Naturopathic Treatment for Ear Pain in Children

E. Michael Sarrell, MD*‡§; Herman Avner Cohen, MD*‡§; and Ernesto Kahan, MD, MPH‡§

ABSTRACT. Objective. Otitis media is 1 of the most frequent diseases of early infancy and childhood and 1 of the most common reasons for children to visit a physician. In the past 2 decades, there has been a substantial increase in the diagnosis of otitis media worldwide. In the United States, 93% of all children have had at least 1 episode of acute otitis media (AOM) by 7 years of age. Otitalgia is the hallmark of AOM. Most affected children either complain of earache or manifest behavior that the parents interpret as indicating ear pain. Treatment of the ear pain early in the course of AOM decreases both parental anxiety and the child’s discomfort and accelerates the healing process. The objective of this study was to determine the efficacy and tolerability of naturopathic versus traditional treatment for the management of otalgia commonly associated with AOM in children.

Methods. The study was designed as a double-blind trial in an outpatient community clinic. A total of 171 children who were aged 5 to 18 years and had otalgia and clinical findings associated with middle-ear infection were studied. The children were randomly assigned to receive treatment with Naturopathic Herbal Extract Ear Drops (NHED) or anesthetic ear drops, with or without amoxicillin. On enrollment, the children were assigned by computer-numbered randomization to receive NHED (contents: allium sativum, verbascum thapsus, calendula flores, hypericum perforatum, lavender, and vitamin E in olive oil) 5 drops 3 times daily, alone (group A) or together with a topical anesthetic (amethocaine and phenazone in glycerin) 5 drops 3 times daily (group B), or oral amoxicillin 80 mg/kg/d (maximum 500 mg/dose) divided into 3 doses with either NHED 5 drops 3 times daily (group C) or topical anesthetic 5 drops 3 times daily (group D). A double-blind design was used, and all ear drops were placed in identical bottles. Treatment was initiated by the nurse in all cases. A single physician (M.S.) evaluated and treated all of the patients included in the study and recorded all of the data. The presence or absence of ear pain was assessed over 3 days with a visual analog scale. Ear pain was assessed by a specially devised observational instrument based on previous reports. One side of the instrument consisted of a linear numbered scale, from 1 (no pain) to 10 (worst possible pain), and a corresponding color scale, ranging from blue to dark red. The reverse side contained a scale of 5 facial expressions, ranging from broad smile (no pain) to a sad and crying face (worst possible pain), and a corresponding color scale, ranging from blue to dark red.

Results. There were no significant between-group differences in patient age or gender, degree of fever, main symptoms, associated symptoms, and severity or laterality of acute otitis media. Each group had a statistically significant improvement in ear pain over the course of the 3 days. Patients who were given ear drops alone had a better response than patients who were given ear drops together with amoxicillin. Results were better in the NHED group than in the controls. Nevertheless, the findings indicated that the pain was mostly (80%) self-limited and could be explained simply by the time elapsed. The American Academy of Otolaryngology—Head and Neck Surgery guidelines recommend topical medications as the first line of treatment for ear pain in the absence of systemic infection or serious underlying disease. Because no evidence was found that systemic antibiotics alone improved treatment outcome, if antibiotics do not change the natural course of otitis media, then the main goal of treatment, as in the present study, should be to alleviate the ear pain. The alternative, naturopathic herbal extract medications, may offer many new possibilities in the management of ear pain associated with AOM. Primary care physicians should be aware that at least 10% of their patients may have tried 1 or more forms of alternative/complementary medicine before presenting for consultation. As it was widely reported in the medical literature, these herbal extracts have the potential to meet all of the requirements of appropriate medication that could be routinely used in the pediatric patient, namely in vitro bacteriostatic and bacteriocidal activity against common pathogens, immunostimulation ability, antioxidant activity, and anti-inflammatory effects. They are also well-absorbed with good penetration into the tissue surrounding the tympanic membrane. They have been found to enhance local immunologic activity. Finally, herbal extracts are well-tolerated (owing to their long elimination time), easy to administer, and less expensive than the new antibiotics. There are no documented side effects. On the basis of our findings that the group with the most significant treatment effects (NHED with topical anesthetic) explained only 7.3% of the total pain reduction, we propose that sometimes the general practitioner or pediatrician needs to give the human body a chance to repair itself. Nevertheless, if the physician believes that there is an indication for some treatment, especially if the parents are anxious, then a local treatment such as one used in our study might be adequate.

