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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 N<sub>2</sub>O 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 studies<sup>1-3</sup> 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.*<sup>1</sup> contains some attractive ideas. Certainly there are enough data indicating that hepatic arterial blood flow (HABF) autoregulation exists,<sup>2,3</sup> and indeed the HABF might very well be increased during sodium nitroprusside infusion.<sup>4</sup> Therefore, it is difficult to believe that the increased half-life of plasma renin activity in patients

of Khambatta *et al.*<sup>5</sup> 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.<sup>5</sup> The inactivation of renin is related to *total* hepatic blood flow, not to HABF only. There is enough evidence

that portal blood flow and total hepatic blood flow are decreased during sodium nitroprusside-induced hypotension. The observed concomitant increase in HABF provides adequate oxygenation, but is not adequate to restore the total hepatic blood flow to base-line levels.<sup>4</sup>

The second point of the letter of Ward *et al.*<sup>1</sup> is related to the influence of halothane on HABF. The authors state that HABF has been found to be decreased in man.<sup>6,7</sup> In these studies, HABF was not actually measured; the impression of diminished HABF was obtained from angiographic pictures of four patients only—three children and one adult.<sup>6,7</sup> However, other data showed that HABF autoregulation was preserved and HABF was increased during halothane anesthesia.<sup>8,9</sup> Thus, we can speculate that total hepatic blood flow was decreased (leading to an increase in the half-life plasma renin activity) in the patients described by Khambatta *et al.*,<sup>5</sup> but any conclusion related to changes in HABF during sodium nitroprusside infusion and halothane anesthesia cannot be justified at present.

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## Thoracoscopy for Retrieval of Intrathoracic Foreign Bodies

*To the Editor:*—Double-lumen endobronchial tubes can be used for selective bronchspirometry and pulmonary toilet, to prevent spread of blood or infective material, to improve life-threatening ventilation-perfusion inequality, or to provide a selectively collapsed lung in order to facilitate operation. We have found intubation of the trachea with a double-lumen tube useful to aid in recovery of intrathoracic foreign bodies.

#### REPORT OF A CASE

A patient had a three-day history of pleuritic chest pain. Radiogram of the chest revealed a right pleural effusion; thoracentesis was performed using fluoroscopy with commercially available catheter-inside-needle equipment. A small amount of serosanguinous fluid was obtained. During removal of the thoracentesis catheter, a 6-inch segment was sheared off in the right pleural space. The thoracic surgery service was consulted. In the operating

room following induction of anesthesia, the trachea was intubated with a 37-mm, disposable left endobronchial tube.\* Correct placement was verified by auscultation. A 3-cm incision was made in the midaxillary line of the seventh right intercostal space and the pleura was entered with a trochar. The right lung was then selectively collapsed by ventilating only the left lung through the endobronchial lumen and opening the tracheal lumen to air. A Storz thoracoscope was inserted into the pleural space. The catheter fragment was immediately visualized using a 30° lens and removed with pleural biopsy forceps. Analysis of arterial blood showed that blood-gas values were satisfactory while the right lung was deflated. Total operative time was 20 min, with the right lung deflated for 15 min. The patient tolerated the procedure well, and the trachea was extubated in the operating room. There was no post-operative complication.

At our institution, thoracoscopy instead of thoracotomy is the procedure of choice for diagnosis of

\* Broncho-Cath, National Catheter Company, Argyle, New York 12809.