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Cost analysis of diltiazem and nitroglycerin for the prevention of coronary bypass conduit spasm

Prabashni Reddy, C. Michael White and Jessica Song
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paper, the rate of preoperative aspirin use has increased from 58% to 80%. In the last 13,350 patients undergoing isolated coronary artery bypass grafting, preoperative aspirin use continues to show a protective effect, with a 28% decrease in mortality compared with patients who do not receive it (odds ratio, 0.78; 95% confidence interval, 0.61-0.99, adjusted for age, sex, reoperation, number of diseased vessels, ejection fraction, comorbidities, and priority of operation). Despite the increased use of preoperative aspirin, we have also seen a decline in the reexploration rate for hemorrhage, currently 2.1%.

We agree that all patients who are about to undergo bypass grafting can quickly and unpredictably turn from seemingly stable to acutely ischemic. Inasmuch as aspirin is known to decrease the incidence of myocardial ischemic events, discontinuing it in patients with known critical coronary stenosis before operation may indeed contribute to preoperative or intraoperative instability. Adequate proof of a beneficial effect of preoperative aspirin from a randomized controlled trial will require a large study. In the meantime, there is strong observational evidence to suggest that preoperative aspirin is safe and effective for patients undergoing coronary operations.

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Cost Analysis of Diltiazem and Nitroglycerin for the Prevention of Coronary Bypass Conduit Spasm To the Editor:

We read with interest the recently published study by Dr Shapira and associates [1] in which nitroglycerin was found to be as effective but safer and less expensive than diltiazem in preventing coronary artery bypass conduit spasm. Of particular note were the reported doses and cost analysis.

In their study, Dr Shapira and associates [1] gave a loading dose of diltiazem 0.1 mg/kg followed by a continuous infusion of 0.1 mg/kg/min, or gave 0.1 μ g/kg/min of nitroglycerin for 24 hours. Oral diltiazem and nitroglycerin were then commenced on the first postoperative day and continued for 6 months; the actual doses used in the study were not reported [1]. The authors then compared the cost of diltiazem to nitroglycerin using actual hospital pharmacy costs.

The maximum infusion rate recommended by Baxter Healthcare Corporation [2] (the manufacturers of the brand of intravenous diltiazem used in the study) is 15 mg/h or \approx 0.004 mg/kg/min for a 70-kg patient, less than 25 times the dose used in the study [1]. In addition, their dose is 100-fold greater than the 0.001 mg/kg/min employed in a prior evaluation of the use of radial arteries in coronary artery bypass graft surgery, which was followed by oral diltiazem up to a maximum dose of 240 mg per day [3]. Moreover, the intravenous dose in this latter study was later reduced by 50% to 75% due to a 32% incidence of adverse events.

We estimated costs utilizing the 2000 Advertised Wholesale Price (AWP) [4], which is typically higher than the cost negotiated by hospital pharmacies. The cost of the 24-hour intravenous regimen of diltiazem, according to our estimates and using the maximum recommended loading dose of 25 mg plus 15 mg/h for 24 hours [2], was \$77 compared with the \$3,312 reported by

Shapira and colleagues [1]. Similarly, we found that a 24-hour infusion at 0.1 μ g/kg/min of nitroglycerin, based on a 70-kg patient, cost \$9 compared with \$340 [1] recorded in their study. We estimated the 6-month cost of the oral medication using the maximum recommended doses in our calculations [5, 6]. A 6-month supply of Cardizem CD (Hoechst Marion Roussel, Inc, Strasbourg, France) 540 mg daily was calculated to be \$787 versus the substantially higher reported cost of \$13,340. We found that a 6-month supply of Imdur (Key Pharmaceuticals, Schering-Plough, Kenilworth, NJ) 240 mg daily [6] cost \$724, which is similar to the observed cost of \$756 [1]. Thus, Shapira and associates [1] found the total cost of the diltiazem regimen to be \$16,652 compared with \$1,096 for the nitroglycerin regimen, a difference of \$15,556. In contrast, we found that the total cost of diltiazem was \$864 versus \$733 for nitroglycerin, a difference of only \$131.

Based on our estimates, it appears that diltiazem is, indeed, more expensive than nitroglycerin, although the cost difference is considerably less than the 16-fold difference stated by the authors [1].

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Reply To the Editor:

We thank Dr Reddy and her colleagues for their comments on our cost analysis of the use of diltiazem versus nitroglycerin for prevention of coronary bypass conduit spasm [1]. Doctor Reddy and colleagues are correct with respect to the IV dose of diltiazem. The dose of continuous IV diltiazem infusion used in the study was 0.1/kg/hour, not per minute, as was mistakenly published. This is well within the recommended dose range [2, 3]. The daily oral dose of each drug was derived from the total amount of drug given intravenously over the first 24 hours.

The cost analysis in the manuscript was based on the following data, as supplied to us by the Boston University Medical Center pharmacy, reflecting 1998 cost/charge:

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