Conclusions. This study suggests that in cases of ear pain caused by AOM in children in which active treatment, besides a simple 2- to 3-day waiting period, is needed, an herbal extract solution may be beneficial. Concomitant antibiotic treatment is apparently not contributory. Pediatrics 2003;111:e574–e579. URL: http://www.pediatrics.org/cgi/content/full/111/5/e574; ear infection, otitis, ear pain, otalgia, naturopathic, acute otitis media.

From the *Pediatric and Adolescent Ambulatory Community Clinic of the General Health Services and ‡Department of Family Medicine, Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel; and §Israel Pediatric Research in Office Setting Network, Tel Aviv, Israel.

Received for publication Jul 26, 2002; accepted Jan 6, 2003.

Address correspondence to Ernesto Kahan, MD, MPH, 7 Azarim, Apt 4, Kfar Sava 44459, Israel. E-mail: ekahani@post.ac.il

PEDIATRICS (ISSN 0031-4005). Copyright © 2003 by the American Academy of Pediatrics.
Acute otitis media (AOM) is 1 of the most frequent diseases of early infancy and childhood and 1 of the most common reasons for children to visit a physician. In the past 2 decades, there has been a substantial increase in the diagnosis of otitis media worldwide. In the United States, acute otitis media (AOM) is diagnosed >5 million times per year and is the most common reason for prescription of antibiotics in children.

Otitis media is one of the most frequent diseases of early infancy and childhood and 1 of the most common reasons for children to visit a physician. In the past 2 decades, there has been a substantial increase in the diagnosis of otitis media worldwide. In the United States, acute otitis media (AOM) is diagnosed >5 million times per year and is the most common reason for prescription of antibiotics in children.

Otalgie is the hallmark of AOM. Most affected children either complain of earache or manifest behaviors that the parents interpret as indicating ear pain. Treatment of the ear pain early in the course of AOM decreases both parental anxiety and the child’s discomfort and accelerates the healing process. Some physicians today prescribe topical ear drops, usually a mixture of amethocaine (anesthetic activity) and phenasone (analgesic activity) dissolved in dehydrated glycerin (hygroscopic activity). The pain has been shown to be alleviated within 30 minutes of instillation of the drops into the external auditory canal. The preparation has no known systemic effect.

In recent years, patients in the United States and Europe have been increasingly turning to unconventional medications as an alternative therapy for ear pain. However, rigorous scientific data regarding their clinical effectiveness are lacking. They have been found to have analgesic, anti-inflammatory, hygroscopic, occlusive, and anti-infection properties and to lead to decompression of edematous tympanic membrane. In a previous study, we demonstrated that the use of Naturopathic Herbal Extract Ear Drops (NHED; M. Pharm Co, Petah Tiqva, Israel), an herbal extract in an olive oil base, for the management of ear pain commonly associated with AOM in children is as appropriate and effective as anesthetic ear drops. However, because in this evaluation none of the participating subjects received antibiotic treatment, we designed the present study with the purpose of comparing the efficacy of NHED with an anesthetic ear drop solution with and without oral antibiotics in the management of ear pain commonly associated with AOM.

