REVIEW ARTICLE

Fever in pediatric office practice

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Abstract

Objective: To determine how to select a child who requires in depth laboratory investigation, defining the most appropriate laboratory screening tests, and to detect the individual who requires immediate therapy, when fever is the main symptom presented by the child seen in an outpatient clinic, or at the physician’s office. Additionally, this review aims at providing suggestions on how to deal with fever, and with the anxiety it causes.

Sources: Bibliographic review using Medline database and previously selected manuscripts.

Summary of the findings: Fever may cause both negative and positive outcomes, none of major consequence. Age group, fever magnitude and duration, shivering, appetite decrease or behavioral changes (toxemia), and other localizing symptoms should be investigated through the patient’s medical history. Laboratory screening tests should include complete blood count, erythrocyte sedimentation rate, C-reactive protein, urinalysis (white cells count and gram stain of the sediment), and in some cases, lumbar puncture and blood culture. The treatment should include antipyretic medications and, occasionally, physical methods (cool baths, sponging) in order to reduce discomfort caused by the fever.

Conclusions: Children with fever request both scientific expertise, as well as empathy from the pediatrician, so that they can receive individualized therapy.


Introduction

In the well-known game of quick association of ideas, the words disease and fever are closely related and this is valid for both laypersons and healthcare providers. Hence, it is no surprise that the symptom fever is accompanied by a strong feeling of anxiety that worsens with the feeling of insecurity when the etiology of fever cannot be defined soon after the onset of the disease.

Fever is a warning sign, and 20-30% of pediatric appointments are estimated to have fever as the sole predominant complaint.

In the context of a large number of benign fevers, it is the pediatrician’s duty to select those that require further investigation, detect the severe cases that demand immediate intervention and properly manage common episodes of
fever - a context in which a few rules do exist but in which the physician has a wide variety of approaches, according to his/her temperament.

The aim of this article is to review and summarize the best available literature (science,) including long-established experience (art,) in order to offer pediatricians what is considered to be “state-of-the-art” and thus help them carry out their task as well-child care providers - with empathy, which allows them to undertake their mission on health education and the task of improving the quality of life of the child and the whole family, by establishing trustworthiness, respect and authority.

Therefore, we formulated some sequential questions that will be briefly and objectively discussed.

What is fever?

Fever is the controlled rise in body temperature above normal values for an individual.

This implies the need to establish what normal body temperature is, a task that is not at all easy because normal temperature varies, within certain thresholds, according to some well-known factors:

Age: The normal temperature in infants is higher than that of adults; after one year of life, the temperature tends to decrease to levels that resemble those of adults. The temperature is higher in females and varies according to the menstrual cycle.

Circadian rhythm: The temperature is lower in the night (3 a.m.) and in the early morning and higher in the late afternoon (5 p.m.) and in the evening. This difference is observed from the sixth month onwards (0.5 ºC) and is more prominent in the second and especially in the sixth year of life (0.9 - 1.1 ºC).

Intense physical activity and high ambient temperature in a poorly ventilated environment may cause temperature to rise.

Type of reading: Rectal temperature is higher than the oral one and the oral temperature is higher than the axillary one.

Thus, it is not possible to speak of normal temperature, but of a normal range and of upper normal limits instead.

Normal axillary temperature ranges from 36.5 ºC in the morning to 37.2 ºC in the afternoon; oral temperature is approximately 0.5 ºC higher than the axillary one and rectal temperature by 0.8 to 1 ºC higher than the axillary one, that is, 37.8 ºC, and can reach up to 38.5 ºC.

Therefore, we may define fever as axillary temperature greater than 37.2 ºC or rectal temperature greater than 38 ºC, but in the third month of life the upper limit of rectal temperature reaches 38.2 ºC.

Note: to convert ºF into ºC subtract 32 from the temperature in ºF, divide the result by 9 and multiply it by 5. Example: 100.4 ºF = 100 - 32 = 68. 4 ÷ 9 = 7.6 x 5 = 38 ºC.

What is the mechanism of fever?

