Preoperative Continuation of Aspirin Therapy May Improve Perioperative Saphenous Venous Graft Patency After Off-Pump Coronary Artery Bypass Grafting

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Background. **There is limited information about the effect of preoperative continuation of aspirin therapy on perioperative graft patency in patients undergoing off-pump coronary artery bypass (OPCAB). We sought to evaluate the effect of preoperative continuation of aspirin therapy on perioperative graft patency after OPCAB.**

Methods. **Using retrospectively collected data from 582 consecutive patients undergoing first-time isolated OPCAB by a single surgeon at Fuwai Hospital from October 2009 through September 2012, we evaluated the association between aspirin (100 mg daily) preceding OPCAB and the risk of adverse in-hospital postoperative events. The primary outcomes were in-hospital mortality and graft patency. The secondary outcome measures were hemorrhage-related outcomes (reexploration rate, blood transfusions, perioperative drainage loss).**

Results. **There was no death in the postoperative hospitalization period. Patients receiving preoperative continuation of aspirin therapy (n = 400) had significantly higher postoperative saphenous venous graft patency than did those not receiving preoperative aspirin [98.2% vs 96.1%, $p = 0.02$]. Multivariate analysis indicated that preoperative discontinuation of aspirin therapy significantly increased the risk of occlusion of saphenous venous graft (odds ratio, 2.193; 95% confidence interval, 1.023 to 4.701, $p = 0.043$). No significant differences between the two groups were observed in perioperative bleeding risks, including chest tube drainage, blood product transfusion, and reoperation for bleeding.**

Conclusions. **This study indicates that preoperative continuation of aspirin therapy may improve perioperative saphenous vein graft patency after OPCAB without increasing the risk of perioperative bleeding.**

(Ann Thorac Surg 2014;■:■–■)

In 2010, the European Society of Cardiology and the European Association for Cardio-Thoracic Surgery recommended that preoperative aspirin should not be stopped [1], and in 2011, the American College of Cardiology Foundation and the American Heart Association guideline for coronary artery bypass grafting (CABG) recommended that aspirin (100 to 325 mg daily) should be administered to CABG patients preoperatively [2]. Some well-conducted studies have shown that aspirin use before coronary artery bypass procedures is safe without an associated increase in hemorrhage-related risks and could reduce in-hospital mortality [3–5]. The relationship of aspirin to graft patency after conventional CAB has been studied extensively at both the clinical and the pathophysiologic levels, and it is generally accepted as established fact that aspirin therapy increases graft patency [6–10]; however, few published data have evaluated the effect of preoperative continuation of aspirin therapy on perioperative graft patency after off-pump coronary artery bypass (OPCAB). OPCAB has offered a promising alternative strategy that had the potential to decrease perioperative morbidity, mortality, and cost by eliminating cardiopulmonary bypass, but there is growing concern that OPCAB is associated with reduced graft patency. Platelet inhibition with aspirin has been shown to reduce the rates of acute and subacute bypass graft occlusion. To evaluate the potential effects of preoperative continuation of aspirin therapy in patients undergoing OPCAB, we performed this retrospective cohort analysis evaluating the association between aspirin therapy preceding coronary bypass procedures and perioperative postoperative outcomes.

Accepted for publication July 30, 2014.

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Material and Methods

Study Design

This study was a retrospective cohort study including 582 consecutive patients who underwent first-time isolated

Published by Elsevier

0003-4975/$36.00
http://dx.doi.org/10.1016/j.athoracsur.2014.07.074

OPCAB by a single surgeon at Fuwai Hospital from October 2009 through September 2012. Patients were classified to either of two groups depending on whether or not they had continued aspirin (100 mg daily) therapy preceding OPCAB. Patients who received preoperative continuation of aspirin (100 mg/day) were classified to the CA group, and patients who discontinued aspirin at least 5 days before the operation were classified to the DA group. We evaluated the association between preoperative aspirin therapy before OPCAB and prespecified a priori postoperative outcomes. This study was approved by the local ethics committees. All of the patients had previously granted permission for use of their medical records for research purposes.

