Comparison of miniaturized pneumatic chest compressor to Thumper®

Sir,

I read with interest the article by Ristagno et al. in which a newly developed miniaturized pneumatic chest compressor (MCC) was compared with a Thumper® for restoring circulation in ten pigs. While I agree with the outcome of the study, I need to point out the authors did not use a “currently marketed Michigan Thumper®” as stated, but instead used a long since discontinued model 1004 that is 37 years old in design. The model 1004 was first introduced to the market in May 1972. It was subsequently replaced by the model 1005 in June 1985. The model 1007 was cleared by the FDA and placed on the market in December 1997. The model 1007 was a major departure from the previous model 1004 and model 1005 in the action of the piston. It delivers a very significant (high energy) impulse chest compression designed to provide increased cardiac output. The effect of this high-impulse mode is illustrated in Betz et al. The protocol used in the Betz study was a compression-to-ventilation ratio of 5:1, but still the hemodynamic differences of high-impulse CPR are apparent. What Ristagno et al. have shown is that the MMC is most comparable to human manual CPR, not CPR as performed by a currently marketed Thumper® using high-impulse technology. In February of this year the most recent model 1008 (Life-Stat™) was cleared by the FDA. The Life-Stat™ has the same high-impulse CPR piston action as in the model 1007. However, the Life-Stat™ uses a microprocessor to coordinate the chest compressions with the built-in ventilator per the 2005 AHA CPR Guidelines (http://www.life-stat.com).

Conflict of interest

Dr. Bruce H. Barkalow is currently the President of Michigan Instruments, Inc., as well as a shareholder and member of the Board of Directors.

References


Bruce H. Barkalow*
Michigan Instruments, Inc., 4717 Talon Court, SE, Grand Rapids, MI 49512, United States
*Tel.: +1 616 554 9696; fax: +1 616 554 3067.
E-mail address: bbarkalow@michiganinstruments.com

Junctional bradycardia due to cathartic—A rare presentation of hypermagnesaemia in emergency department

Sir,

Magnesium oxide is a commonly used cathartic and is rarely associated with symptomatic hypermagnesaemia in clinical practice. The elderly with bowel disorders or renal insufficiency are at particularly high risk. We present a nursing home resident who developed life-threatening bradycardia caused by hypermagnesaemia associated with the long-term use of magnesium oxide as a cathartic. An 81-year-old male with a history of hypertension, diabetes mellitus with nephropathy, as well as previous subdural hemorrhage, cerebral vascular accident with left hemiparesis, and myocardial infarction presented to the emergency department (ED) with bradycardia and hypotension. On arrival, the vital signs were unremarkable except the heart rate was 40 beats/min and the blood pressure was 108/59 mmHg. The electrocardiogram (ECG) revealed a junctional bradycardia with retrograde P waves and an increased Q–T interval (Figure 1). Cardiac enzymes were within the normal range, serum potassium, calcium, creatinine and blood urea nitrogen were 4.8 mmol/l, 8.0, 3.8, and 47 mg/dl, respectively. Junctional bradycardia and hypotension persisted despite the administration of two intravenous doses of atropine 0.5 mg and a continuous infusion of dopamine and dobutamine at a rate of 5–10 μg/kg/min, the patient was admitted at the hospital. At the second assessment, chart review disclosed prescription of magnesium oxide, 500 mg p.o. three times per day, for more than.
3 months as a cathartic. The serum magnesium concentration was 5.0 mg/dl. Intravenous loop diuretics (furosemide, 20 mg) and calcium gluconate (2 g) were immediately administered and a continuous infusion of calcium gluconate (1 g) was given for the following 2 days. The serum magnesium concentration gradually decreased to 3.2 and 2.2 mg/dl on day 6 and day 13, respectively. Subsequent to the normalization of serum magnesium, the patient’s heart rate and blood pressure recovered and renal function returned to baseline.

Hypermagnesaemia is frequently overlooked and many ED physicians are unfamiliar with the side effects of magnesium so the measurement of serum magnesium is not performed routinely in many hospitals. The elderly consume many over-the-counter preparations which contain magnesium oxide. Hypermagnesaemia can occur with excessive magnesium administration, even when the creatinine clearance is >50 ml/min in elderly.

Bradycardia, increased Q–T interval and hypotension can occur in patients with serum magnesium concentrations in the range of 7.2–12 mg/dl. While the peak serum magnesium value in our patient was 5.0 mg/dl, the ECG changes were related to a higher serum magnesium concentration. Only one previous report of junctional bradycardia from fatal hypermagnesemia was found in the literature review. Therefore, this case demonstrates that life-threatening bradyarrhythmias observed on the ECG should prompt the diagnosis and aggressive treatment of hypermagnesaemia despite the related level of serum magnesium. The implantation of a pacemaker can be avoided by recognising hypermagnesaemia-related life-threatening bradyarrhythmias.