METHODS

The study sample comprised 180 children who were aged 5 to 18 years and had presented at our Pediatric and Adolescent Ambulatory Community Clinic with treatment for ear pain caused by AOM between January 1999 and January 2001. The diagnosis of AOM was based on a clinical complaint of ear pain combined with fever or other signs and symptoms of infection, a reevaluation none of the participating subjects received antibiotic treatment, we designed the present study with the purpose of comparing the efficacy of NHED with an anesthetic ear drop solution with and without oral antibiotics in the management of ear pain commonly associated with AOM.

Otitis media is 1 of the most frequent diseases of early infancy and childhood and 1 of the most common reasons for children to visit a physician. In the past 2 decades, there has been a substantial increase in the diagnosis of otitis media worldwide. In the United States, acute otitis media (AOM) is diagnosed >5 million times per year and is the most common reason for prescription of antibiotics in children.

Otalgie is the hallmark of AOM. Most affected children either complain of earache or manifest behaviors that the parents interpret as indicating ear pain. Treatment of the ear pain early in the course of AOM decreases both parental anxiety and the child’s discomfort and accelerates the healing process. Some physicians today prescribe topical ear drops, usually a mixture of amethocaine (anesthetic activity) and phenasone (analgesic activity) dissolved in dehydrated glycerin (hygroscopic activity). The pain has been shown to be alleviated within 30 minutes of instillation of the drops into the external auditory canal. The preparation has no known systemic effect.

In recent years, patients in the United States and Europe have been increasingly turning to unconventional medications as an alternative therapy for ear pain. However, rigorous scientific data regarding their clinical effectiveness are lacking. They have been found to have analgesic, anti-inflammatory, hygroscopic, occlusive, and anti-infection properties and to lead to decompression of edematous tympanic membrane. In a previous study, we demonstrated that the use of Naturopathic Herbal Extract Ear Drops (NHED; M. Pharm Co, Petah Tiqva, Israel), an herbal extract in an olive oil base, for the management of ear pain commonly associated with AOM in children is as appropriate and effective as anesthetic ear drops. However, because in this evaluation none of the participating subjects received antibiotic treatment, we designed the present study with the purpose of comparing the efficacy of NHED with an anesthetic ear drop solution with and without oral antibiotics in the management of ear pain commonly associated with AOM.

Otitis media is 1 of the most frequent diseases of early infancy and childhood and 1 of the most common reasons for children to visit a physician. In the past 2 decades, there has been a substantial increase in the diagnosis of otitis media worldwide. In the United States, acute otitis media (AOM) is diagnosed >5 million times per year and is the most common reason for prescription of antibiotics in children.

Otalgie is the hallmark of AOM. Most affected children either complain of earache or manifest behaviors that the parents interpret as indicating ear pain. Treatment of the ear pain early in the course of AOM decreases both parental anxiety and the child’s discomfort and accelerates the healing process. Some physicians today prescribe topical ear drops, usually a mixture of amethocaine (anesthetic activity) and phenasone (analgesic activity) dissolved in dehydrated glycerin (hygroscopic activity). The pain has been shown to be alleviated within 30 minutes of instillation of the drops into the external auditory canal. The preparation has no known systemic effect.

In recent years, patients in the United States and Europe have been increasingly turning to unconventional medications as an alternative therapy for ear pain. However, rigorous scientific data regarding their clinical effectiveness are lacking. They have been found to have analgesic, anti-inflammatory, hygroscopic, occlusive, and anti-infection properties and to lead to decompression of edematous tympanic membrane. In a previous study, we demonstrated that the use of Naturopathic Herbal Extract Ear Drops (NHED; M. Pharm Co, Petah Tiqva, Israel), an herbal extract in an olive oil base, for the management of ear pain commonly associated with AOM in children is as appropriate and effective as anesthetic ear drops. However, because in this evaluation none of the participating subjects received antibiotic treatment, we designed the present study with the purpose of comparing the efficacy of NHED with an anesthetic ear drop solution with and without oral antibiotics in the management of ear pain commonly associated with AOM.
drops (dummy variable coded NHED = 1 and anesthetic = 0); 3) mild pain (dummy variable coded mild = 1 and moderate + severe = 0); 4) moderate pain (dummy variable coded moderate = 1 and mild + severe = 0); 5) severe pain (dummy variable coded severe = 1 and mild + moderate = 0); 6) body temperature (dummy variable coded ≥38.5°C = 1 and 37.5°C–38.4°C = 0); 7) antibiotics (dummy variable coded with = 1 and without = 0); 8) number of major related symptoms; and 9) number of associated symptoms. A probability value of .05 was considered statistically significant. To evaluate the influence of the variable "time" (alone and in interaction with the variable "group") on the variance in the level of pain, we used repeated measurements analysis at 3 time points: 1) day 1 before treatment (TA0); 2) day 2 before instillation (TB0); and 3) at last follow-up (48 hours after the completion of the treatment).

