after DES placement in patients who have had a myocardial infarction.[3] It is important to note, however, that because many patients with active cancer have heightened thrombosis risk, extended DAPT may be appropriate in selected patients. It is essential to individualize this risk and balance it against the bleeding risk to optimize outcomes. For example, one study showed that the duration of DAPT can be determined on the basis of poststenting intravascular imaging in patients with cancer, allowing earlier interruption of DAPT.[4] Thus, the 2016 Society for Cardiac Angiography and Interventions Expert Consensus Statement suggests using newer generation DESs in patients with cancer who have a platelet count of more than 30,000.[5]

We agree that the current preference of BMSs in cancer patients is dependent on clinical experience and is not driven by evidence, simply because randomized trials have generally excluded patients with cancer. We believe that the therapeutic approach should be individualized, highlighting the need for interventional cardiologists with an understanding of onco-cardiology.

The authors also discussed the optimal therapeutic approach in patients who have coronary artery disease and who received mediastinal radiation. Although this was not explicitly discussed by Wang et al,[6] we agree with the authors that care in these patients also needs to be individualized. The authors correctly report that these patients are at increased risk for in-stent restenosis, especially after placement of BMSs.[7] In a retrospective cohort analysis of 157 patients with a history of mediastinal radiation who underwent coronary stenting in one center, BMS use, but not DES, was associated with increased risk of long-term mortality compared with matched controls.[8]

The lack of data to guide treatment strategies in these complex patients is alarming. There needs to be an urgent call for prospective research to address these and other unresolved questions in the field. Until we get prospective data, treatment strategies should be individualized, and a multidisciplinary approach to patient care (with oncologists and cardiologists contributing) should be encouraged.

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## In Reply II—A Differing Opinion on Primary Percutaneous Coronary Intervention in Patients Who Have Had Cancer: Stent Choice in Onco-cardiology Revisited

***To the Editor:*** We deeply appreciate and commend Ganatra et al[1] for the points they raised, namely, that cancer patients who have coronary artery disease requiring treatment may not be well served by withholding drug-eluting stents (DESs). As they rightly state, it is often feared that these patients might suffer a bleeding event or undergo an intervention that could compromise the duration of dual antiplatelet therapy (DAPT). Intriguingly, an updated recommendation on the minimum duration of DAPT after DES placement was released by the American College of Cardiology/American Heart Association just last year, and therapy for 6 months was considered sufficient as a general recommendation, that is, for all patients.[2] As the authors further indicate, newer generation DESs are even safer than bare-metal stents in terms of stent thrombosis and mortality.[3] Accordingly, one may argue that DES use should not be feared, even in cancer patients.

Data on this very topic are, however, scarce, and even more so when it comes to systematically obtained data and clinical trials. Our study, as implicated by Ganatra et al,[1] therefore presents an opportunity to surveil and compare the treatment of coronary artery disease patients with and without cancer. Truly, it is a striking observation that only 40% of the cancer patients who suffered an ST-elevation myocardial infarction received DESs in our study,[4] in view

of an average DES utilization rate of 70% to 75% in general.[4,5]

We should note, however, that DES use was low even in the noncancer group (50%) in our study.[4] One likely explanation is that our analysis started in 2000 and it was not until later in 2003 that DESs became available for clinical practice. Thus, nearly one-third of the entire enrollment period for our study was in an era when bare-metal stents were the only available stent choice. Indeed, recalculating the numbers only for the time when DESs were available (and assuming equal annual patient volume) would yield a DES rate of 78.1% in the noncancer group, but only 59.8% in the cancer cohort. Accordingly, the DES utilization rates we report are not very different from national reports for the overall cohort of patients with ST-elevation myocardial infarction (STEMI), whereas DES utilization rates are lower in patients with STEMI with a cancer history.

As a limitation to our study, we did not have data extending into the most current era and stratified by years to assess whether trends changed over time as newer generation DESs became available. We were also not in a position to gauge the reasons for the use or nonuse of DESs in our cohort. It is likely that the comfort level of DESs varies with exposure, as it does with performing percutaneous coronary intervention (PCI) on patients with low platelet counts.[6] Centers that treat a higher volume of cancer patients with STEMIs, including even those who are undergoing active cancer treatment (eg, MD Anderson in Houston, TX) document improved survival outcomes when adhering to guideline-recommended therapies including aspirin in patients with thrombocytopenia and PCI for acute coronary syndromes.[7,8]

The consensus document of the Society of Cardiac Angiography and Intervention summarizes these experiences and provides recommendations in regard to the management of cancer patients referred to the catheterization laboratory. As a unique aspect, decisions on whether to proceed with PCI and which type of PCI to use depend on the clinical presentation, estimated survival prognosis, platelet count, and planned therapy.[9] At present there are no data on how systemic chemotherapies influence the response to PCI injury and stent reendothelialization. Suffice it to say, many of the drugs used for stent coating are in essence chemotherapeutics (eg, paclitaxel and everolimus). One may therefore postulate that patients with cancer, especially those on active, potent antiproliferative chemotherapy, will require a prolonged duration of DAPT. This postulate is supported by a single-center study on more than 7000 patients documenting a 7-fold higher incidence of stent thrombosis in patients with coronary artery disease with concomitant malignancy.[10] Importantly, this particular study excluded patients with DESs, and all cancer patients with in-stent thrombosis had solid cancers.

The unique aspects of cardiovascular care of cancer patients will continue to require further and more comprehensive studies. Ganatra et al[1] provide valid points in line with our report that optimal cardiovascular therapy should not be withheld from cancer patients. This may include DESs, and importantly prolonged DAPT after any type of stent implantation.

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