



# Newborn Screening ACT Sheet

## [Elevated C3 acylcarnitine]

### Propionic Acidemia and Methylmalonic Acidemia

**Differential Diagnosis:** Propionic acidemia ([PA](#)); Methylmalonic acidemias (MMA) including defects in B12 synthesis and transport; maternal severe B12 deficiency.

**Condition Description:** PA is caused by a defect in propionyl-CoA carboxylase which converts propionyl-CoA to methylmalonyl-CoA; MMA results from a defect in methylmalonyl-CoA mutase which converts methylmalonyl-CoA to succinyl-CoA or from lack of the required B<sub>12</sub> cofactor for methylmalonyl-CoA mutase (cobalamin A, B, C, D, and F).

#### **MEDICAL EMERGENCY - TAKE THE FOLLOWING IMMEDIATE ACTIONS:**

- Contact family to inform them of the newborn screening result and ascertain clinical status (poor feeding, vomiting, lethargy, tachypnea).
- Consult with pediatric metabolic specialist.
- Evaluate the newborn; check urine for ketones and, if elevated or infant is ill, initiate emergency treatment as indicated by metabolic specialist and transport immediately to tertiary center with metabolic specialist.
- Initiate timely confirmatory/diagnostic testing as recommended by specialist.
- Educate family about signs, symptoms and need for urgent treatment of hyperammonemia and metabolic acidosis (poor feeding, vomiting, lethargy, tachypnea).
- Report findings to newborn screening program.

**Diagnostic Evaluation:** Plasma acylcarnitine confirms the increased **C3**. Blood amino acid analysis may show increased **glycine**. Urine organic acid analysis will demonstrate increased metabolites characteristic of propionic acidemia or increased **methylmalonic acid** characteristic of methylmalonic acidemia. Plasma total **homocysteine** will be elevated in the cobalamin C, D and F deficiencies. Serum **vitamin B12** may be elevated in the cobalamin disorders.

**Clinical Considerations:** Patients with PA and severe cases of MMA typically present in the neonate with metabolic ketoacidosis, dehydration, hyperammonemia, ketonuria, vomiting, hypoglycemia, and failure to thrive. Long-term complications are common, early treatment may be lifesaving and continued treatment may be beneficial.

(Click on underlined items below to take you to the website. Complete URLs are listed in the Appendix)

#### **Additional Information:**

##### **Emergency Treatment Protocol**

[PA](#)

[MMA](#)

##### **Gene Tests**

[PA](#)

[MMA](#)

##### **Genetics Home Reference**

[PA](#)

[MMA](#)

#### **Referral (local, state, regional and national):**

##### **Search for Metabolic Specialist**

##### **Testing**

[PA](#)

[MMA](#)

[Clinical](#)

**Disclaimer:** These standards and guidelines are designed primarily as an educational resource for physicians to help them provide quality clinical services. Adherence to these standards and guidelines does not necessarily ensure a successful medical outcome. These standards and guidelines should not be considered inclusive of all proper procedures and tests or exclusive of other procedures and tests that are reasonably directed to obtaining the same results. In determining the propriety of any specific procedure or test, the healthcare provider should apply his or her own professional judgment to the specific clinical circumstances presented by the individual patient or specimen. It may be prudent, however, to document in the patient's record the rationale for any significant deviation from these standards and guidelines.

## APPENDIX: Resources with Full URL Addresses

### *Additional Information:*

#### **Emergency Treatment Protocol**

**PA** <http://www.childrenshospital.org/newenglandconsortium/NBS/PAA.html>

**MMA** <http://www.childrenshospital.org/newenglandconsortium/NBS/MA.html>

#### **Gene Tests**

##### **PA**

<http://www.genetests.org/servlet/access?db=geneclinics&site=gt&id=8888891&key=NexQvDbtfnPSK&gry=&fcn=y&fw=SoH9&filename=/profiles/oa-overview/index.html>

##### **MMA**

<http://www.genetests.org/servlet/access?db=geneclinics&site=gt&id=8888891&key=NexQvDbtfnPSK&gry=&fcn=y&fw=QtIb&filename=/profiles/mma/index.html>

#### **Genetics Home Reference**

**PA** <http://ghr.nlm.nih.gov/condition=propionicacidemia>

**MMA** <http://ghr.nlm.nih.gov/condition=methylmalonicacidemia>

### *Referral (local, state, regional and national):*

**Search for Metabolic Specialist** <http://www.simd.org/Membership/publicListNames.asp?mode=geo>

**Testing** <http://biochemgen.ucsd.edu/UCSDW3BG/Labchoose.asp>

##### **PA**

[http://www.genetests.org/servlet/access?prg=j&db=genetests&site=gt&id=8888891&fcn=c&qry=22169&res=nous&res=nointl&key=NexQvDbtfnPSK&show\\_flag=c](http://www.genetests.org/servlet/access?prg=j&db=genetests&site=gt&id=8888891&fcn=c&qry=22169&res=nous&res=nointl&key=NexQvDbtfnPSK&show_flag=c)

##### **MMA**

[http://www.genetests.org/servlet/access?prg=j&db=genetests&site=gt&id=8888891&fcn=c&qry=22174&res=nous&res=nointl&key=NexQvDbtfnPSK&show\\_flag=c](http://www.genetests.org/servlet/access?prg=j&db=genetests&site=gt&id=8888891&fcn=c&qry=22174&res=nous&res=nointl&key=NexQvDbtfnPSK&show_flag=c)

##### **Clinical**

<http://www.genetests.org/servlet/access?id=8888891&key=RRqZcXXEUiAx9&fcn=y&fw=zLsf&filename=/clinicsearch/searchclinic.html>

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