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Original article

Cardiovascular and bleeding risk of non-cardiac surgery in patients on antiplatelet therapy

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ABSTRACT

Background: The perioperative risk of non-cardiac surgery (NCS) in the patients on antiplatelet therapy after percutaneous coronary intervention (PCI) remains unclear.
Methods: This study was a retrospective and single center study. Between January 2008 and December 2011, 198 patients who had already received PCI underwent NCS in our hospital. Among them, 63 patients underwent surgery on dual antiplatelet therapy (DAPT group) and 88 patients on single antiplatelet therapy (SAPT group). We compared bleeding events and cardiovascular events during perioperative period between the two groups.
Results: There was no stent thrombosis in either group. The bleeding events in the DAPT group were significantly higher than that in the SAPT group (9.5% vs 2.3%, $p = 0.049$). There was no difference in events between with or without heparin-bridge in the SAPT group.
Conclusions: The frequency of bleeding events was higher in the DAPT group. Both bleeding and cardiovascular events with aspirin alone were low in our study. It may be safe to undergo NCS with SAPT after PCI.

Introduction

Antiplatelet therapy (APT) plays a central role in the treatment of patients receiving stent deployment [1]. The most important stent thrombosis (ST) predictor is premature discontinuation of dual antiplatelet therapy (DAPT) [2,3]. Apart from non-compliance, the most common reason for early discontinuation of either DAPT or single antiplatelet therapy (SAPT) is the need for non-cardiac surgery (NCS), accounting for one-third of cases [3].

According to current American College of Cardiology/American Heart Association (ACC/AHA) guidelines, approximately two-thirds of all NCS procedures in the first year after index percutaneous coronary intervention (PCI) are classified as moderate to high risk for major adverse cardiac events (MACE) [4–6]. MACE, particularly ST, is a concern after discontinuation of APT; however, its continuation is associated with bleeding risk. The perioperative management of APT remains controversial because there is limited amount of evidence to suggest what strategies are effective in preventing bleeding or cardiovascular events.

In this study, we investigated NCS outcomes in patients who had received either bare-metal stents (BMS) or drug-eluting stents (DES), comparing between DAPT and SAPT.

Methods

Study patients

The present study included 198 patients who had undergone NCS after successful PCI between January 2008 and December 2011, and the data were retrospectively analyzed. The local ethics committee approved this study. All patients had already undergone PCI with either BMS or DES. The treating physician determined the type of stent used at the PCI procedure. Patients with a BMS were prescribed aspirin (100 mg/day) and thyenopyridine (ticropidin 200 mg/day or clopidogrel 75 mg/day) for 30 days. Patients with a DES usually were prescribed aspirin and thienopyridine clopidogrel for 6 months or longer, at the discretion of the treating physician. NCS were performed after stent deployment during

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328 ± 290 days. If the patients took DAPT before surgery in SAPT group, only thyenopyridine was discontinued 5–14 days before surgery.

Inclusion criteria

The inclusion criteria were (1) patients who underwent NCS after stent deployment and (2) patients who received DES or BMS. NCS was defined as surgical procedure in the operation room and required local or general anesthesia (abdominal, aortic, urologic, etc.). The type of DES included both first-generation (sirolimus-eluting stent and paclitaxel-eluting stent) and second-generation (zotarolimus-eluting stent, everolimus-eluting stent, and biolimus-eluting stent).

Exclusion criteria

The exclusion criteria were the patients who underwent body surface surgery (ophthalmology and dermatology), and patients who did not require hospitalization. We excluded the patients who received only balloon angioplasty or aspiration.

Event definitions

The perioperative complications were defined as the occurrence of MACE and bleeding in hospital. Any perioperative myocardial infarction (MI) and ST was considered as MACE. ST was defined according to the Academic Research Consortium definition [7]. Bleeding complications were categorized as major and minor bleeding as previously reported [8]. In brief, major bleeding was defined as bleeding requiring transfusion, intracranial bleeding, clinical overt signs of hemorrhage associated with a drop in hemoglobin of 5 g/dl, and fatal bleeding that resulted directly in death in 7 days. Minor bleeding was defined as clinically overt bleeding resulting in hemoglobin drop of 3–5 g/dl [8].