RESULTS

Nine of the 180 children enrolled in the study (1 in group A, 3 in group B, 3 in group C, and 2 in group D) were excluded from the final analysis because of noncompliance: 5 forgot to take the medicine, and 4 could not be reached for the follow-up interview. The remaining patients completed all 3 days of treatment. No adverse events were reported. No patient showed clinically significant otalgia, alone or associated with fever or other findings of infection, after the third day of follow-up.

The characteristics of the study groups, which are detailed in Table 1, the distribution of the main symptoms of AOM, physical examination findings, and the related symptoms (laterality, aspect, color of and presence of air in the tympanic membrane, otorrhea, cough, rhinorrhea, sore throat, headache, postnasal drip, facial pain, lymphadenopathy, malaise, and the overall number of symptoms) showed that there were no statistically significant differences among the 4 groups in clinical presentation. There was also no significant difference in pain score between the children who received NHED and those who received an anesthetic at the onset of treatment (TA0). Both groups showed a significant decrease in pain by the end of the study (Fig 1, Table 2). Treatment was considered successful in the NHED group: their average total level of ear pain dropped from 8.53 at baseline to 0.56 at 30 minutes after instillation of day 2 (TB30), for a reduction of 93.4%. Corresponding values in the patients who were given anesthetic were 8.44 and 1.61, for a reduction of 80.9%. By subgroup, the rates of pain reduction were as follows: NHED alone (group A), 95.9%; NHED plus antibiotics (group B), 90.9%; anesthetic alone (group

---

**TABLE 1. Characteristics of the Study Groups**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total (N = 86)</th>
<th>With Antibiotics Group A (n = 44)</th>
<th>Without Antibiotics Group A (n = 44)</th>
<th>With Antibiotics Group B (n = 42)</th>
<th>Without Antibiotics Group B (n = 40)</th>
<th>Total (n = 85)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (y), mean [SD]*</td>
<td>6.81 (3.88)</td>
<td>8.0 (0.62)</td>
<td>6.65 (0.62)</td>
<td>7.3 (0.44)</td>
<td></td>
<td>6.5 (0.56)</td>
</tr>
<tr>
<td>Temperature (°C; N [%])</td>
<td>37.5–38.4</td>
<td>132 (77.2)</td>
<td>36 (85.7)</td>
<td>33 (75.0)</td>
<td>69 (80.2)</td>
<td>33 (76.7)</td>
</tr>
<tr>
<td>≥38.5</td>
<td>39 (22.8)</td>
<td>6 (14.3)</td>
<td>11 (25.0)</td>
<td>17 (18.8)</td>
<td></td>
<td>10 (23.3)</td>
</tr>
<tr>
<td>Severity of ear pain (score; mean [SD])</td>
<td>2.40 (0.64)</td>
<td>2.43 (0.67)</td>
<td>2.32 (0.64)</td>
<td>2.37 (0.65)</td>
<td></td>
<td>2.70 (0.46)</td>
</tr>
<tr>
<td>Total symptoms (mean [SD])†</td>
<td>2.38 (1.15)</td>
<td>2.41 (0.99)</td>
<td>2.32 (1.18)</td>
<td>2.36 (1.08)</td>
<td></td>
<td>2.42 (1.33)</td>
</tr>
</tbody>
</table>

NS indicates not significant; SD, standard deviation.
* Mean age of boys is 8.9 years and of girls is 8.5 years.
† Major and associated symptoms of AOM listed individually in Tables 2 and 3, respectively.

