ERNDIM Qualitative Blood Spot Acylcarnitine Scheme

Annual Report 2009

Two circulations (13 & 14) were sent out during 2009. These circulations were both sent out together in August with return dates of 25th September 2009 and 5th November 2009. Samples were sent to 93 laboratories for both circulations. 73 returns (78%) were received for circulation 13 (61 of these by the due date) and 67 (72%) for circulation 14 (63 by the due date).

There were 18 laboratories who failed to make a return on circulation 13 and 25 on circulation 14, 18 laboratories provided no return for either circulation. 1 of these laboratories informed the organisers that they would make no return.

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Respondents were asked to respond using an electronic report form including details they would report to a physician at a non-specialist hospital, and to send a scan and/or table of quantitative results if possible. The majority of laboratories provided a suggested/differential diagnosis. Most suggested some form of appropriate follow-up to confirm a putative diagnosis. A summary of the samples sent and number of respondents suggesting the definitive diagnosis as part of the differential is given in the table below.

Sample	Enzyme/transporter defect	Diagnostic Acylcarnitine	Respondents
13a	propionic acidaemia (PA, MIM 606054)	C3	55/73
13b	isovaleryl CoA dehydrogenase (IVA, MIM 243500)	C5	73/73
13c	Normal		63/73
14a	Medium chain acyl CoA dehydrogenase deficiency (MCADD, MIM 201450)	C8, C6, C10:1	65/67
14b	3-hydroxy-3-methylglutaryl CoA lyase deficiency (MIM 246450)	C5OH, C6DC	53/67
14c	methylmalonyl CoA mutase deficiency (MMA, MIM251000)	C3, C4DC	62/67

The sample which proved particularly difficult to interpret was sample 13a. This was from an acute neonatal presentation of propionic acidaemia and the patient was severely carnitine depleted as is not unusual in this situation. The propionyl carnitine was therefore not outside the reference range for a proportion of laboratories. Those laboratories reporting ratios rather than absolute values seemed to have fewer difficulties. The low free and total carnitine resulted in 16 laboratories suggesting primary carnitine deficiency rather than propionic acidaemia. On the other hand 3 laboratories reported secondary assays on the original blood spot sample confirming the correct diagnosis by

assay of methylcitrate, 3-hydroxypropionate and methylmalonate. The other sample where the definitive diagnosis was not suggested by a significant proportion of respondents was sample 14b, however all respondents reported a raised C5OH carnitine level and those who suggested other diagnoses also included follow-up tests which would have revealed the true situation.

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Once again, we are extremely grateful to the centres that have provided informative material for circulation. If any participants can provide samples in the future it would enormously facilitate this scheme, providing, as it does, genuine clinically derived samples for assay and interpretation. 4ml of anticoagulated whole blood or 60-70 30-50µl blood spots on Whatman (Schleicher & Schuell) 903 paper would provide sufficient material for one circulation from one centre (see below). Samples for use in the scheme should be accompanied by a short clinical history and confirmation that informed consent/local ethical approval (as required) for use of the sample had been obtained.

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