Statistics

Descriptive results were expressed as frequency and percentage for categorical variables, and they were compared using the chi square test (or Fisher exact test for small samples). For continuous variables, statistics were expressed as mean ± SD and were analyzed using Student's *t*-test. Statistical analyses were performed using StatView (SAS Institute Inc., Cary, NC, USA).

Results

A total of 1794 patients underwent stent deployment in our institution between January 1st, 2008 and December 31st, 2011. Among them, 198 patients also underwent NCS; the DAPT group included 63 patients and the SAPT group included 88 patients (Fig. 1). Mean age was 69.4 ± 8.3 years in the DAPT group and 70.3 ± 8.7 years in the SAPT group, and 70.4 ± 7.8 years overall (p = ns) (Table 1). The number of DES implantations was 53 (84.1%) in the DAPT group and 54 (61.3%) in the SAPT group. Patients taking anti-coagulants were 15.9% in the DAPT group and 11.4% in the SAPT group (Table 2). Aortic surgery and abdominal surgery were performed more frequently in the SAPT group, while peripheral vascular surgery and urologic surgery were more frequently seen in the DAPT group (Table 3). The frequency of bleeding was significantly higher in the DAPT group (9.5%) compared with the SAPT group (2.3%, p = 0.049). Two patients who suffered bleeding during operation in the SAPT group did not use heparin-bridge in the perioperative period. Of these two patients, blood transfusion was required in one patient, and re-operation was required in the other (Tables 4 and 5). Seven out of eight patients who had bleeding events were patients who received DES. No patient died from bleeding (Table 6). No patient experienced ST in either group during the observational period. NCS after stent deployment was performed during 328 ± 290 days.

Discussion

The present study showed that the risk of bleeding during the perioperative period was significantly higher in the DAPT group. There was no difference in risk between with or without heparin-bridge in the SAPT group.

Current guidelines of the European Society of Cardiology or ACC/AHA provide information on how to manage cardiovascular risk during the non-cardiac perioperative period [6,9]. Given the lack of prospective randomized clinical trials, recommendations are mostly dependent on experts' opinions and retrospective studies.

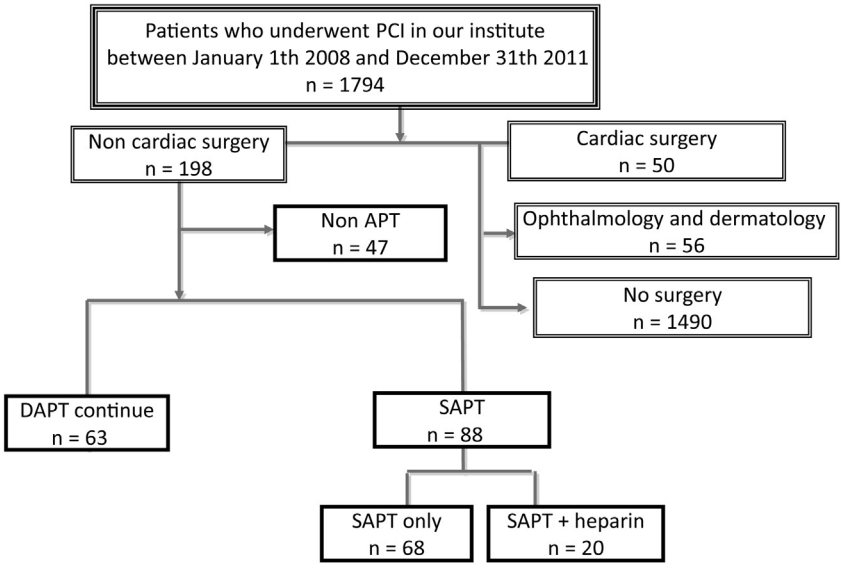

Fig. 1. The flowchart of this study. APT, antiplatelet therapy; DAPT, dual antiplatelet therapy; SAPT, single antiplatelet therapy.