Study Data

Data used in this analysis were retrieved from our database. This database prospectively collects a comprehensive list of prespecified data points in all of the consecutive patients undergoing OPCAB by a single surgeon at our institution, including demographic, clinical and outcome data.

Outcome Measures

The entire outcome measures used in this analysis were prespecified. We prespecified the all-cause in-hospital mortality and graft patency after OPCAB as the primary outcome measure. The prespecified secondary outcomes included reoperation for bleeding, perioperative drainage loss, and receipt of postoperative blood product transfusion.

Surgical Procedures

All surgical procedures were performed by a single experienced cardiac surgeon (SHS), who had performed more than 3500 OPCAB procedures. A standard anesthetic protocol was used throughout the study. All patients underwent a standard median sternotomy. The internal mammary artery (left or right) and the saphenous vein were removed under direct vision. Whenever possible, single-vein grafts were used for patients with one distal anastomosis. When sequential grafts were used, the number of anastomotic sites per graft was two. No circular sequential grafts were used. All the anastomoses were created by hand. The Octopus Evolution Tissue Stabilizer (Medtronic, Inc, Minneapolis, MN) was used for each patient to stabilize the coronary target. After completion of the anastomoses, each bypass graft was assessed with transit-time flow measurement (Medi-stim Butterfly flowmeter, Medi-stim AS, Oslo, Norway), and the mean flow values and pulsatile index were obtained.

Periprocedural Pharmacologic Protocol

The protocol for heparin sodium administration consisted of a half dose of 150 IU/kg before division of the internal mammary artery and supplemental doses of 3000 units every 30 minutes until the last anastomoses were completed. The objective was to obtain an activated clotting time greater than 300 seconds. Heparin was reversed by administering two thirds dose of protamine (0.75 mg protamine/100 IU heparin) after completion of the last anastomosis. Intravenous tranexamic acid (2.5 g) was routinely applied during the procedure. All patients were routinely given aspirin 100 mg daily postoperatively, with the first dose of aspirin (100 mg) being administrated on the day of operation.

Graft Patency by 64-Slice Multislice Computed Tomographic Angiography

A total of 582 patients were scheduled for systematic multislice computed tomographic angiography (MSCTA) an average of 5 days after operation. The procedure was undertaken with a 64-slice MSCTA scanner (GE Healthcare, Milwaukee, WI). The images were transferred to a stand-alone workstation (Deep Blue, ADW4.3, GE Healthcare) and evaluated with dedicated analysis software. The results of the scans were independently interpreted by two cardiovascular radiologists. Each graft was classified as patent (flow visible), occluded, or not

Table 1. Demographic and Clinical Characteristics of 582 Consecutive Patients Undergoing Off-Pump Coronary Bypass

Characteristic	CA Group (n = 400)	DA Group (n = 182)	*p* Value
Age, y	61.07 ± 9.69	62.46 ± 8.62	0.10
Male gender, n (%)	315 (78.8)	142 (78.0)	0.84
Body mass index, kg/m^2	25.54 ± 2.90	25.09 ± 2.89	0.09
Left main disease	149 (37.3)	70 (38.5)	0.78
Triple vessels disease	342 (85.5)	161 (88.5)	0.33
Creatinine level, μmol/L	82.61 ± 18.52	84.04 ± 19.01	0.40
Preoperative LVEF	60.28 ± 9.27	59.52 ± 9.83	0.37
Hypertension	272 (68.0)	128 (70.3)	0.57
Diabetes	147 (36.8)	67 (36.8)	0.99
Hyperlipidemia	235 (58.8)	113 (62.1)	0.45
History of smoking	213 (53.3)	94 (51.6)	0.72
Family history	60 (15.0)	22 (12.1)	0.35
OMI	141 (35.3)	61 (33.5)	0.68

CA = continued aspirin therapy; DA = discontinued aspirin therapy; LVEF = left ventricular ejection fraction; OMI = old myocardial infarction.