Impact of Continuing Medical Education on Primary Care Providers’ Knowledge and Confidence in Caring for Patients with Congenital Hypothyroidism

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Participating states: California and Hawaii

Target populations: PCPs and their patients with PCH
PCH Project: Overall Objectives

1) **Assess** the willingness and capability of PCPs to provide long-term care for patients with PCH and their needs for PCH-related continuing medical education

2) **Evaluate** the current case management patterns and clinical outcomes

3) **Determine** PCPs’ willingness to obtain informed consent and provide data to the PCH long-term follow-up (LTFU) database

4) **Investigate** the practicality of providing real time LTFU data by PCPs and identify barriers incurred

5) **Improve** PCPs’ knowledge about PCH and increase their capability of providing care for patients with PCH
Why develop a CME course for PCPs?

Clinical Knowledge Gaps

Our 2014 cross-sectional survey (N=226) revealed gaps in PCPs’ knowledge on treating patients with PCH:

- **Only 49%** knew the recommended frequency of blood tests to monitor PCH over a patient’s lifespan
- **Only 23%** knew when to try a patient off levo-thyroxine treatment to determine if PCH is transient

Interest

- **84%** of surveyed PCPs reported that they are **likely** or **very likely** to participate in CME on PCH if available
Relatively simple to treat:
Patients with PCH can potentially be managed well by PCPs with support from endocrinologists

High incidence rate:
PCH is the most common disorder identified in blood spot screening and affects 1 in 1,706 live births in CA

Geographic distribution of cases:
Need to increase number of PCPs who can provide PCH case-management in rural areas of CA with very few pediatric endocrinologists

To improve access to quality care:
CME for PCPs may reduce barriers to quality follow-up care for families for whom specialty care is difficult to obtain

More good reasons for a PCH course....
Course was developed with the PCH Project’s Advisory Committee of CA pediatric endocrinologists

Continuing Medical Education (CME) can be a key element in a PCP-centered follow-up model
Course Format and Content Summary

- **50 minute lecture**, followed by a 10 minute Q & A
- **Begin** by presenting 5 Case Studies in question format
- **Review** of California’s PCH newborn screening methodology
- **Review** of thyroid pathophysiology and clinical presentation of PCH symptoms
- **Focus** on the functional priorities of PCH diagnosis, treatment and follow-up in the pediatric primary care context
- **Recommend** consultation with endocrinologist when needed
- **Conclude** with the same 5 Case Studies, with opportunity for audience self-assessment and discussion
Perform confirmatory testing and initiate treatment if newborn thyroid function screening is abnormal

Assess treatment needs and monitor clinical outcomes for infants, children, and adolescents with congenital hypothyroidism

Describe the diagnostic process for determining whether a patient has transient or permanent hypothyroidism

Educate families about the importance of adherence to treatment for congenital hypothyroidism
After Receiving Positive Newborn Screening (NBS) Results

- **Within 24 hours** of receiving a positive NBS result for CH (TSH ≥ 29 µIU/mL), test serum TSH and free T4 (or total T4) for confirmatory diagnosis

- **If newborn screening TSH result is:**
  - > 40 µIU/mL: Initiate treatment as soon as a serum sample is collected and refer to a pediatric endocrinologist
  - 29 – 40 µIU/mL: May wait for the results of confirmatory serum test to initiate treatment

- **If confirmatory serum TSH result is:**
  - > 40 µIU/mL: Initiate levo-thyroxine treatment immediately
  - 10 – 40 µIU/mL: Repeat the free T4 (or total T4) and TSH tests but do not start levo-thyroxine treatment yet
  - < 10 µIU/mL: Considered normal, no treatment needed

Levo-thyroxine Treatment Dosing

- **Start at 10 – 15 µg/kg**
  - (Use 15 µg/kg if free T4 < 0.5 ng/dL or total T4 < 5 µg/dL)
  - **Either brand name or generic**, but stay with the same formulation, if possible. **USE TABLETS, DO NOT USE LIQUID FORM**
  - Maintain TSH concentration in the age-specific reference range
  - Maintain free T4 (or total T4) concentration in the upper half of the age-specific reference range

