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A New Device Increases the Hazards of Methylmethacrylate Bone Cement

To the Editor:—The purpose of this letter is to reemphasize that methylmethacrylate bone cement can cause serious hypotension, and to alert the reader to the presence of a new device being promoted to inject raw cement under pressure.

A recent case involved the insertion of a long-stemmed metal hip prosthesis for a femoral fracture. The procedure, done with N₂O and enflurane as the primary anesthetic agents, proceeded uneventfully for 35 min. Then, methylmethacrylate which had been mixed for only 2 min was injected under pressure into the femoral shaft, and the prosthesis was forced into place. Within a few minutes the patient's blood pressure, being monitored by an intraarterial cannula, fell precipitously to zero. The patient had complete cardiac electromechanical dissociation, with an unchanged ECG and a flat pulse wave. The patient was turned to her back, and standard resuscitation methods were applied. Following the intravenous injection of sodium bicarbonate, epinephrine, and calcium gluceptate (and with continued cardiopulmonary resuscitation), cardiac mechanical activity was suddenly reestablished. The blood pressure went from zero to 350/150 torr, and the pulse rate from zero to approximately 200 beats/min. These abnormalities were brought under control by the use of propranolol and nitroprusside. The patient made an uneventful recovery.

Beginning in the early 1970s, and continuing to the present, reports and studies¹⁻³ of hypotension and myocardial depression resulting from the introduction of the bone cement methylmethacrylate have been published. It has been the consensus that the major offender as a causative agent is the monomer or liquid component.

The liquid and powder components are mixed and kneaded, during which the monomer becomes transformed into polymer, with the reaction fairly well complete after 8 to 10 min. A new technique has recently been introduced in which the liquid and powder components are mixed for only 1½ to 2 min, then injected under pressure into the femoral shaft. The injection device (Exeter Cement Gun by Howmedica) is, in essence, an expensive caulking gun with a long nozzle. The result is the introduction of a large quantity of monomeric methylmethacrylate into a closed space.

As in the case described above, and in other cases not so dramatic, we are finding significant reductions in blood pressure when the raw cement is injected. Perhaps this is a spurious association, but it represents a potential problem that must be watched closely.

We would be interested in learning of the experiences of others with this injection method.

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Hypertension Following Nitroprusside and Hepatic Blood Flow

To the Editor:—The letter of Ward *et al.*¹ contains some attractive ideas. Certainly there are enough data indicating that hepatic arterial blood flow (HABF) autoregulation exists,^{2,3} and indeed the HABF might very well be increased during sodium nitroprusside infusion.⁴ Therefore, it is difficult to believe that the increased half-life of plasma renin activity in patients

of Khambatta *et al.*⁵ was related to a decrease in HABF. However, Khambatta *et al.* speculate that "hepatic blood flow may be decreased during hypotensive anesthesia" and this could lead to an increase in the half-life of plasma renin activity.⁵ The inactivation of renin is related to *total* hepatic blood flow, not to HABF only. There is enough evidence