Body temperature is regulated by the thermoregulatory center located in the anterior hypothalamus, which is the region of the brain that serves as a thermostat, balancing heat gain and heat loss (the thermostat acts more as a controller of heat loss,) thus maintaining the temperature at approximately 37 ºC.

During fever, the thermostat is readjusted - the thermoregulatory center elevates the set point to a higher level.

Pathogenic sequence of fever: infectious agents (microorganisms: bacteria, viruses, fungi or their toxins) or noninfectious agents (toxic substances, drugs, antigens) work as exogenous pyrogens, which cause phagocytes (macrophages and others) to produce protein-rich substances (IL 1, IFNδ, FNT, IL 6) known as endogenous pyrogens, which in their turn stimulate the production of prostaglandins (PGE₂) that act on the thermoregulatory center by elevating the set point and provoking fever. The production of PGE₂ is controlled by cyclooxygenases.

Fever should be distinguished from hyperthermia, in which heat is produced or lost without affecting the set point.

This may occur when environmental heat is excessively high, including overdressing, intense physical exercise, hypernatremic dehydration (do not forget that hypernatremic dehydration causes fever and that fever aggravates hypernatremic dehydration.)

Is fever harmful or beneficial to the body? (Is it a friend or a foe)?

Fever is a foe but not as much as we believe it to be, because:

- Fever increases oxygen uptake and impairs cardiac output, but this is only clinically relevant in extremely unwell children, in severe pneumonias with pronounced hypoxemia, and in those with heart diseases.
- Fever may cause seizures, but only in sudden-onset fevers in genetically susceptible children aged between six months and three years; in addition, today, it is common knowledge that febrile seizures, albeit undesirable, do not pose a risk of brain injury; moreover, children older than one year and who have already had fevers greater than 38.7 ºC and who have not experienced seizures, will hardly suffer from this event.
Fever is a friend but not as much as we believe it to be, because:
- There is some experimental evidence in animals and humans that high temperatures are associated with the decrease of microbial and viral reproduction and with the increase in immunological activity, but there is no convincing clinical proof that antipyretic therapy increases the risk or worsens common viral or bacterial infections.
- The fever curve helps with diagnosis, but an antipyretic given during a fever peak does not produce significant alterations.
- The antipyretic may mask the severity of the disease, but the contrary occurs: in doubtful cases, with moderate toxemia, the re-examination of the child after the effect of a dose of antipyretic may determine whether the case is really serious (the child still feels unwell) or benign (child’s enthusiasm improves greatly.)

How to measure the temperature

The standard instrument for measuring body temperature is the clinical glass mercury thermometer.

The international literature, especially the American one, adopts rectal temperature as the most accurate to check the core temperature.

Technique: introduce the thermometer in the rectum at 5cm in infants and at 7cm in adolescents, for two minutes.4

Oral temperature (also preferred by Americans, but is difficult to measure in children and presents some risks) is taken by placing the thermometer under the tongue, with the mouth closed, and waiting for three to five minutes for the reading.

In our setting, the widely accepted and culturally incorporated method is the measurement of axillary temperature, which although not so accurate as rectal temperature, is totally satisfactory for clinical purposes.

Technique: dry under the arm (in case of sweating), place the thermometer under the arm and keep the arm firmly pressed against the chest for four minutes. Note: in too warm sites, perform the reading right after removing the thermometer.4
The first obligatory question would be about the age of the child in order to detect the age of risk, which especially includes newborns and infants in the first two to three months of life. And believe it or not, 20% of emergency care providers (qualified doctors and nurses) did not ask about the child’s age, that is, they finished their telephone advice without knowing whether they were dealing with a newborn or an adolescent. Another basic question would be: how high was the temperature (fever peak) and whether it was accompanied by shivering, changes in behavior and in appetite. Well, 13.5% did not ask about the intensity of the fever; 81% did not ask about loss of appetite and 93% (!) were not concerned with knowing whether changes in behavior and enthusiasm had occurred.