**Fig 1.** Level of pain (score 0–10) by study group and follow-up time.
infection within the middle ear. Reduction of fever is also a cause of ear pain. The presence of fluid in the middle ear can be determined by tympanometry and is also a cause of ear pain. The appearance of the tympanic membrane is identical in early AOM and in otitis media with effusion, which may explain the influence of pain from sites other than the ear. The variable “drops” explained 7.3% of the total variance. On a separate analysis of repeated measurements, “time” (3 days) proved to be very significant ($P < .001$). This analysis also demonstrated that there was an interaction between “drops” and “time.”

**DISCUSSION**

Studies of treatment regimens for AOM are difficult to design for a number of reasons. The diagnosis is clinical as there is no objective method available to confirm it. Not all ear pain is caused by AOM. The appearance of the tympanic membrane is identical in early AOM and in otitis media with effusion, which is also a cause of ear pain. The presence of fluid in the middle ear can be determined by tympanometry and pneumatic otoscopy, but effusions are present in both AOM and otitis media with effusion. The response to treatment is difficult to measure as there is no way of objectively assessing resolution of the infection within the middle ear. Reduction of fever can be assessed objectively, but improvement in pain can be assessed only with the use of visual analog scales. In these circumstances, it is not surprising that the studies that have compared antibiotic treatment with placebo have shown only a seemingly modest response to active treatment. In addition, it is clear that AOM is a self-limiting condition.

The present study evaluated the effectiveness of a nonconventional topical medication (NHED) compared with traditional anesthetic ear drops, with and without antibiotics, in alleviating the symptoms of otitis media that are important to the patient’s sense of well-being. Because pain is subjective and varies in intensity according to its source and the mechanism of relief, self-reporting is considered the most reliable means of measurement. Furthermore, children have a limited ability to describe their pain experience accurately, so we selected participants older than 5 years, although otitis media is more prevalent in the 2- to 3-year age group. We also used the Pain-O-Meter because even younger children who may not be able to cope with numerical symbols understand the concepts of more/less and higher/lower and can apply them to facial representations.\(^\text{1,8,9}\)

The major finding of the study was the statistically significantly greater pain relief on both days 2 and 3 of treatment in the patients who were given ear drops alone than in the patients who were given ear drops and antibiotics. Nevertheless, all of the variables in our study model explained only 22% of the reduction in pain and suggested that the remaining relief may be accounted for by the passage of time alone. On repeated measurements analysis, time (3

**TABLE 2.** Mean (±SD) Pain Score Over Time by Group

<table>
<thead>
<tr>
<th>Group</th>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>15 Min</td>
<td>30 Min</td>
</tr>
<tr>
<td>A: NHED alone</td>
<td>8.4 (1.5)</td>
<td>4.7 (2.3)</td>
<td>3.0 (2.0)</td>
</tr>
<tr>
<td>B: NHED + antibiotic</td>
<td>8.7 (1.5)</td>
<td>5.2 (2.6)</td>
<td>3.5 (2.5)</td>
</tr>
<tr>
<td>C: Anesthetic alone</td>
<td>7.8 (1.9)</td>
<td>4.3 (2.3)</td>
<td>2.9 (1.6)</td>
</tr>
<tr>
<td>D: Anesthetic + antibiotic</td>
<td>9.1 (1.1)</td>
<td>6.7 (1.9)</td>
<td>5.6 (2.6)</td>
</tr>
</tbody>
</table>

