Whole-breast irradiation (WBI) has become the standard of care following breast-conserving surgery in patients with early-stage breast cancer. Patterns of failure in these patients suggest that limiting radiation therapy to the lumpectomy cavity via accelerated partial breast irradiation (APBI) may produce acceptable clinical outcomes in properly selected patients (1–4). APBI can be delivered via multiple techniques, including single catheter-based brachytherapy, interstitial brachytherapy, intraoperative radiation, and external beam irradiation (EBI). It has been widely acknowledged that APBI provides several potential advantages over WBI, including both decreased overall treatment times and reduced radiation dose delivery to normal breast tissue and adjacent organs. However, among several theoretical disadvantages to APBI, the most salient is the potential that occult foci of cancer elsewhere in the breast may remain untreated and result in subsequently higher rates of tumor recurrence. Several multicenter randomized clinical trials have been initiated or completed to compare the effectiveness and safety of APBI vs WBI (5–10). Most breast cancer experts agree that conservative patient selection criteria for APBI should be used until the results of phase III trials comparing APBI and WBI become available, particularly because of the growing body of evidence that WBI after lumpectomy provides a benefit in long-term survival (11).

Historically, physicians have had to rely upon single-institution phase II trials to determine which patients could safely be treated with APBI off protocol, but the authors were faced with insufficient long-term data with which to accurately classify patients. None of the categorizations of suitability for receipt of APBI by the ASTRO consensus statement were based on direct comparisons of rates of recurrence or other outcomes between these cohorts of patients.

The article by Hattangadi et al. (14) in this issue of the Journal is the third one this year to document an increased utilization of APBI using brachytherapy (APBIb) nationally. Smith et al. (15) first examined a large national database of Medicare beneficiaries with private supplemental insurance. In their study of 6882 women with invasive breast cancer who were treated with breast-conserving surgery, they documented a rise in the usage of brachytherapy as an alternative to WBI over time, from less than 1% in 2001 up to 10% in 2006. The authors explained that this trend coincided with the approval by the United States Food and Drug Administration of the MammoSite device in 2002 and with Medicare reimbursement for APBIb in 2004. Abbott et al. (16) next published a retrospective analysis of the Surveillance, Epidemiology, and End Results (SEER) database on the use of APBIb compared with WBI between 2000 and 2007 among 127 257 women with stage 0 to II breast cancer. During the time period examined, the proportion of women who received this treatment increased from 0.4% in 2000 to 6.8% in 2007, with the largest increase in use of this new technology among women who were aged 80 years or older. White race, lower-stage disease, and geographic location also predicted for greater utilization of APBIb.

The study by Hattangadi et al. (14) examines the SEER data from the perspective of the ASTRO consensus statement, asking whether patients with stage 0 to III breast cancer who were treated with breast-conserving therapy and received treatment with APBIb (vs WBI) were “suitable” based on categorization by the ASTRO consensus statement. Overall, the use of APBIb has been higher among patients classified as suitable candidates

Sounding A Warning Bell? Documentation of the Increased Utilization of Accelerated Partial Breast Irradiation

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(5.0%) compared with those classified as “cautionary” (3.4%) or “unsuitable” (1.6%) candidates. Reassuringly, the authors found the fastest increase in utilization among patients who were classified as suitable. However, the authors also raise a potentially alarming concern that among patients treated with APBIb, the majority were not categorized as suitable candidates, with 32% suitable, 30% cautionary, and 36% unsuitable.

Similar to the study of Abbott et al. (16), Hattangadi et al. (14) cites a wide variety in the use of APBI based on geographic location, with the highest rates in the Atlanta registry, a finding that matches a SEER analysis of utilization of prophylactic contralateral mastectomies (17). The authors also found that APBIb was delivered more often among white and non-Hispanic patients than in other race or ethnic groups. It remains to be elucidated whether this disparity stems from physician bias in offering this treatment vs the racial and cultural preferences of patients to prefer a treatment that is the standard of care rather than a treatment that has not been fully validated in randomized controlled trials. Surprisingly, the authors found a lower rate of APBIb use among women who lived in rural areas, and thus likely further from radiation facilities—the very patients who presumably would have benefited from the convenience of an accelerated delivery of radiation therapy.

The authors mention that they are concerned that financial incentives could be a driving force behind the use of APBI. Unfortunately, the data available to the authors in the SEER database is complete only through 2007 and precedes two important changes in reimbursement for APBIb. In 2008, the Centers for Medicare and Medicaid Services (CMS) changed the financial reimbursement of high-dose rate brachytherapy, decreasing reimbursement for each radiation treatment delivered and altering the metric of compensation from one based on dwell positions to one focused on the number of catheters used (18). Later, in 2010, the CMS reimbursement to surgeons for the placement of breast brachytherapy devices was also decreased. Moving forward, it will be useful to analyze more recent trends in the use of APBI and to document whether such changes in financial remuneration are indeed associated with the delivery of APBI. A comparison of the incidence of APBI delivered via EBI vs brachytherapy would also be useful, both because there are differences in reimbursement and because of the substantially greater use of external beam–based APBI in the joint National Surgical Adjuvant Breast and Bowel Project (NSABP) B-39 and Radiation Therapy Oncology Group (RTOG) 0413 trial that is randomly assigning women to WBI vs APBI (19). It remains uncertain whether this trend has continued in the community among patients treated off protocol. An analysis of more current databases may also illuminate how the dissemination of the ASTRO consensus statement into the surgical and radiation oncology community has changed practice.

Because of limitations in the data analyzed, the authors were unable to provide any clarification regarding the validity of the ASTRO consensus statement or to enumerate any differences in rates of recurrence based on receipt of APBI vs WBI. Retrospective reviews that have applied the ASTRO consensus statement categories to examine rates of recurrence among cohorts of patients treated with APBI for whom such data exist have not been able to validate the predicted association of the consensus statement categories with patient prognosis (20–23). At the 53rd Annual ASTRO Meeting held earlier this year, a debate was held among radiation oncologists regarding the consensus statement and the potential need to revise it. In particular, concern was voiced about the terminology chosen to designate the categories cautionary and unsuitable because it was based more on a lack of data than on data indicating poor outcomes.

The studies by Hattangadi et al. (14), Abbott et al. (16), and Smith et al. (15), raise an alarm that the care delivered to patients with early-stage breast cancer has evolved prematurely in relation to the results of large randomized trials examining the equivalency of APBI to WBI. As published guidelines, financial reimbursement, and information in the popular press regarding APBI change over time, it may become increasingly difficult to determine the exact motivation driving the disparate practices occurring nationally. Surgical and radiation oncologists will hopefully continue to be mindful during discussions with patients to inform them about the quality of the published data thus far available concerning patient outcomes following treatment with APBI. Although population-based studies allow us to reflect on changes in patterns of practice, we are still left eagerly awaiting the results of large randomized trials that compare patient outcomes with WBI vs APBI.

References


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