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Title Clinical effectiveness of newborn screening for inborn errors of metabolism using mass spectrometry. Part I: maple Syrup Urine Disease (MSUD), Homocystinuria, Glutaric Aciduria Type I, Isovaleric Acidaemia (IVA), Long-chain 3-Hydroxyacyl CoA Dehydrogenase Deficiency (LCHADD)

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Reference http://www.sergas.es/Docs/Avalia-t/avaliat_201203_Cribado-Metabolopatias.pdf

Aim

To assess the clinical effectiveness of newborn screening of the following congenital errors of metabolism: maple syrup urine disease; homocystinuria; glutaric aciduria type I; isovaleric aciduria; and long-chain 3-hydroxyacyl CoA dehydrogenase deficiency.

Conclusions and results

Evidence as to the effectiveness of the screening program of congenital errors of metabolism assessed in this review was of low quality and was based on observational studies, longitudinal or comparative case series and cross-sectional studies with no control group, which provided direct evidence in some cases only. Two congenital errors of metabolism, GA-I and LCHADD, would fulfil all the requisites for implementation in screening programmes.

In two cases, MSUD and IVA, the requirement of having a sufficiently long detectable latency period would not be met, unless the availability of the screening results before symptom onset could be ensured. In three diseases, no valid, reliable and efficient screening test can be claimed to exist, due to low sensitivity (using methionine levels in the case of homocystinuria) or irregular sensitivity (in the case of MSUD) or the diversity of screening protocols used (IVA). In all three cases, the positive predictive value (PPV) of the commonly used screening tests was very low.

Before any screening programme can be implemented, an appropriate protocol that maximises the test's sensitivity and specificity must be drawn up, defining the analytes to be used, specific cut-off points for each population and laboratory, and, where applicable, second-tier tests.

Lastly, information systems must be set up, based on pertinent, relevant and reliable results that make it possible to assess whether the activities or processes developed within a screening programme are tailored to health needs, both from the standpoint of the population and from that of the healthcare system.

Such information will be of aid when it comes to measuring attainment of goals, setting priorities and making decisions.

Methods

Systematic literature review of the principal biomedical databases (Medline, Embase, Cochrane Library Plus, Health Technology Assessment, Database of Abstracts of Reviews of Effects, National Health Service Economic Evaluation Database, ISI Web of Science and Índice Médico Español, among others). To retrieve all existing systematic reviews and assessment reports on congenital errors of metabolism screening programmes, we updated the bibliographic search of the avalia-t report from 1 January 2006 to September 2012.

We also conducted specific searches targeting the natural history, epidemiology, analytical validity and clinical utility of the screening of each disease assessed, in order to update the PHG Foundation report from 1 January 2009 to September 2012. After perusal of the abstracts of the resulting papers, studies were selected on the basis of a series of inclusion/exclusion criteria.

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