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To The Editor:

Performance of chest compressions during prehospital transport is an underinvestigated issue. The recent publications by Stone and Thomas on resuscitation in ambulances and helicopters are, therefore, of great importance, and I know of only one report from another author on this subject.[1–4]

Please allow me some constructive criticism and some questions that possibly could be answered by Stone and Thomas in the Forum section of *Prehospital and Disaster Medicine.*

Their study on chest compressions in ambulances does not mention the type of ambulance used, the speed of the moving ambulance, and the success of chest compressions in a standing ambulance. It showed that chest compressions are difficult to perform in a moving ambulance, but does not answer the question of whether the problems are related to the movement, the ambulance design, or both.[1]

An influence of ambulance size and design is quite possible because the same authors showed differences between two types of helicopters.[2] If the ambulance design is the main problem, which could be shown by similar low rates of correct compressions in a standing and a moving ambulance, better ambulances would be an adequate solution. A pressure-sensing device, which was used successfully for two minutes in the "cramped quarters of the BO-105," seems a suboptimal solution because of the high physical demands to the operator.[3]

An influence of speed was shown by Greenslade who reported greater difficulties when driving over 30 mph, but this report is only qualitative and does not mention the type of ambulance used.[4] If the ambulance movement is the main problem, transport in a helicopter, preferably in a MBB BK-117 or something similar, would be a solution.[2] Obviously this is not always possible. A lower speed is another solution that also reduces the risks to the operator who stands in an ambulance driven with warning lights and siren. However, a lower speed prolongs transport, and this could be detrimental for the patient even if it is associated with better quality of chest compressions.

So pneumatic devices are probably the best solution to the problem because they might enable a better quality of chest compressions, allow the operator to be seated, and free the operator for other tasks. Further studies on this subject are needed.

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To the Editor:

The fact that mask ventilation with more than 20 mbar risks gastric insufflation has been known for more than 30 years, but often is forgotten. The publications by Weiler et al and Devitt et al are important because they remind us of a common and dangerous complication that also occurs with the laryngeal mask.[1–3] Weiler et al propose limitation of pressure to 20 mbar during mask ventilation and a reduction in tidal volumes during cardipulmonary resuscitation.[1] We agree to this and want to add some aspects.

There is at least one manufacturer that implements 20 mbar pressure-release valves (that can be switched to 60 mbar for intubated patients) in both automated and manual ventilators (Medumat–®: and Combigag®: Weinmann, Kronsaalasweg, D-22502-Hamburg, Germany).[4–6] These devices are far from perfect, but they are able to prevent gastric insufflation. Their main disadvantage is the lack of a loud audible control of the pressure-release valve as realized in 1959 by Lucas.[7]

Recently, we tested 10 manual ventilators.[8] We did not measure pressures but found that the Weinmann Combibag® limited tidal volumes to 1,100 ml on a Laerdal Recording Resusci® Anne. Use of ventilation bags without pressure-release valves resulted in tidal volumes up to 1,500 ml. It should be noted, however, that 20% of the ventilations with the Combibag® were below 500 ml, and the device got a bad handling assessment. Both problems might be overcome by training and the above-mentioned implementations of an audible control of the pressure-release valve.

Another interesting device in our test was the prototype bellows ventilator Cardiovent® (Kendall, Raffineriestr., D-93333-Neustadt, Germany). The 40-mbar pressure-release valve of the prototype does not prevent gastric insufflation, but the tidal volume can be adjusted in 200-ml steps. It allows controlled tidal volumes of about 500 ml with mask ventilation, as proposed by Weiler et al, and tidal volumes of 800–1,200 ml after intubation with the same ventilator.

A safe manual ventilator should allow adjustment of the tidal volume, like the Cardiovent,® should have a 20/60-mbar valve like the Combibag,® and an audible control of the pressure-release valve. In addition, an ideal manual ventilator should have a built-in manometer and an expiratory volumeter.

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To the Editor:

In Central European countries, the philosophy of prehospital advanced trauma life support by well-trained emergency physicians is preferred. However, our North American colleagues favor a paramedic approach to trauma life support. Among these, colleague opinions vary as to how this should be provided, some preferring the "scoop and run" approach, i.e., rushing a patient to the hospital instead of taking care of vital functions before and during transport, and others recommend the on-site care approach.

Sampalis et al have published results of their study under the titles of "Impact of On-site Care, Prehospital Time and Level of In-hospital Care on Survival in Severely Injured Patients," "Standardized Mortality Ratio Analysis in a Sample of Severely Injured Patients from a Large Canadian City Without Regionalized Trauma Care," in the *Journal of Trauma* in 1992 and 1993, respectively, and now in *Prehospital and Disaster Medicine* (Volume 9, No. 3), titled "Determinants of On-Scene Time in Injured Patients Treated by Physicians at the Site." The authors came to the conclusion that "physician-provided, on-site advanced life support causes a significant increase in scene time and total prehospital time. These 'delays' are associated with an increased risk for death in patients with severe injuries."

For Central European purposes, these and a number of other studies are of critical importance. Due to the current financial crisis experienced by health-care systems throughout Europe, quite a few politicians favor abolishing an advanced physician-guided prehospital trauma and emergency-care system and instituting the approach currently used in the United Kingdom and the United States Yet, physicians in these countries increasingly seem to lean toward a physician-guided prehospital system.

Unfortunately, "the data from which we are left to draw conclusions are taken from a widely varied and heterogeneous population with mixed cases of blunt and penetrating trauma and a widely differing injury severity between studies" and are "mostly based on poor statistical analyses and without a prospective controlled and randomized approach."[1]

The study performed by Sampalis et al shows a number of weaknesses, to which Jones referred to as early as 1991:

Population Samples:

First, the authors assessed the records of:

a) 4,722 patients who were treated by physicians at the scene in Montreal;
b) 1,477 patients where a physician was required by the central dispatching agency but was not available;
c) A third sample of 977 patients treated by emergency medical technicians where a physician was neither required nor available; and
d) An initial group of 4,722 patients where 312 were excluded because they died at the scene or during transport and 1,117 patients as they were not hospitalized. Of the remaining 3,293 patients, 2,956 additional patients were excluded because they only had minor trauma. The final number of major trauma cases treated by physicians at the scene and during transport, therefore, stands at 337.

The 337 patients were compared with a sample of 10% (287) of those patients who would have needed primary care by a physician (according to what criteria?), but where a physician was not available at the scene as well as to 13% (304) of the sample of emergency medical technician treated trauma cases.

Of the patients from groups I and II, 415 fulfilled the criteria:

- Alive at the scene
- A prehospital index of >3
- Transported to a hospital
- Admitted to a hospital
- Received surgery and care in the intensive care unit

Out of these 415, 30 patients were excluded because they died and another 30 because no records were available. A total number of 355 patients with severe trauma finally entirely met the outlined criteria.

Standard of Care

Standard No. 1 included prehospital advanced trauma life support or better, i.e., at least *one* of the following measures—intubation, medication, intravenous fluids, or pneumatic anti-shock garment (thus, only fluids