A complementary question would be about the concomitant occurrence of other symptoms that could suggest the identification or involvement of a system (cough, coryza, wheezing, shortness of breath, diarrhea, vomiting.) Had the questions been asked, the answers to the mock case would have been: age - five weeks (maximum alert) temperature 39.5 ºC (possibility of bacterial infection,) pronounced loss of appetite (bottle refusal), the child would sleep most of the time and when awake he/she would show intense and uncommon irritability. This case characterized a severe infectious state in a high-risk group, in which meningitis should not be ruled out, thus requiring immediate clinical examination, urgent request of basic laboratory tests and implementation of empirical antibiotic therapy while awaiting the results.

**Anamnesis for complaint of fever at the doctor’s office**

1. Age - determine the age group (attention to the ages of risk.)
2. Intensity of the fever - find out whether it reached 39.5 ºC and whether hypothermia occurred (below 36 ºC.)
3. Association of fever with shivering (distinguish between simple chills or muscle jerks.)
5. Changes in behavior - marked irritability, excessive drowsiness, apathy, inconsolable crying, whining, hallucinations, grunting. Ask whether after the fever abates, due to the use of antipyretics, child’s enthusiasm improves or whether the child is still quite unwell.
6. Other constitutional symptoms: coryza, nasal discharge, sneezing, cough (airways,) wheezing and breathing difficulty (bronchi), vomiting and diarrhea (digestive tract,) headache (mild, nonspecific or pronounced due to the involvement of the central nervous system.)
7. Length of the fever episode.
   
   Important: try to find out the precise moment of fever onset. Immediately disregard the first piece of information given by the mother, which not uncommonly is a mathematical trap. Beware of expressions like “he has been febrile all the time” or “he has had fever for over one month,” which, instead of continuous fever, could express some isolated fever episodes, although close, of different causes. This misleading information may totally tamper with medical thinking.

**When immediate investigation is indicated**

1. Age of risk: newborn (obligatory investigation), first two months of life (recommended investigation) and third month of life (provided that the general impression is satisfactory, it is acceptable to maintain the newborn closely monitored). After three months of life, outpatient observation with easily available (telephone, return visit) and programmed access.
2. Fever higher than 39.4 ºC especially if accompanied by shivering - suggests bacterial infection/bacteremia. 
3. Pronounced infectious/toxemic state: poor general impression, listlessness, lack of appetite, irritability alternated with drowsiness, lethargy, apathy, suffering appearance, inconsolable crying or whining, grunting (warning sign) and child’s enthusiasm.
4. Length of fever greater than three days (over 72 hours) counted as accurately as possible from the presumed onset of fever.

Viral infections may cause up to three days of fever (adenoviruses may cause fever for longer periods. After these three days have passed, consider urinary tract infection (request urine bacterioscopy) especially in children younger than two years with no other symptoms; but if the fever prolongs the upper airway infection, suspect of bacterial contamination (rhinosinusitis-otitis.)

Infants may have high-grade fever (above 39.5 ºC) showing pronounced irritability in (frequent) cases of roseola (exanthema subitum) in which the rash develops suddenly after three days of fever and coincides with the sharp reduction in temperature. The occurrence of other cases in the same time period and the presence of eyelid edema after two days of fever allow anticipating the diagnosis.

The mere presence of congested tympani in a febrile child does not characterize the diagnosis of acute otitis media.

**How to investigate a child whose only complaint is fever**

As previously mentioned, the age between two and three months of life demands enhanced attention (maximum state of alert) due to the high prevalence of severe bacterial infections (9%) combined with the difficulty in distinguishing children with severe bacterial
infections from those with simple viral infections. This concern encouraged a large number of studies, usually conducted at emergency services, which were repetitive and poorly creative, and produced neither a protocol nor a consensus. The most relevant studies are listed in Table 1.\textsuperscript{13-15}

In a recent publication,\textsuperscript{16} the retrospective analysis of infants younger than three months cared for at the emergency service of the Children’s Hospital, in Boston, concluded that the best data to detect bacterial disease were: age less than 14 days, rectal temperature $>39.6\,^\circ\mathrm{C}$, leukocytosis $>20,000$ and leukopenia $<4,100$ and positive urine test (five or more leukocytes per high-powered field in spun urine or positive screening test for leukocyte esterase or nitrite).