**TABLE 3.** Stepwise Linear Regression Model of Change in Pain Level (Score 0–10) From Baseline to Last Follow-up

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>Significance</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>6.868</td>
<td>.0001</td>
<td>-</td>
</tr>
<tr>
<td>Drops(^\circ)</td>
<td>1.218</td>
<td>.0001</td>
<td>0.073</td>
</tr>
<tr>
<td>Severity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mild(^\dd)</td>
<td>Rejected#</td>
<td>Rejected#</td>
<td>-</td>
</tr>
<tr>
<td>Moderate(^\s)</td>
<td>Rejected#</td>
<td>Rejected#</td>
<td>-</td>
</tr>
<tr>
<td>Severe(^\s)</td>
<td>1.021</td>
<td>0.001</td>
<td>0.055</td>
</tr>
<tr>
<td>Age (y)(^*)</td>
<td>Rejected#</td>
<td>Rejected#</td>
<td>-</td>
</tr>
<tr>
<td>With antibiotics</td>
<td>Rejected#</td>
<td>Rejected#</td>
<td>-</td>
</tr>
<tr>
<td>All related symptoms</td>
<td>Rejected#</td>
<td>Rejected#</td>
<td>-</td>
</tr>
<tr>
<td>Temperature(^\j)</td>
<td>Rejected#</td>
<td>Rejected#</td>
<td>-</td>
</tr>
<tr>
<td>All other symptoms</td>
<td>-0.401</td>
<td>.0001</td>
<td>0.07</td>
</tr>
</tbody>
</table>

$R^2$ of variables in last step = 0.198; $R^2$ of variables not in last step = 0.022; Total $R^2$ = 0.22

Independent variables: * age; † drops (dummy variable), NHED = 1, anesthetic = 0; \(^\circ\) mild pain (dummy variable), mild = 1, moderate + severe = 0; \(^\dd\) moderate pain (dummy variable), moderate = 1, mild + severe = 0; \(^\s\) severe pain (dummy variable), severe = 1, mild + moderate = 0; \(^\j\) fever (dummy variable), ≥38.5°C = 1, 37.5–38.4°C = 0.

# Variables rejected from the model because of lack of significance ($P < .05$).
days) proved to be the most effective treatment variable; this finding is similar to a recent report from England.\textsuperscript{10}

The minor (if any) contribution of antibiotics to pain relief noted here agrees with earlier studies of similar samples wherein antibiotics had no appreciable benefit over placebo in treating AOM\textsuperscript{2} or in lessening its sequelae.\textsuperscript{1,11} Two studies noted that the ear pain of AOM subsided within 3 to 4 days, with or without antibiotics.\textsuperscript{12,13} Accordingly, meta-analyses of European and Australian studies showed only a marginal effect (1 in 20) of antibiotics on AOM.\textsuperscript{12,14} This finding may also confirm previous reports showing that antibiotics might even interfere with the healing process in the middle-ear fluid by encouraging the growth of resistant organisms or viruses\textsuperscript{15} or interfere with the protective mechanism of bacterial/permeability, increasing protein against mucosal changes in the middle ear, which inhibits the inflammatory activity of bacterial lipopolysaccharide.\textsuperscript{16}

There is widespread awareness that the indiscriminate use of antibiotics in pediatric patients results in antibiotic resistance. The respective resistance rates to penicillin of \textit{Streptococcus pneumoniae}, \textit{Haemophilus influenzae}, and \textit{Moraxella catarrhalis} are reportedly 58%, 50%, and almost 100%, respectively\textsuperscript{7,18}, the increasing tendency to microbial antibiotic resistance compounds the problem.\textsuperscript{19} Furthermore, the rates of spontaneous resolution of infection with these 3 agents are 16%, 50%, and 80%, respectively.\textsuperscript{20} These findings have prompted the American Academy of Otolaryngology–Head and Neck Surgery to recommend topical medications as the first line of treatment for ear pain in the absence of systemic infection or serious underlying disease. They have not found evidence that systemic antibiotics alone improved treatment outcome.\textsuperscript{21}

