"Bringing on the light" in a complex clinical scenario: Optical coherence tomography–guided discontinuation of antiplatelet therapy in cancer patients with coronary artery disease (PROTECT-OCT registry)

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Background Cancer patients with recently placed drug-eluting stents (DESs) often require premature dual antiplatelet therapy (DAPT) discontinuation for cancer-related procedures. Optical coherence tomography (OCT) can identify risk factors for stent thrombosis such as stent malapposition, incomplete strut coverage and in-stent restenosis and may help guide discontinuation of DAPT.

Methods We conducted a single-center prospective study in cancer patients with recently placed (1-12 months) DES who required premature DAPT discontinuation. Patients were evaluated with diagnostic coronary angiogram and OCT. Individuals with appropriate stent strut coverage, expansion, apposition, and absence of in-stent restenosis or intraluminal masses were considered low risk and transiently discontinued DAPT to allow optimal cancer therapy. Patients who did not meet all these criteria were considered high risk and underwent further endovascular treatment when appropriate and bridging with low-molecular weight heparin. The incidence of adverse cardiovascular events was assessed after the procedure and at 12 months.

Results A total of 40 patients were included. Twenty-seven patients (68%) were considered low risk by OCT criteria and DAPT was transiently discontinued. Thirteen patients (32%) were considered high risk with one or more OCT findings: uncovered stent struts (4 patients, 10%); stent underexpansion (3 patients, 8%); malapposition (8 patients, 20%); in-stent restenosis (2 patients, 5%). The high-risk patients with uncovered stent struts and malapposition underwent additional stent dilatation. There were no cardiovascular events in the low-risk group. One myocardial infarction occurred in the high-risk group. Fourteen non-cardiac deaths were registered before 12 months due to cancer progression or cancer therapy.

Conclusion OCT imaging allows identification of low-risk cancer patients with DES placed who may safely discontinue DAPT and proceed with cancer-related surgery or procedures. (Am Heart J 2017;194:83-91.)

Approximately 5% of patients with drug-eluting stents (DES) will require a non-cardiac surgical procedure within 12 months after stent implantation.[1,2] Recent guidelines recommend a shorter duration of dual antiplatelet therapy (DAPT) for only six months with newer generation DES outside a setting of acute coronary syndrome.[3] DAPT can now be discontinued as early as 3 months after stent placement in cases of emergent surgery. However, patients with newly diagnosed or existing cancer may need premature DAPT discontinuation for unpredicted diagnostic biopsies, surgery or initiation of cancer therapy. Moreover, cancer is a prothrombotic state which increases the risk of stent thrombosis in such patients.[4] Thus, the optimal duration of DAPT in patients with cancer and recently placed coronary stents during the periprocedural period is unclear. The management of cancer patients with recent stent placement requiring urgent DAPT discontinuation remains largely empirical.

Incomplete endothelial stent coverage is associated with late stent thrombosis, with increasing risk based on