The few cases in which bacterial infection could not be identified were related to urinary tract infection, and the authors admit that urine bacterioscopy could have avoided most of these problems. In fact, in our experience, urine bacterioscopy is almost perfectly correlated with urine culture.\textsuperscript{17}

The general impression about the febrile infant was not taken into consideration, since it was a retrospective study. This is a drawback of the study.

Some experts drew attention to the fact that American pediatricians do not comply with the guidelines established by these studies with febrile children and only some of them understand that this is a particular problem with private office physicians.\textsuperscript{18} As a matter of fact, the guidelines were drawn up in an attempt to immediately diagnose children admitted to the emergency service. General pediatricians have an irreplaceable resource: observation through telephone contact and return visits.\textsuperscript{19} Many cases are clarified after 24 hours of observation, with no need for unnecessary exams, hospitalization and use of intravenous empirical antibiotics as proposed by many of these studies (Table 1).

Following this train of thought, a study carried out at a highly sought-after emergency service, in São Paulo, proposes to maintain some of the children treated at the emergency service closely monitored 12 to 24 hours, which clarifies most of doubtful diagnoses.\textsuperscript{20}

Some researchers checked whether the fact that a child becomes feverless after a dose of antipyretic could distinguish the severity of the infectious process, but this hypothesis was rejected.\textsuperscript{21}

### Table 1 - Assessment of the risk of febrile infants

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Boston\textsuperscript{13}</th>
<th>Rochester\textsuperscript{14}</th>
<th>Philadelphia\textsuperscript{15}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>28-89 days</td>
<td>$&lt; 60$ days</td>
<td>29-60 days</td>
</tr>
<tr>
<td>Fever</td>
<td>$\geq 38,^\circ\mathrm{C}$</td>
<td>$\geq 38,^\circ\mathrm{C}$</td>
<td>$\geq 38.2,^\circ\mathrm{C}$</td>
</tr>
<tr>
<td>Appearance</td>
<td>Good</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>Laboratory tests that define low-risk patients</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Leukocytes</td>
<td>$&lt; 20,000$</td>
<td>$&gt; 5,000$ and $&lt; 15,000$</td>
<td>$&lt; 15,000$</td>
</tr>
<tr>
<td>- Rods</td>
<td>$&lt; 1,500$</td>
<td>$&lt; 1,500$</td>
<td>$&lt; 0.2$</td>
</tr>
<tr>
<td>- Rods/segmented</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Leukocytes in the urine</td>
<td>$&lt; 10/field$</td>
<td>$&lt; 10/field$</td>
<td>$&lt; 10/field$</td>
</tr>
<tr>
<td>- Bacterioscopic/urine</td>
<td></td>
<td></td>
<td>Negative</td>
</tr>
<tr>
<td>- Stool/smear</td>
<td>without infiltrated</td>
<td>$&lt; 5$ leukocytes/field</td>
<td>No blood and leukocytes without infiltrated</td>
</tr>
<tr>
<td>- Thoracic X-ray</td>
<td>$&lt; 10$ leukocytes/mm$^3$</td>
<td></td>
<td>$&lt; 8$ leukocytes/mm$^3$ negative bacterioscopic</td>
</tr>
<tr>
<td>- Liquor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>Hospital + antibiotic</td>
<td>Hospital + antibiotic</td>
<td>Hospital + antibiotic</td>
</tr>
<tr>
<td></td>
<td>Home/return</td>
<td></td>
<td>Home/return</td>
</tr>
<tr>
<td>Empiric antibiotic</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sensitivity

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Boston\textsuperscript{13}</th>
<th>Rochester\textsuperscript{14}</th>
<th>Philadelphia\textsuperscript{15}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>94%</td>
<td>92%</td>
<td>98%</td>
</tr>
<tr>
<td>Specificity</td>
<td>50%</td>
<td>50%</td>
<td>42%</td>
</tr>
<tr>
<td>Positive predictive value</td>
<td>12%</td>
<td>14%</td>
<td>14%</td>
</tr>
<tr>
<td>Positive predictive value</td>
<td>9%</td>
<td>98.9%</td>
<td>99.7%</td>
</tr>
</tbody>
</table>
Thus, in office practice in our setting, some tests (including CSF) are mandatory in newborns; in others, clinical impression should be valued (infectious state, toxemia) with reassessment of doubtful cases after fever abates with the use of antipyretics.

