RESEARCH PAPER

Comparative Effectiveness of Tepid Sponging and Antipyretic Drug Versus Only Antipyretic Drug in the Management of Fever Among Children: *A Randomized Controlled Trial*

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Objective: To compare the effectiveness of tepid sponging and antipyretic drug versus only antipyretic drug among febrile children.

Design: Randomized controlled trial.

Setting: Tertiary care hospital.

Participants: 150 children 6 mo – 12 yr age with axillary temperature ≥ 101ºF.

Intervention: Tepid sponging and antipyretic drug (Paracetamol) (*n*=73) or only antipyretic drug (Paracetamol) (*n*=77).

Main outcome measures: Reduction of body temperature and level of comfort.

Results: The reduction of body temperature in the tepid sponging and antipyretic drug group was significantly faster than only antipyretic group; however, by the end of 2 hours both groups had reached the same degree of temperature. The children in tepid sponging and antipyretic drug had significantly higher discomfort than only antipyretic group, but the discomfort was mostly mild.

Conclusion: Apart from the initial rapid temperature reduction, addition of tepid sponging to antipyretic administration does not offer any advantage in ultimate reduction of temperature; moreover it may result in additional discomfort.

Keywords: *Antipyretic drug, Fever, Hydrotherapy, Paracetamol, Tepid sponging.*

Fever is a common childhood problem faced by health care personnel including doctors, nurses and others in both hospital and community settings. However, the nursing management of fever in children is often not based on research and remains inconsistent in practice(1,2). Several methods have been recommended to reduce fever in children, which include tepid sponging, fanning, alcohol sponging and antipyretics. However, controversy surrounds the use of tepid sponge for reduction of fever. The effectiveness of tepid sponging as a treatment alongside antipyretic varies between studies, with some finding that it is of no benefit(3) and others suggesting that it is helpful(4). There is dearth of related studies in India. Therefore, we conducted a study to compare the effectiveness of tepid sponging and antipyretic drug versus only antipyretic drug in the management of fever among children.

METHODS

The study was conducted at Child Health Department of Christian Medical College, Vellore, a tertiary care hospital in South India. The study subjects were children in the age group of 6 months – 12 years, who presented with fever (axillary temperature ≥101ºF). Children who had received antipyretic drug within 4 hours before or those with active seizure or clinically unstable were excluded. A written informed consent was obtained from the

parents. A minimum sample of 60 in each group had a 90% power of detecting a difference of 0.40° F mean change between the baseline and the last follow up and with a follow up correlation of 0.70 and the level of significance at 5% (two sided).

The children were then randomized by using a random number table to receive tepid sponging and antipyretic drug or only antipyretic drug. The initial temperature checking time was considered as 0 minutes. If the child belonged to the group of tepid sponging and antipyretic group, syrup/tablets paracetamol 10 mg/kg was administered and was sponged for 15 minutes. Tepid sponging procedure was as follows: Required articles: 5 sponge towels, a steel/enamel basin, Mackintosh, 2 bath towels, thermometer, bath thermometer and tap water (room temperature –0.5°C). After washing hands and checking the temperature of the child, a long mackintosh was spread under the patient. After assuring privacy the dress was removed and the child covered with top sheet. A sponge was then used to dab over the face and neck without touching the eyes and kept at the edge of the basin. A second sponge was used to dab one arm starting from the acromion process and proceeding laterally till the fingers and then medially reaching the axilla. The sponge cloth was left in the axillary pit. The same was done for the other arm. For the legs, a sponge cloth was used to dab from the groin proceeding laterally till the feet and then medially reaching the groin. The sponge cloth was kept on the fold of the groin. The abdomen and back were dabbed with the first sponge kept at the edge of the basin. The procedure was completed in 15 minutes, when the child was dabbed dry. At 15 minutes point, temperature was checked and if it continued to be >101° F, sponging was administered for another 15 minutes. Later temperature was checked at 30, 45, 60, 90 and 120 minutes. Children in the only antipyretic drug group received only paracetamol (10mg/kg) at 0 minutes and subsequently temperature was monitored at similar intervals. The level of discomfort of children was also assessed at the same time points in terms of 3 criteria–crying, restlessness and irritability. It was scored and the total score was converted into percentage and was interpreted as mild, moderate and severe discomfort.

The reduction of body temperature between the treatment groups was analysed using the analysis of covariance method adjusting for the baseline temperature. The level of discomfort was also subjected to statistical tests of significance. STATA software was used for the statistical analysis of the data.

