Correlative study of various discrimination indices for screening of beta thalassaemia trait

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Introduction

Anaemia affects about 800 million people worldwide. Major contributors are iron deficiency anaemia (IDA) and thalassaemia trait. Thalassaemia (Greek for 'sea blood') is so called because it was first discovered around the Mediterranean coast and usually affects people originating from this area and to a lesser extent Chinese, Asians and African Americans.[1] It is important to differentiate between thalassaemic and non-thalassaemic microcytosis as both conditions share many overlapping characteristics.[2] This study aimed to find out the best discrimination index to screen for thalassaemia trait cases, so that they can be subjected to haemoglobin electrophoresis for confirmation to reduce the diagnostic cost and disease burden on society.[3]

Material and methods

This was a 2-year prospective study. Six hundred and ten cases of microcytic hypochromic anaemia were selected. A complete blood count and general blood picture were carried out and seven discrimination indices were calculated, then subjected to iron studies / alkaline haemoglobin electrophoresis accordingly.

Results and discussion

The highest sensitivity was noted by the Shine and Lal index (88.16%). The highest specificity was noted by the Mentzer index (88.0%). Youden's index was found to be highest for the Shine and Lal index. As observed, the Shine and Lal index and Mentzer index can be safely relied on for cost-effective mass screening of microcytic hypochromic anaemia. Although the cut-offs of the indices are already set, they are all based on European/American Standards. Therefore, the cut-off values need to be revised to achieve the best combination of sensitivity and specificity taking into account the demographics and prevalence of nutritional anaemia, which varies from region to region. The presence of subclinical infections and latent inflammatory disorders can falsely alter the serum iron profile analysis, therefore suggesting that we probably need to redefine the cut-off for serum ferritin levels in our population on a larger level. The patients with silent β-thalassaemia trait (βTT), who exhibit near-normal haematological parameters and normal haemoglobin A2 (HbA_2) levels, are easily missed if not subjected to genetic studies.[4]

Conclusions

In an era of rising cost consciousness, prevention is the most effective way for controlling β-thalassaemia. Efficient diagnostic approaches that can rule in or out diseases with sufficient accuracy during mass screening so that the testing is minimised are particularly welcome. Though HbA_2 estimation is the gold standard for diagnosing βTT, in developing countries the Shine and Lal index, Mentzer and red blood cell distribution width index (RDWi) have good discriminative function based on sensitivity, specificity and Youden's index. ■

Conflicts of interest

None declared.

References

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