

## Evaluation of sponging to reduce body temperature in febrile children

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A study was conducted to evaluate the efficacy of sponging as a way of reducing body temperature in febrile children. Of 130 children 73 received antipyretic medication and sponging and 57 received antipyretic medication alone. No difference in temperature reduction was noted between the two groups. It is therefore suggested that sponging be abandoned as a mode of temperature reduction in febrile children whose increased temperature is due to an infectious process.

**Étude comparative de l'efficacité du bain à l'éponge dans l'abaissement de la température chez l'enfant fiévreux. On l'a pratiqué chez 73 enfants et non chez 57 autres; tous ont pris des antipyrétiques. Entre les deux groupes on n'observe aucune différence dans l'abaissement de la température. Il est donc proposé d'abandonner le bain à l'éponge pour abaisser la température de l'enfant chez qui la fièvre résulte d'une infection.**

Fever is one of the commonest symptoms for which primary care physicians see children in their offices or in hospital clinics. Although a large number of parents and health care professionals have a great fear of fever, in some cases amounting to phobia, the thinking of the medical community has begun to change in recent years. Because there is a lack of evidence that vigorous antipyretic therapy will prevent febrile convulsions, because many young children tolerate fever without discomfort, and because experimental evidence suggests that fever may have a role in the immune response to infection, many physicians now feel that a reduction of the febrile reaction to infection is of secondary importance and is overemphasized in our dealings with febrile children and their parents. Furthermore, the understanding of the mechanism of fever, although far from complete, has highlighted the inappropriateness of the physical removal of heat in the treatment of fever due to infectious processes. Recent reviews have discussed these points in some detail.<sup>1-3</sup>

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However, despite all this, many doctors and other health care workers still advise sponging in the treatment of fever. My colleagues and I therefore decided to evaluate the temperature reduction in febrile children presenting to the Emergency Department of the Hospital for Sick Children, Toronto, achieved with the use of antipyretic medication and sponging or antipyretic medication alone. Our aim was to simulate as closely as possible the way sponging is done in outpatient departments or the way parents are advised to do it.

### Patients and methods

Our study, conducted in September and October 1980, involved 137 children, aged 0.25 to 2.0 years, whose temperature at the time of arrival at the Emergency Department was 39.0°C or greater. The children were divided into two groups according to whether their Emergency Department admitting number was even or odd. Those with even numbers received sponging in a basin of water that was tepid (i.e., felt "neutral" in temperature to a nurse's elbow) for 20 minutes. The head, face and body were continuously sponged with a moist washcloth. The children's temperatures were taken 30 minutes after they received sponging or 50 minutes after the initial temperature reading. The children with odd numbers were undressed to their diapers but did not receive sponging. Their temperatures were taken 50 minutes after the initial temperature reading. All the temperatures were taken rectally with a mercury thermometer. If the child had received no antipyretic medication in the 4 hours before presentation or if he or she had received an inadequate dose of acetylsalicylic acid or acetaminophen, 5 to 10 mg/kg, was given after the initial temperature reading. If the child had received adequate antipyretic medication in the previous 4 hours no medication was given. The children who had received antibiotics and those who were judged too ill for investigation to be delayed were not included in the study.

The results were analysed by a *t*-test of independent means with a two-tailed test of significance.

### Results

A total of 137 children were studied. Of these, 80 received sponging (treatment group) and 57 did not (control group). In seven children the sponging was discontinued because they began to shiver and had to be

removed from the bathtub. Their data were therefore not included in our analysis. Of the remaining 73 children in the treatment group 38 were boys and 35 girls, and their mean age was  $1.04 \pm 0.48$  years. Twenty-four had received antipyretics before arriving at the Emergency Department, and 49 received them on arrival. In the control group there were 33 boys and 24 girls, and their mean age was  $1.14 \pm 0.50$  years. Twenty-three had received antipyretics before arriving at the Emergency Department, and 34 received them on arrival. There were no significant differences in age, sex or the time of administration of the antipyretics between the two groups (Table I).

Table II shows that there were no significant differences at or below the 0.05 probability level between the treatment and control groups with respect to mean initial temperature, temperature change and interval between temperature measurements. The temperature decrease in the treatment group was  $0.16^\circ\text{C}$  greater than that in the control group. The possibility of a type II error is negligible since our study design had the power to reject a  $0.30^\circ\text{C}$  difference with a 95% probability of being correct. Our data support the null hypothesis that in febrile children given antipyretics sponging does not lower the temperature significantly.

## Discussion

We attempted to duplicate as much as possible the

**Table I—Characteristics of febrile children who received antipyretics and sponging (treatment group) or antipyretics alone (control group)**

Variable	No. of children or mean $\pm$ standard deviation (SD)	
	Treatment group	Control group
No. of children	73	57
Mean age (yr)	$1.04 \pm 0.48$	$1.14 \pm 0.50$
Sex		
Male	38	33
Female	35	24
Time of administration of antipyretics		
Before arrival	24	23
On arrival	49	34

**Table II—Mean initial temperatures, temperature changes and intervals between temperature readings**

Variable	Mean $\pm$ SD	
	Treatment group	Control group
Initial temperature ( $^\circ\text{C}$ )	$39.70 \pm 0.45$	$39.88 \pm 0.57$
Temperature change ( $^\circ\text{C}$ )	$-1.06 \pm 0.61$	$-0.92 \pm 0.57$
Interval between temperature measurements (min)	$57.2 \pm 9.8$	$56.7 \pm 10.2$

way sponging is done in hospital outpatient departments and the way parents are advised to do it. We were mainly interested in the effects of sponging, as previous studies showed little, if any, difference between the two commonly used antipyretics acetylsalicylic acid and acetaminophen.<sup>4</sup> Sponging to lower body temperature in children with infectious diseases is not theoretically useful since the physical removal of heat does not affect the set point of the hypothalamic "thermostat", the determinant of body temperature. Indeed, it is an impractical procedure in a busy emergency or outpatient department. Furthermore, children whose only desire is to get warm (behaviour appropriate to the hypothalamus's order that the body temperature must go up) do not appreciate being dunked into tepid (for them, cold) water. All physicians know what it's like to arrive at the emergency department to evaluate a previously calm child who is now screaming in the bathtub.

Our results indicate that sponging, as it is usually done, does not lower body temperature below that achieved with antipyretics alone. Steele and colleagues<sup>5</sup> showed some advantage to sponging with tepid water. However, they sponged children continuously until a certain temperature was achieved; this could rarely be done in a busy outpatient clinic or even by parents at home. Hunter<sup>6</sup> found that sponging alone lowered body temperature somewhat, but that sponging together with the administration of antipyretics was not superior to the use of antipyretics alone. Hunter also continued sponging until a predetermined temperature was achieved, presumably for as long as 4 hours.

We feel that sponging of febrile infants should be abandoned except in those rare situations in which the physical removal of heat is logical in light of present knowledge (e.g., a high environmental temperature or a child's inability to perspire). The goal, of course, should be to find the cause of the fever, but if, as often happens, no definite cause is found, the parents must be taught how to watch for any changes in the child's condition rather than be preoccupied with the height of the temperature and with how it must be lowered at all cost. If doctors take this approach, their message can only be undermined by the ritual of sponging.

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