If antibiotics do not change the natural course of otitis media, then the main goal of treatment, as in the present study, should be to alleviate the ear pain. The alternative, naturopathic herbal extracts, may offer many new possibilities in the management of ear pain associated with AOM. Primary care physicians should be aware that at least 10% of their patients may have tried 1 or more forms of alternative/complementary medicine before presenting for consultation.\textsuperscript{15,22} These herbal extracts have the potential to meet all of the requirements of appropriate medication that could be routinely used in the pediatric patient,\textsuperscript{7,23,24} namely in vitro bacteriostatic and bacteriocidal activity against common pathogens,\textsuperscript{25} immunostimulation ability,\textsuperscript{26} antioxidant activity,\textsuperscript{27} and anti-inflammatory effects.\textsuperscript{28} They are also well-absorbed with good penetration into the tissue surrounding the tympanic membrane. They have been found to enhance local immunologic activity. Finally, herbal extracts are well-tolerated (owing to their long elimination time), easy to administer, and less expensive than the new antibiotics. There are no documented side effects.

On the basis of our findings in the regression model, the use of drops (NHED or topical anesthetic) produced the most significant independent treatment effects but explains only 7.3% of the total pain reduction, whereas the use of antibiotics had no independent effect. In consequence, we propose that sometimes the general practitioner or pediatrician needs to give the human body a chance to repair itself. Nevertheless, if the physician believes that there is an indication for some treatment, especially if the parents are anxious, then a local treatment, such as the one used in our study, might be adequate.

In conclusion, this study suggests that in cases of ear pain caused by otitis media in which active treatment, besides simply a 2- to 3-day waiting period, is needed, herbal extract solution may be very beneficial. Concomitant antibiotic treatment is apparently not contributory.

ACKNOWLEDGMENTS

We thank David Nakar, M. Pharm., of Nakar Co of Petah Tiqa, who supplied the NHED and all medications used in this study, and Dr Shara Benny of the Clinical Laboratory, Department of Microbiology, General Health Services, Dan District, for the laboratory evaluation of the NHED. We also thank Dorit Karsh of the Department of Epidemiology, Section of Information and Statistics, General Health Services, Dan District, for the statistical analysis. We are grateful to Drs Monica Finkelstein and Katusa Karnosca for enrolling their patients in the study. We also thank Gloria Ginzhach and Marian Propp for editorial and secretarial assistance.

REFERENCES

Naturopathic Treatment for Ear Pain in Children
E. Michael Sarrell, Herman Avner Cohen and Ernesto Kahan

*Pediatrics* 2003;111;e574
DOI: 10.1542/peds.111.5.e574

Updated Information & Services
including high resolution figures, can be found at:
http://pediatrics.aappublications.org/content/111/5/e574

References
This article cites 27 articles, 5 of which you can access for free at:
http://pediatrics.aappublications.org/content/111/5/e574#BIBL

Subspecialty Collections
This article, along with others on similar topics, appears in the following collection(s):
Pharmacology
http://www.aappublications.org/cgi/collection/pharmacology_sub
Therapeutics
http://www.aappublications.org/cgi/collection/therapeutics_sub
Toxicology
http://www.aappublications.org/cgi/collection/toxicology_sub

Permissions & Licensing
Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:
http://www.aappublications.org/site/misc/Permissions.xhtml

Reprints
Information about ordering reprints can be found online:
http://www.aappublications.org/site/misc/reprints.xhtml
Naturopathic Treatment for Ear Pain in Children
E. Michael Sarrell, Herman Avner Cohen and Ernesto Kahan
Pediatrics 2003;111:e574
DOI: 10.1542/peds.111.5.e574

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://pediatrics.aappublications.org/content/111/5/e574