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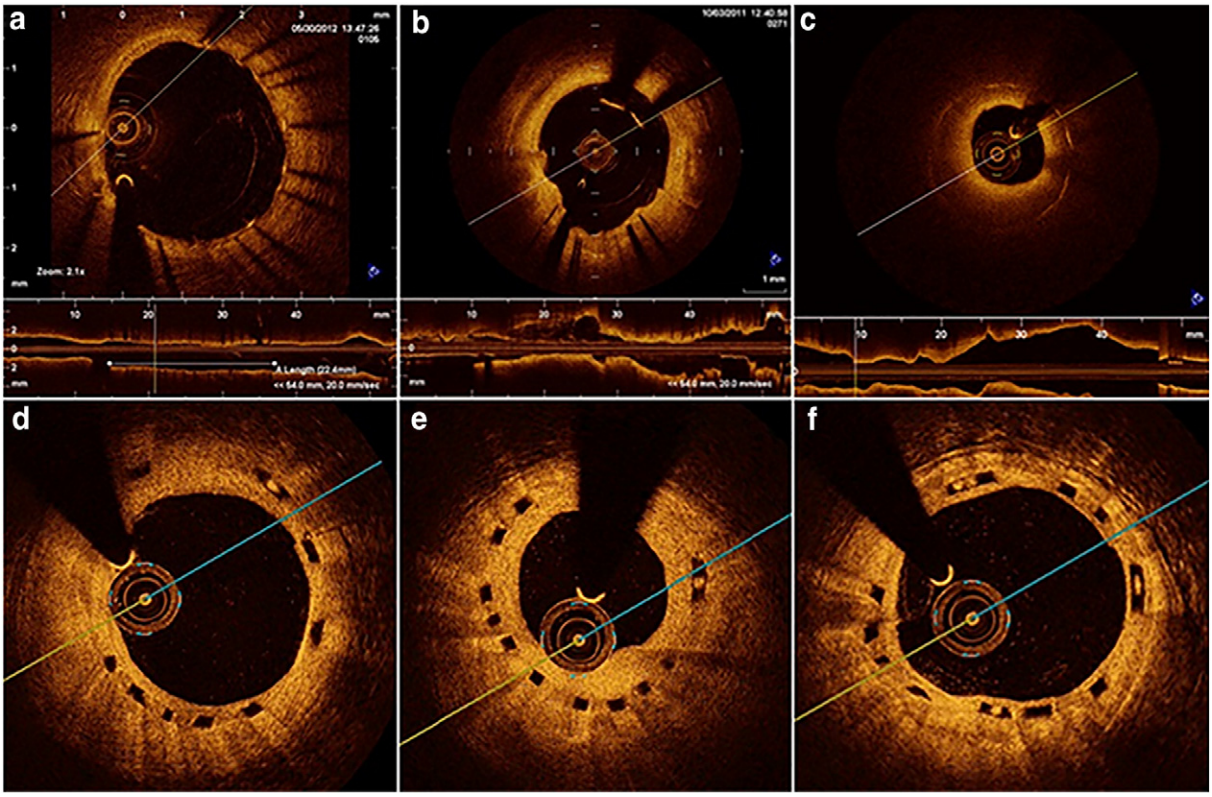
Figure 1



Example of OCT in a second-generation DES one month after stent implantation showing low risk of thrombosis (a). Incomplete stent apposition and coverage of a stent in the proximal right coronary artery (b). In-stent restenosis (c).

the number of uncovered stent struts.[5,6] Stent under expansion and residual stenosis are also responsible for early stent thrombosis post implantation. Optical coherence tomography (OCT) offers a unique axial resolution of 10–15 μm of the stented coronary segments. Stent strut underexpansion, and residual stenosis are clearly visualized using OCT.[7-9] Recent OCT studies have assessed the risk of early DAPT discontinuation in the general population.[10-13]

We hypothesize that in cancer patients with recently placed DES (1–12 months), who require P2Y12 inhibitor discontinuation for cancer-related procedures, performance of an OCT guided approach is associated with low peri-procedural risk. Moreover, we aim to investigate if OCT can expedite cancer therapy and can improve outcomes at 12 months, with decreased risk of stent thrombosis despite premature DAPT discontinuation.

Methods

Patient selection

The study population comprises patients from a high-volume cancer center with a diagnosis of cancer, who have received a drug-eluting stent (DES) implantation (1–12 months earlier) and then required premature discontinuation of DAPT to continue optimal cancer therapy (procedure or surgery). We examined clinical, angiographic, and procedural data. We identified patients with an indication for non-cardiac surgery, for a high-risk procedure (surgery, biopsy with increased risk of bleeding), or chemotherapy with high risk for secondary thrombocytopenia. Before proceeding, we performed diagnostic coronary angiography and OCT to assess their risk of stent thrombosis. The study protocol was reviewed and approved by the institutional review board, and all patients provided written informed consent for cardiac catheterization and inclusion in the Prospective Registry of Cancer Patients with Coronary Stents Undergoing Cardiac Catheterization/Optical Coherence Tomography (PROTECT-OCT). Patient data were anonymized, and OCT analysis was performed by a core laboratory with blinded patient and procedural characteristics. All patients had a cancer diagnosis established at the time the PCI was performed. Advanced cancer was defined as stage greater than T2 and/or N1 and/or M1 as well as any malignancy considered refractory, relapsing, recurrent, or requiring stem cell transplant.[14]