**Basic tests**

1. **Hemogram:** Check for leukocytosis > 15,000 and leukopenia < 5,000; neutrophilia (> 10,000 neutrophils), with a left shift (rods > 1,500), morphological neutrophil alterations (toxic granulations and vacuoles).

2. **Erythrocyte sedimentation rate:** Check for ESR > 30mm on the second day of fever.

3. **Quantitative C-reactive protein:** Currently, it is better indicated than leukocyte and neutrophil counts and even better than ESR; concentrations lower than 5mg/dL rule out severe bacterial infection.

4. **Urine test:** Leukocyte count and bacterioscopy.

   Consider that a child up to the age of two or three years may have pyelonephritis only characterized by the presence of fever. Therefore, the urine test is obligatory if the fever lasts over three days or before that if fever is associated with toxemia with shivering. On the other hand, urinary tract infection is seldom responsible for the fever in older children who have no urinary tract disorder.

   Unarguably, suprapubic aspiration is the ideal method for urine collection, since it is formally indicated in severe cases that demand quick and reliable results. Bag urine specimens are highly susceptible to contamination and they are of great value only if the result is negative (thus ruling out urinary tract infection.)

   The analysis of a significant sample (37,450 infants) allowed the following recommendation: urine may be collected in bags in male febrile infants (with no other source of fever) older than six months and in female infants older than 12 months; in any other cases, urine should be collected by a bladder probe (urethral catheterization or suprapubic aspiration.) Request microscopy for leukocytes and bacterioscopy. In Canada, the analysis of 7,500 urine cultures suggests that collection bags are admissible in newborns; in others, should be submitted to urethral catheterization or suprapubic aspiration. Likewise, the urine should be examined for the presence of leukocytes and bacteria. In our setting urethral catheterization is also considered for children who do not urinate on demand (in these cases, midstream urine specimens are important) and in girls with vulvovaginitis (even in those with urine control.)

5. **Cerebrospinal fluid test:** Recommended in all cases of fever with no apparent cause in newborns and strongly considered in febrile and toxemic children or in those with neurological or sensory disorders.

6. **Blood culture:** Useful in selected high-risk cases but not regularly used as a routine test.

Even children (especially infants between one and two months of life) whose clinical and laboratory evaluation rules out any possibility of bacterial disease should remain under outpatient monitoring. On the other hand, the indiscriminate use of antibiotics should not replace clinical judgment.

**The treatment of fever: why and how**

The decision to treat or not fever (trying to normalize temperature) depends on previously mentioned facts: there is some evidence that fever stimulates the body’s self-defense but this advantage is probably only marginal; fever itself is not a risk except in quite unwell children, in those suffering from heart diseases or respiratory insufficiency. Conversely, central nervous system injuries could occur near 42.5ºC; fever causes discomfort, which may be relieved by lowering the temperature; fever may cause seizures in susceptible children.

Based on this premise, the treatment should be provided on a patient-to-patient basis.

It is the pediatrician’s duty to eliminate (and never contribute towards) fever phobia, but he/she is not allowed to deny treatment to the patient based on his/her principles or on incomplete scientific evidence. The symptoms that accompany fever cause a transient change in the child’s behavior, making parents not recognize their children’s attitudes, thus causing anxiety and discomfort.

**Fever can be controlled by physiological mechanisms or antipyretic drugs**

Physiological mechanisms such as bath, cold compresses and application of alcohol to the skin are not valid because they do not have an effect on the pathophysiological mechanism of fever. However, once the hypothalamic set point has been lowered with drug therapy and, if necessary, after removal of clothing and maintenance of the child in a ventilated environment, warm baths for 10 to 20 minutes can be used, but the water should be allowed to cool down slowly or a sponge wet in warm water should be gently rubbed on successive parts of the child’s body, in a total of 20 to 30 minutes. This should only be used if evident comfort is to be obtained for the child and if it does not cause any further problems to the parents. Cold water may cause chills and shivering, which cause discomfort and elevate the temperature. A febrile child should not be immersed in a bathtub.

