other hand, measurements of arterial plasma concentrations of nitroglycerin and its metabolites failed to detect significant pharmacokinetic differences between elderly and young patients. The authors thereby hypothesized that an age-related difference in the effect of nitroglycerin at the active site was likely. Furthermore, they were forced to speculate that a markedly decreased circulatory compensation might be responsible for the reductions in cardiac output and blood pressure if there was a decreased venous distensibility in elderly patients. Unfortunately, they did not provide the complete hemodynamic data, particularly cardiac output and systemic vascular resistance, following nitroglycerin administration for comparison. Other than the already well known vasodilating effect of nitroglycerin, it would be interesting to know if myocardial contractility was decreased. If there was, did it have a greater effect on the elderly heart? So far, the effect of nitroglycerin on myocardial contractility has not been well defined or characterized.  

Recently, we conducted studies to investigate the direct effects of nitroglycerin on myocardial contractility in rabbits. 1,3 We used myocardial septa and perfused them with nitroglycerin through the first septal perforator of the left coronary artery in different concentrations. The results showed that nitroglycerin infusions caused a significant dose-related depression of inotropic activity in rabbit myocardium that differed from that of nitroprusside (Fig. 1). Of course, we cannot extrapolate our data directly to humans. However, since the relationship between age and relaxation of vascular smooth muscle is still controversial, 26 it would have been helpful had they studied the effects of nitroprusside in addition to those of nitroglycerin.

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References


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In Reply—As Lee and colleagues correctly note, we were unable to definitively determine the cause of our patients' blood pressure responses to nitroglycerin, because we were unwilling to place invasive monitors that were not required for clinical care.

Lee and colleagues propose a cause for nitroglycerin's blood pressure effects we had not seriously considered, namely, myocardial depression. In their letter, they provide us with data demonstrating a dose-dependent effect of nitroglycerin on peak developed tension (PDT) and the maximal acceleration of tension (dT/dt).

However, we question the relevance of their findings to ours for...
two reasons. First, the vast majority of the arterial concentrations we measured were in the range of 10-30 ng/ml, concentrations that are less than one tenth that (about 0.5 µg/ml) at which Lee and colleagues began to detect decreases in PDT and dT/dt. Unfortunately, table 5 in our manuscript, which provides our concentration data, does not state the units we used. We apologize for this error of omission. (Please note in our appendix that our calibration points for nitroglycerin were 0.1-15 ng/ml.) Second, Higuchi and Sakamaki recently found in the open-chested dog model that nitroglycerin augments myocardial contractile force probably by causing a release of endogenous catecholamines.

Therefore, we conclude that myocardial depression was not a likely contributor to the blood pressure decreases we noted after administration of nitroglycerin to our patients. Again, we thank Lee and colleagues for their interest in our work and for the chance their letter has provided us to clarify the units we used in reporting arterial concentrations of nitroglycerin.

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Regional Anesthesia for Arteriovenous Fistula

To the Editor—A recent case report provided a new approach for regional anesthesia for arteriovenous fistula creation. The authors described a technique of blocking the musculocutaneous nerve in the body of the proximal coracobrachialis muscle and the medial antebrachial cutaneous nerve by a subcutaneous ring proximal to the elbow.

This letter presents a refinement of their technique. The sensory fibers of the musculocutaneous nerve that form the lateral cutaneous nerve of the forearm can be anesthetized easily by a subcutaneous injection of 5 ml of local anesthetic solution just lateral to the biceps tendon at the level of the intercondylar line in the antebrachial fossa. Advantages of blockade of the fibers at this level include the ease in locating the anatomic landmarks leading to a high rate of success anesthetizing the nerve, as well as less pain involved with a subcutaneous compared to an intramuscular injection. Both the lateral and medial cutaneous nerve blocks at the elbow can be supplemented easily by the surgeons in the operative field if the duration of the original local anesthetic is inadequate.

This modification of the technique for regional anesthesia for placement of arteriovenous fistulas has been used successfully at our institution without complications. The only disadvantage arises in the lack of blockade of the sympathetic fibers innervating the vasculature that may lead to discomfort with vessel manipulation.

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