

## Back Blows and Chest Thrusts for Choking Victims? Dr. Heimlich Answers

A letter to the editor (*Public Health Reports*, March-April 1986) from Joseph Greensher, MD, of the American Academy of Pediatrics and William H. Montgomery, MD, Chairman, 1985 National Conference on Standards and Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiac Care, advises that chest thrusts will continue to be recommended for treating choking children under 1 year of age.

"The success of a maneuver to dislodge a foreign body from the airway," as Surgeon General C. Everett Koop stated in his response, "depends on a reservoir of air being forcibly expelled through the airway." Backslaps, with an infant draped over the rescuer's forearm that rests on the thigh, is, therefore, an acceptable alternative to the standard Heimlich Maneuver in an infant, since the forearm is performing intermittent subdiaphragmatic pressure, which is also a Heimlich Maneuver.

There is, however, no known published documented or anecdotal case report of the life of an infant being saved by chest thrusts. Furthermore, a Johns Hopkins University Medical Institutions study proved that intrathoracic pressure generated by chest thrusts (or compressions) is dissipated because it forces the diaphragm downward (*JAMA* 1981;246:351). Airflow from the trachea is, therefore, minimal and inadequate to expel a foreign body from the airway.

Of greater significance, reports from the Mayo Clinic and other outstanding institutions describe injuries following chest thrusts for CPR which include damaged liver, heart, spleen, lungs, and chest wall (*Pediatrics* 1982;70:120 and 1983;71:982).

Doctors Greensher and Montgomery also state that the Heimlich Maneuver "was recommended as the sole treatment for choking to fulfill a need for simplicity and uniformity in teaching, not a substitute for potential hazards from previously taught methods." Simplicity and uniformity are good reasons for having eliminated their earlier recommendations for treating choking. Extensive scientific evidence exists, however, that "previously taught methods," backblows and chest thrusts, are "hazardous, even lethal," as stated by the Surgeon General (*Public Health Reports*, November-December 1985). Numerous published references that attest to the fact that those methods are ineffective and have resulted in injuries and deaths can be found in the above-mentioned papers as well as in the following: Montgomery, WH: Standards and guidelines for cardiopulmonary resuscitation (CPR) and emergency cardiac care (ECC). *JAMA*, June 6, 1986;225:2905-2989. See references 45, 47, 48, 49, 50, 53 on page 2932.

Should those who initiated or perpetuated back blows and chest thrusts not inform physicians, first aid instructors, and the general public of the ineffectiveness and dangers of those methods, their organizations will lose credibility and millions of Americans who were taught such techniques will continue to endanger the lives of choking victims.

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## Treatment for Choking Infants: Some Controversy Lingers

Regretfully, controversy regarding the treatment of a choking infant appears to have been only partially resolved. Dr. Heimlich was a member of the Panel on Management of Foreign Body Airway Obstruction at the 1985 National Conference. He presented his views and data at the open session and also participated in the discussions which later led to the panel and conference recommendations of abdominal thrusts (Heimlich Maneuvers) for all children above 1 year of age and continuation of back blows and, if these fail, chest thrusts for choking infants under 1 year of age.

The recent recommendations have narrowed past differences. Of great importance was the acceptance that no maneuvers are necessary if the victim can cough, breathe, or speak because the natural cough reflex very adequately resolves most choking episodes spontaneously.

Dr. Heimlich's acceptance of back blows for infants further closes the gap, although we would postulate that back blows contribute to chest rather than subdiaphragmatic compression as a potential additive effect.

The controversy regarding the effectiveness and benefit to risk ratios of chest thrusts has been extensively dealt with in the literature.

The chest in infants and young children is resilient, and injury data indicate a more than adequate ability to handle external force. Chest compression in this age group has been a well accepted part of cardiac resuscitation. However, chest thrusts for choking episodes should not be equated with the prolonged chest compression often used for CPR. There have been no complications reported in children from chest thrusts used to relieve a choking episode. There is concern by pediatricians that abdominal thrusts done too zealously may be harmful to the liver, a concern that I am sure is shared by Dr. Heimlich. Proper techniques must be learned to avoid damage in *any* maneuver.

