring systems appear to have the best operating characteristics to predict stroke due to LVO. The presence of cortical signs in these scales showed an increased accuracy. However, the results are not conclusive because of the high level of heterogeneity between studies and scales.
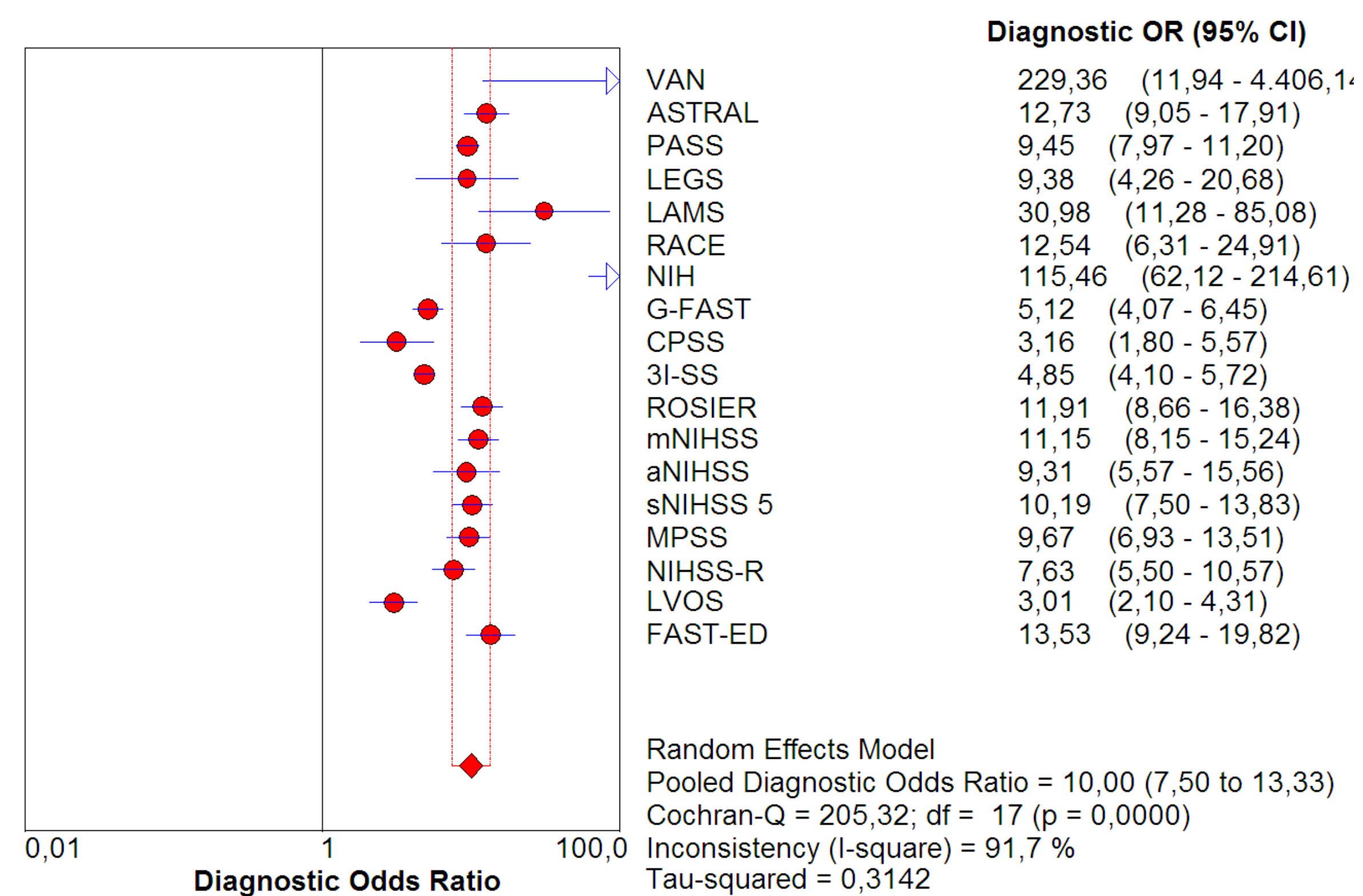

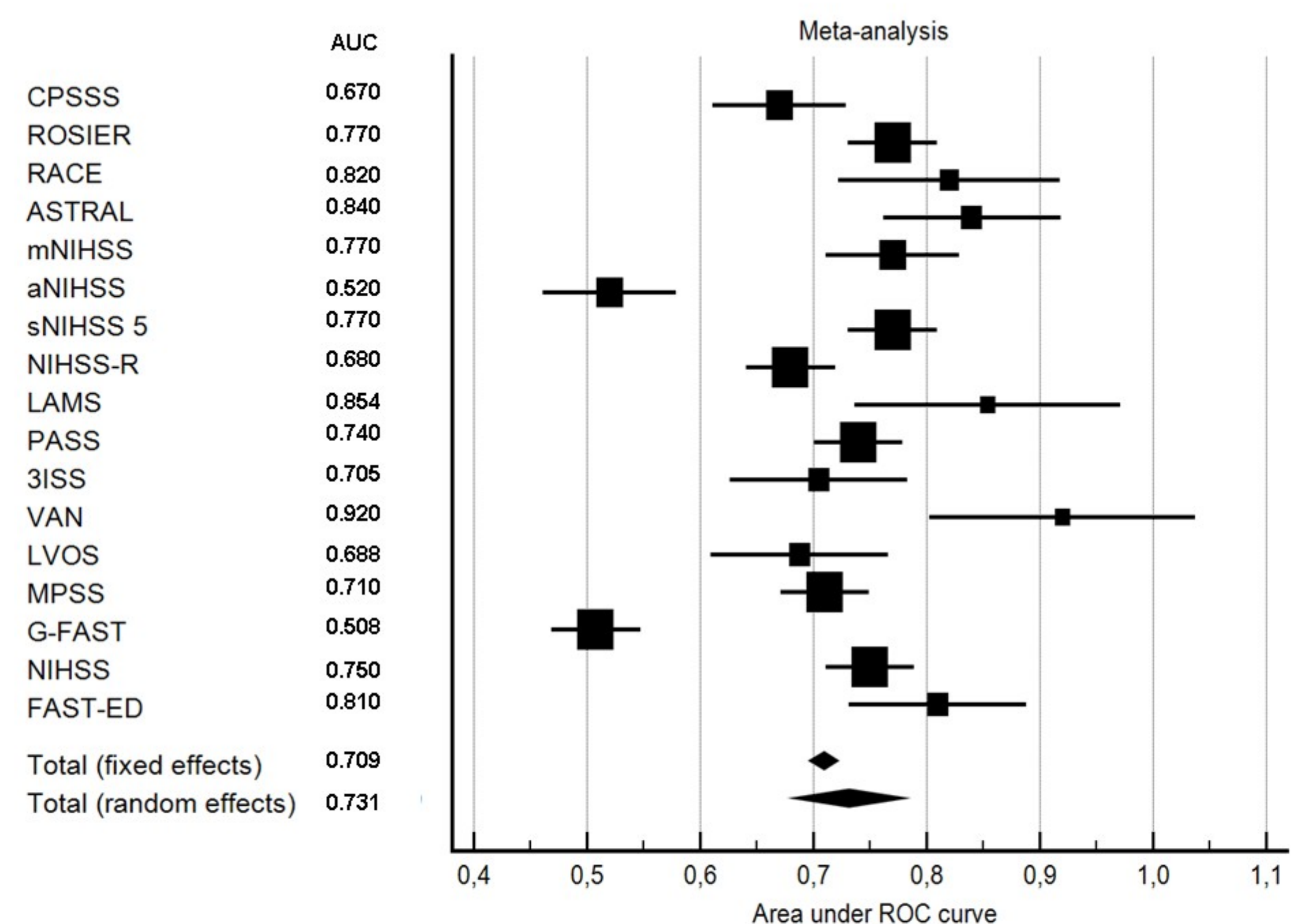Figure 1: Diagnostic Odds Ratio for different Scales

Figure 2: Forest plot for Area under ROC curve for each scale