Alcohol may be absorbed by the skin and cause systemic toxicity, so it should never be used.

Encourage the child to take fluids (water, tea, juice, soft drinks) in order to prevent hypernatremia, which increases fever.
Antipyretics

The most widely used antipyretics include acetylsalicylic acid (AAS); paracetamol (acetaminophen), dipyrone and norhormonal anti-inflammatory drugs, such as ibuprofen and others (Table 2).

Dipyrone, which was the antipyretic/painkiller most widely used in our setting for decades, was taken off the market in the United States due to the risk of bone marrow toxicity, shown by a study whose methodology is arguable today and has not been confirmed in a more recent multicenter study. Dipyrone, which was the antipyretic/painkiller most widely used in our setting for decades, was taken off the market in the United States due to the risk of bone marrow toxicity, shown by a study whose methodology is arguable today and has not been confirmed in a more recent multicenter study.36

Acetylsalicylic acid, which replaced dipyrone during this period, was responsible for extremely serious accidental intoxications in the United States, thus making the government encourage the use of childproof medicine packages. Later on, AAS was associated (also according to epidemiological evidence) with Reye’s syndrome whose existence is questioned today.37 However, it has been confirmed that AAS produces high risk of digestive hemorrhage.

Acetaminophen, which replaced dipyrone and AAS, in habitual doses, has low toxicity and causes fewer allergic reactions than the other two drugs. Nevertheless, it may cause liver toxicity in doses that are a little bit larger than those recommended.38

Quite recently,39 the analgesic/antipyretic effect of nonhormonal anti-inflammatory drugs has been widely accepted, and so far ibuprofen has been approved for use. One advantage of this drug is that its antipyretic effect lasts longer. Gastritis (even the hemorrhagic type) may be provoked by long-term use (not so frequent in children); hypersensitivity to the drug is not uncommon. The possibility of incorrect doses, which not uncommonly cause toxicity, should also be considered.40

In view of different preparations of the same product, it is of paramount importance to pay attention to the dose shown on the package or in the directions.

Antipyretic therapy is a good moment for the pediatrician to associate knowledge and empathy with the patient/family and take on his/her role in health education and improvement of the quality of life of the people with whom he/she is in contact.

Table 2 - Antipyretics

<table>
<thead>
<tr>
<th>Medication</th>
<th>Dosage (mg/kg/time)</th>
<th>Gap</th>
<th>Forms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetylsalicylic</td>
<td>10-15</td>
<td>4 to 6 hours</td>
<td>tablets</td>
</tr>
<tr>
<td>Dipyrone</td>
<td>15-20</td>
<td>4 to 6 hours</td>
<td>drops, solution, tablets, suppository</td>
</tr>
<tr>
<td>Acetaminophen</td>
<td>10-15</td>
<td>4 to 6 hours</td>
<td>drops, syrup, tablets</td>
</tr>
<tr>
<td>Ibuprofen</td>
<td>10</td>
<td>6 to 8 hours</td>
<td>suspension</td>
</tr>
</tbody>
</table>

Due to the existence of different preparation forms for the same product, it is necessary to pay attention to the dosage printed on the package or the instructions. AAS is not recommended for suspicious cases of dengue. Suppository products might be useful for children that usually vomit or reject the medication. Intravenous antipyretics are not recommended for outpatient cases. The concomitant and sequential use of antiinflammatory medication with acetaminophen or dipyrone (whose gaps are different), can have increased effect and cause hypothermia.41

Practical counseling to parents

Decalogue of the febrile child

How to counsel parents/family in cases in which fever is the only or prevalent symptom and in which severe bacterial disease has been ruled out.