In summary, early recognition and treatment of hypermagnesaemia can help to prevent life-threatening bradyarrhythmias and avoid the unnecessary implantation of a pacemaker.

Conflict of interest

None declared.

References


Chien-Yu Yeh
Department of Family Medicine, Taoyuan General Hospital, Department of Health, No. 1492 Chung Shan Road, Taoyuan, Taiwan
Shi-Wei Lee
Tzu-Yi Chuang
Yuh-Shiun Jong
Wen-Jone Chen

Department of Internal Medicine, Taoyuan General Hospital, Department of Health, No. 1492 Chung Shan Road, Taoyuan, Taiwan

Corresponding author. Tel.: +886 3 3699721x2457; fax: +886 3 3795129.
Two-person paediatric resuscitation (basic life support)—Defining the role of the second rescuer

Sir,

The recommendations for paediatric basic life support (BLS) indicate that when there are two or more rescuers with a duty to respond, resuscitation should be undertaken with a compression–ventilation ratio of 15:2. They indicate that one person should give chest compressions while the second person maintains the airway and ventilates the lungs while minimising the pause in compressions. The recommendations do not state whether the second person should attempt to keep the airway open throughout resuscitation or during delivery of breaths only.

Because most cases of cardiac arrest in infants and children are caused primarily by respiratory problems, it is important to ensure adequate delivery of oxygen during resuscitation. The breaths given by rescuers during mouth-to-mouth or mouth-to-barrier device can only deliver breaths with an inspired oxygen concentration of approximately 16–17%. The chest of the infant or child should be compressed to 1/3 to 1/2 of its anterior–posterior diameter. Maintaining patency of the airway during chest compressions should enable some ventilation with atmospheric air (approximately 21% oxygen). We believe that this may improve survival.

Hyperventilation is a concern during cardiopulmonary resuscitation as this may increase intrathoracic pressure thus reducing venous return to heart and decreasing cardiac output. There is also risk of air trapping, barotrauma and regurgitation/aspiration. Any gas exchange achieved by chest compressions while the airway is patent will be passive and will not be associated with these adverse effects.

Taking these points into consideration, we suggest that the role of the second rescuer in two-person paediatric basic life support should be defined more clearly: this individual should keep the airway patent during delivery of chest compressions as well.

Conflict of interest statement

We do not have any conflicts of interest to declare.

Reference


Goneppanavar Umesh∗
Department of Anaesthesiology,
Kasturba Medical College,
Manipal, India

∗Corresponding author.

Introductory adult cardiac life support course for Vietnamese healthcare workers

Sir,

In Vietnam there is no resuscitation council responsible for setting guidelines and establishing training system. In the absence of such an organization an Immediate Cardiac Life Support (ICLS) course, based on the Japanese Guidelines 2005, was conducted for Vietnamese health care workers.

A total of 10 Vietnamese healthcare workers, including 5 doctors and 5 nurses from 4 different hospitals, participated in the ICLS course. It was conducted at the International Medical Center of Japan, which is an affiliated hospital of the Ministry of Health, Labour and Welfare. In total, 18 Japanese trainers and 2 Japanese–Vietnamese translators participated as teaching staff members on the course. The 10 trainees were divided into two groups (A and B). The following special considerations were made in order to facilitate learning: use of posters translated into Vietnamese, speaking slowly to facilitate sequential translation, and modifications to the sequence of basic life support performed in Vietnam because automated external defibrillators are uncommon. The evaluations were carried out using a pre-test and a post-test (comprising the same 20 questions), an objective structured clinical examination (OSCE) comprising a 21-item checklist that was completed twice by each group, and a questionnaire scored on a 5-point scale. Statistical significance was determined using paired t-tests, with P values less than 0.05 considered significant.

Scores achieved in the post-test were a mean of 15% (95% confidence interval of 7–27%) (P = 0.0017) higher than those achieved in the pre-test. Items in the post-test that improved significantly were importance of chest compressions (P = 0.0078), restart timing of chest compression (P = 0.016), and drug dosage (P = 0.016). In group A, 20 (95%) items were achieved after the first OSCE and 21 (100%) were achieved after the second OSCE following a role change. In group B, 21 (100%) and 20 (95%) items were achieved, respectively. Questionnaire responses were collected from 100% of the participants. The participants’ responses demonstrated improvement in the following: confidence in cardiopulmonary resuscitation, recognition of the usefulness of the training in Vietnam, awareness of the importance of team dynamics, interest in being an instructor, and interest in simulation learning.

Posters with attractive illustrations, which are ordinarily used on the ICLS course, were translated from Japanese into Vietnamese. These posters seemed to facilitate...