RESULTS

One hundred and fifty children were studied, 73 in the tepid sponging and antipyretic drug group and 77 children in the only antipyretic drug group. The baseline characteristics are shown in ***Table* I**. Males outnumbered females in both the groups by an approximate ratio of 2:1. Majority of children in both the groups had respiratory diseases like upper respiratory tract infection, pneumonia etc. A higher number of children in both groups had their initial body temperature between 101° F – 103° F.

The mean temperature of both groups at different time intervals is depicted in the graph (***Fig.*1**). It shows a rapid reduction of temperature in the tepid sponging and antipyretic group at 15 minutes. Only antipyretic group had slow but sustained reduction in temperature.

TABLE I BASELINE CHARACTERISTICS OF THE STUDY CHILDREN

Variable	Tepid sponging and antipyretic drug group (*N*=73)		Only antipyretic drug group (*N*=77)	
	n	%	*n*	%
Age				
6 months–2 years	30	41.1	30	38.9
3 years – 6 years	28	38.4	32	41.6
7 years – 12 years	15	20.5	15	19.5
Sex				
Male	46	63.0	53	68.8
Female	27	37.0	24	31.2
Initial body temperature				
101ºF–102ºF	28	38.4	38	49.3
102ºF–103ºF	32	43.8	28	36.4
103ºF–104ºF	13	17.8	11	14.3

WHAT IS ALREADY KNOWN?

- Fever reducing measures in children include antipyretic administration and tepid sponging (hydrotherapy).

WHAT THIS STUDY ADDS?

- Apart from the initial rapid temperature reduction, addition of tepid sponging to antipyretic administration does not offer any advantage in ultimate reduction of temperature; it may result in additional discomfort.

The comparative effectiveness of the two methods was assessed based on the analysis of covariance. The results indicate that there is a difference in mean temperature over time between the treatment methods after adjusting for the initial temperature as covariate. The analysis of covariance confirms the rapid reduction of temperature in the combined tepid sponging and antipyretic group as shown in ***Fig.*1**. However, by the end of 2 hours both groups had reached the same degree of temperature. There was no difference in ultimate reduction of temperature between the two groups.

The level of discomfort was higher in tepid sponging and antipyretic group than only antipyretic group. It was compared by using a chi-square test and the result showed a statistically significant value (P<0.001). The discomfort in the tepid sponging group was mostly mild.

DISCUSSION

Administration of tepid sponging for fever has been practised for years. Formally and informally, healthcare personnel have voiced opinion for and against the practice of tepid sponging and questioned its relative effectiveness compared to other methods.

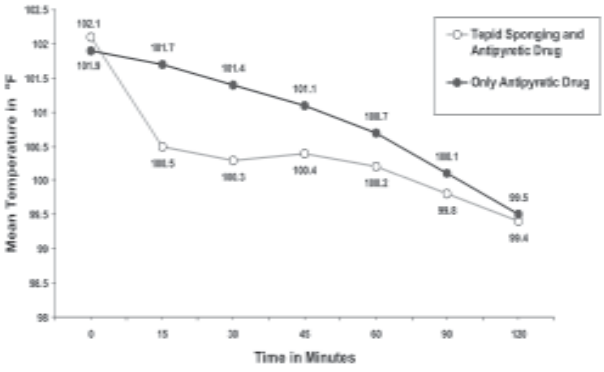

FIG. 1 *Mean temperature of the Tepid sponging and antipyretic drug group and Only antipyretic drug group at different time intervals.*

A number of studies have been done to compare the efficacy of these methods. Some of them had shown that tepid sponging with antipyretic drug is more effective than only antipyretic drug(5,6), while others concluded that there was no difference in temperature reduction(3,4). We observed that administration of tepid sponging and antipyretic drug resulted in rapid temperature reduction in the initial 15-30 minutes as compared to antipyretic drug alone; however, by the end of 2 hours both groups had reached the same degree of temperature. There was no difference in ultimate reduction of temperature between the two groups.

Children in the tepid sponging and antipyretic group had a higher level of discomfort than only antipyretic group, although the discomfort was only mild in most cases. These findings are supported by Sharber(4), but certain other studies did not find any significant difference, although they used different criteria for assessing discomfort(6,7). Our findings are also supported by Cochrane Evidence Update. which states: "In trials where all children received paracetamol, those who were treated with tepid sponging in addition to paracetamol were more likely to be clear of fever at 1 hour (relative risk 11.76 (3.39 to 40.79), 2 trials, 125 children). Shivering and goosebumps were more common with tepid sponging (relative risk 5.09 (1.56 to 16.60); 3 trials, 145 children)(8).

Based on our findings and review of literature(9,10), we conclude that apart from the initial rapid temperature reduction, addition of tepid sponging to antipyretic administration does not offer any advantage in ultimate reduction of temperature and may result in additional discomfort.

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