1. If necessary, explain that it is probably a viral disease, usually benign, whose fever is self-limited to three days. Explain that children (especially preschool children) have frequent viral infections and that this is beneficial in the long run because it stimulates their mechanisms of defense (immune system.) It might also be a case of nonsevere bacterial infection (rhinosinusitis, tonsillitis,) in which appropriate antibiotics take up to 48 hours before they eliminate fever.
2. Dress the child with light clothing, keep the environment ventilated; at pleasant hours during the day, the child may stay outdoors, providing he/she is not directly exposed to sunlight.

3. Offer the child fluids, regularly, respecting his/her preferences (water, teas, juices, coconut water, soft drink.)

4. Warn that loss of appetite is inevitable and that the child should eat what he/she tolerates better; offer more food, whenever possible.

5. Explain that moderate fever stimulates the mechanisms of defense against infection and therefore it is not necessary or advantageous to normalize the temperature completely.

6. Explain that the aim of antipyretics is to relieve the discomfort caused by the fever and that they should be used only in moments of pronounced listlessness, with no preset time, but respecting the minimum interval of each medication.

7. Tell the parents they do not need to check the temperature frequently; they should do it in moments of pronounced listlessness, shivering or if the child looks extremely warm. In these cases, have the child firmly press the thermometer under his/her arm for four minutes.

8. Prescribe the most accessible antipyretic and consider the preferences, availability, acceptance, tolerance and habitual efficiency of common antipyretics (acetaminophen, dipyrone or nonhormonal anti-inflammatory drugs) on a case-by-case basis. Warn that nonhormonal drugs should not be combined with other antipyretics (risk of hypothermia.) Explain about the correct dose and minimum administration intervals.

   Explain that fever and malaise only abate while the antipyretic is taking effect (4-6 hours; 8-12h for nonhormonal anti-inflammatory drugs) and that recurrence of fever after this period is normal and does not imply treatment failure.

9. Talk about the limited benefits of the warm baths and warm compresses that may be used after antipyretic administration, when the effect of this drug is not totally satisfactory; warn against the use of cold water and alcohol. Baths and compresses are acceptable when the child agrees and when it is no trouble for the family.

10. Inform (orally and in writing) about the warning signs: fever greater than 39.4 °C with shivering, pronounced listlessness or unwellness (drowsiness, irritability, inconsolable crying or whining, grunting) which do not resolve after the effect of antipyretics; development of different symptoms; fever for over three days in a row. Availability (telephone, return) is an irreplaceable measure.

Appendix

Infectious state

It consists of a group of nonspecific symptoms/signs observed in all infectious processes, which help identify cases of infection, and distinguish them from other similar clinical entities.

Example: children with mucous and bloody stools-with severe infectious state: latent shigella VS colitis without infectious state: colitis caused by cow’s milk allergy; febrile, and grunting infant with phlegm accumulation: VS bronchopneumonia; febrile infant with phlegm accumulation, but great enthusiasm: probably viral.41,42

Detect the infectious state:

- Fever is the most characteristic data, but it is not universal.
- Loss of appetite (occurs in all cases).
- Changes in behavior: listlessness, irritability (important although it depends on the mother’s observation and information.)
- Grunting - occurs in quite severe cases and is life-threatening.

Quantify the severity of the infectious state

- Mild - fever up to 38.5 °C, good general impression. Occurs in cold, viral pharyngitis, viral laryngitis, acute diarrhea, cystitis. Maintain closely monitored without antibiotic therapy.
- Moderate - fever between 38.5 to 39.4 °C and listlessness. Occurs in purulent tonsillitis, otitis, viral meningitis, lobar pneumonia, pyelonephritis. Consider the use of antibiotics.
- Severe- fever reaches 39.5 °C or hypothermia less than 36 °C; grunting, death risk impression. Occurs in pneumonia, bronchopneumonia, purulent meningitis, epiglottitis, pyelonephritis. Hospitalize, investigate, and initiate antibiotic therapy.

Notes

- Fever for over 72 hours is probably nonviral.
- Fever with shivering is usually of bacterial etiology.12
- Consider urinary tract infection in infants with fever and moderate infectious state without constitutional signs.23
- CSF is mandatory in febrile children in case of: seizure in infant less than six months old, seizure that
occurs 24 hours after fever resolution; fever and meningeal signs and/or mental status disorders; fever in newborn.  

References