Little credibility is added to the question of the lack of effectiveness of chest thrusts by Dr. Heimlich's

statements above. There have in fact been both experimental and anecdotal reports of effectiveness (1-4).

The *JAMA* reference "Abdominal Binding During CPR" assesses the effectiveness of chest compression on arterial pressures and does not address airflow dynamics from the trachea. The two references from *Pediatrics* are a letter to the editor and a commentary article—both by Dr. Heimlich.

A great deal of effort has been made in the past 5 years to educate the public regarding the prevention of choking in children from accidental inhalation of foods or small objects. Concomitantly, a campaign has been taking place to teach first aid measures essential for proper evaluation and treatment of choking. The medical and lay literature have widely aired the controversy in treatment recommendations. The results have contributed to a heightened awareness and, happily, a reduction in deaths due to choking in the 0-4-year-old age group—from 600 out of a total 2,900 in 1974 (5) and 600 out of a total 3,100 in 1980 (6), to 300 out of a total of 3,100 in 1984 (7). This record is much superior to results in the elderly where the rates have risen.

There is room for a period of assessment and evaluation of the current recommendations without further recriminations. Dr. Heimlich has made a major contribution that deserves wide acclaim. There is an opportunity now to monitor and evaluate both methods in the young child versus infant age group and assess the data in the future for a need to change recommendations in this fragile age group.

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**References.** .....

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7. Accident facts. 1985 edition, National Safety Council, Chicago.

**Smoking Study Formula  
May Yield Big Errors**

Dr. Waldron's formula for calculating the percentage of the sex mortality differential attributable to smoking at age  $x$  is

$$S_x = 100(1 - \frac{Nx}{Tx})$$

where  $Nx$  is the excess of the male over the female death rate for nonsmokers, and  $Tx$  is the corresponding excess for the total population (*Public Health Reports*, March-April 1986).

$S_x$  is subject to great error, relative to the errors in the death rates themselves, because it depends on  $Nx$  and  $Tx$ , each of which is derived by subtracting two numbers close in value. For example, suppose the death rates at age 40 are as follows:

	<i>Death rates</i>		
	<i>Males</i>	<i>Females</i>	<i>Difference</i>
Nonsmokers	.00255	.00155	.00100
Total population	.00303	.00163	.00140

These data yield a 28.6 percent value for  $S$  when  $x = 40$ . But death rates for nonsmokers often are not determinable to five places of accuracy because of the limited size of studies with data classified by smoking habits. If the nonsmoker rates are determined as shown below, the value of  $S_{40}$  is affected greatly.

	<i>Nonsmoker death rates</i>			
	<i>Males</i>	<i>Females</i>	<i>Difference</i>	<i>S40 (percent)</i>
	.0027	.0014	.0013	7.1
	.0023	.0017	.0006	57.1

Thus a small error in  $Nx$  can lead to a great error in  $S_x$ .

Dr. Waldron points out many difficulties in comparing studies which use different methods. One problem is the classification by smoking habits. Even where studies use identical definitions of "smoker," "former smoker," and "nonsmoker," actual classifications can differ because of the way questions are asked. Not only do individuals tend to underreport their smoking (whether or not they have a financial reason to do so), they also tend to classify former smokers as "nonsmokers." Followup questions must be used to ensure accuracy of the classifications. I believe Dr. Miller's study of Erie County nonsmokers did a very good job of separating the smoking classes.

Because men took up smoking earlier and to a greater degree than women did in this and in other developed countries, inaccuracies of smoking classifications tend to overstate nonsmoker mortality rates for males relative to females.

Dr. Waldron's paper contains much useful information. I believe it is not yet possible to determine precisely the percentage of the sex mortality differential attributable to smoking. Nevertheless, we can conclude with certainty that smoking has a powerful effect on the mortality of both men and women.

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