

La valeur prédictive positive de l'IRM dans les mitochondriopathies

BACKGROUND

Because the mitochondrial respiratory chain is ubiquitous, its deficiency can theoretically give rise to any symptom in any organ or tissue at any age with any mode of inheritance, owing to the twofold genetic origin of respiratory enzyme machinery, i.e nuclear and mitochondrial. Yet, Not all respiratory enzyme deficiencies are primary and secondary or artefactual deficiency is frequently observed, leading to a number of misleading conclusions and inappropriate investigations in clinical practice. This study is aimed at investigating the potential role of brain MRI in distinguishing primary respiratory chain deficiency from phenocopies and other etiologies.

METHODS

Starting from a large series of 189 patients (median age: 3,5 years [8 days- 56 years], 58% males) showing signs of respiratory chain enzyme deficiency, for whom both brain MRIs and disease-causing mutations were available, we retrospectively studied the positive predictive value and the positive likelihood ratio (LR+) of brain MRI imaging and its ability to discriminate between two groups: primary deficiency of the mitochondrial respiratory chain machinery and phenocopies.

RESULTS

Although no anomaly was specific Detection of i) brainstem hyper-intensity with basal ganglia involvement ($p \leq 0.001$) and ii) lactate peak with either brainstem or basal ganglia hyper-intensity were highly suggestive of primary respiratory chain deficiency ($p \leq 0.01$). Fourteen items had a positive predictive value $> 95\%$ and LR+ was greater than 9 for seven signs. Biallelic SLC19A3 mutations represented the main differential diagnosis. Non-significant differences between the two groups were found for cortical/subcortical atrophy, leukoencephalopathy, and involvement of caudate nuclei, spinothalamic tract and corpus callosum.

CONCLUSION

Based on these results and owing to invasiveness of skeletal muscle biopsies and cost of high-throughput DNA sequencing, we suggest giving consideration to brain MRI imaging as a strong diagnostic marker and an informative investigation to be performed in patients at risk of respiratory chain deficiency. at risk of respiratory chain deficiency showing signs of respiratory chain enzyme deficiency.