<table>
<thead>
<tr>
<th>Weight (grams)</th>
<th>Daily Dose</th>
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<tbody>
<tr>
<td>2000 – 2499</td>
<td>25 µg</td>
</tr>
<tr>
<td>2500 – 3999</td>
<td>37.5 µg</td>
</tr>
<tr>
<td>4000 or more</td>
<td>50 µg</td>
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</tbody>
</table>

Follow-up Frequency

- **2 weeks after treatment initiation:** The first clinical follow-up examination and lab tests should take place

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
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<tbody>
<tr>
<td>&lt; 6 months</td>
<td>Every 1–2 months</td>
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</table>
PCPs and PCH?? CME Evaluation Questions

Medical Specialty of participant?

Paired Pre- and Post- Course Questions:

CONFIDENCE?
3 questions assessing PCP’s confidence with PCH Diagnosis, Treatment and Follow-up

KNOWLEDGE?
8 True/False PCH clinical knowledge questions

Intending to make changes to practice?

Course Ratings?

Comments and suggestions?
**Medical Specialties of Course Participants (N=171)**

- **Pediatrics**: 56%
- **Nurse Pract. / Physician Asst.**: 21%
- **Other (Resident, Student etc.)**: 10%
- **Family Medicine**: 7%
- **Nurse**: 6%

6 Events / Total attendance: ~ 300 / Evaluations Returned: 195
Confidence with CONFIRMING a PCH Diagnosis

70% improved their confidence

Pre-Course

N=144

Very Confident
Confident
Somewhat confident
Not confident at all

15
21
39
25
Confidence with INITIATING TREATMENT for PCH

80% improved their confidence

- Very Confident
- Confident
- Somewhat confident
- Not confident at all

N=140

Pre-Course
Confidence with PROVIDING FOLLOW-UP for PCH

69% improved their confidence

<table>
<thead>
<tr>
<th>Category</th>
<th>Pre-Course</th>
<th>N=143</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not confident at all</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>Somewhat confident</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>Confident</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Very Confident</td>
<td>12</td>
<td></td>
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</tbody>
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N=143
Question 1: The recommended frequency of blood tests to monitor PCH patients in first 6 months of life is every 1-2 months (N=167)

Question 2: When transient PCH is suspected, it is safe to do a trial off levothyroxine for 4–6 weeks after 1 year of age (N=164)

Improvements in Knowledge: True/False Questions

After 3 years of age
Question 3: The American Academy of Pediatrics (AAP) recommended initial treatment dose of LT4 for babies with confirmed PCH is 15–20 μg/kg (N=162) **10-15 μg/kg**

Question 4: Thyroid stimulating hormone (TSH) surges by 30 minutes after birth and returns to <10 μIU/mL within 3 days (N=159) **False!**

- **Correct Answers**
  - Question 3: 68% Pre-Course Correct, 40% Post-Course Correct
  - Question 4: 46% Pre-Course Correct, 26% Post-Course Correct

**Within 5-7 days**
Overall Improvement in True/False Total Score

- 135 respondents answered all 8 pre-course and post-course true/false questions

<table>
<thead>
<tr>
<th>Improvement on T/F Test Score (N=135)</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Improved their score</td>
<td>72%</td>
</tr>
<tr>
<td>Unchanged score</td>
<td>22%</td>
</tr>
<tr>
<td>Lower score</td>
<td>6%</td>
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Pre- and Post- Test Score Distributions
For 8 True/False Knowledge Questions (N=135)

Pre-test median score: 63%
Post-test median score: 88%

Test Scores

% of Course participants
Key Conclusions from True/False Results

Results suggest **largest knowledge gaps** among PCPs about the following issues:

- Timing of post-natal TSH surge and return to normal
- Initial treatment dosage
- When and how to assess patients for transient PCH
88% rated the course as “Outstanding”

75% said they plan to make changes to practice
Summary

- The course was shown to be effective in improving PCPs knowledge and confidence in providing follow-up care for patients with PCH.

- PCPs were especially enthusiastic about the simplicity of the course format and the practical instructions provided.

- Participants indicated willingness and intention to make changes to their clinical practice in treating PCH.

- Newborn screening programs may consider offering CME courses to PCPs who care for patients with PCH.
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