

WEB EXCLUSIVES

Saving the Best for Last

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Futuristic Therapies and Regimen Advances Round Off SABCS 2008

I reminded myself this year to stay at SABCS until the very last lecture, since much of the most important information is sometimes kept for the end. The morning session was in the futuristic realm and covered laboratory studies on a new class of drugs that target the insulin-like growth factor-1 receptor (IGF-1R). This receptor is related to HER2 and seems to contribute not only to faster cell growth but also to helping cancer cells become resistant to both hormonal therapy and Herceptin.

Deepali Sachdev, PhD, and Hua Zhang, PhD, from the University of Minnesota showed in laboratory tests that IGF1-R inhibitors can help prevent metastases from developing, but do not have a big effect on metastases once they have developed. In another series of experiments, these inhibitors were shown to reverse resistance to the hormonal therapy Faslodex. While these drugs are in very early trials for a variety of cancers, one of their uses may be to combine them with other targeted drugs or hormonal therapy—ultimately large randomized studies will be needed to prove or disprove their utility.

The day then turned to more practical issues in the treatment of early-stage breast cancer. In patients getting neoadjuvant chemotherapy, Himanshu Nagar presented the M.D. Anderson Cancer Center's review of the role of receiving radiation therapy when patients are treated with a mastectomy for tumors larger than five centimeters at the start of therapy with no lymph node involvement felt on exam. Radiation appeared to lower the risk of local recurrence rates for patients with close margins or those eventually found to have positive nodes at the time of final surgery. He suggested for lower grade tumors with no nodes, a randomized trial might be best to answer the questions about radiation after mastectomy.

Neoadjuvant chemotherapy is used to shrink cancers prior to surgery to minimize the amount of surgery needed (or make surgery possible for locally advanced tumors) and the complete disappearance (also known as a complete

pathological response, or pCR) of tumor is a reflection of prognosis. Clinical researchers also use this situation to test new chemotherapy regimens and look at tumor disappearance as a way to judge how good the new regimen might be.

Gunter von Minckwitz, MD, reviewed a collection of German neoadjuvant trials to look at the different factors associated with a greater tendency for a pCR. He found that longer duration of therapy, younger age, lack of estrogen receptor, and higher grade all were associated with higher pCR rates. These correlations will be helpful as a standard for investigators to judge newer regimens, and may even allow clinicians to choose the best regimens to use as neoadjuvant therapy.

Chemotherapy given after surgery for early-stage breast cancer clearly helps improve the cure rate, but details of exactly what drugs, what dosage, and what schedule are still not established. Regimens that include Cytosan (C), anthracyclines (like Adriamycin, A) and a taxane (like Taxol and Taxotere) are typically used. The NSABP B-30 study tested four cycles of AC followed by four cycles of Taxotere (T), shorter regimens of AT, and all three drugs (TAC) given together for four cycles.

Of these three regimens, the sequential longer regimen was the best in terms of recurrence risk, but also had the most short-term side effects. Another observation was that premenopausal women, who stopped their periods, had fewer recurrences than those that did not—an observation that has been made with other studies and could relate to estrogen withdrawal.

However, since more women stopped their periods on the longer regimen, it is not clear whether the longer administration of chemo itself or the withdrawal of ovarian function and the associated lowering of estrogen played a role. There is a large world-wide study to confirm whether or not suppression of the ovaries can help, but for now, it is not considered standard. So, it appears that the longer sequential chemotherapy regimen might be best for women at higher risk.

Another study, called the BCIRG 005, compared the TAC regimen, but given in the more common way for six cycles to AC followed by Taxotere, for a total of eight cycles. These were equivalent in terms of recurrence, while TAC had more fever associated with low white blood cell counts, the sequential treatment had more muscle pain. Therefore, apart from fever and low white blood cell counts, it looks like TAC might be easier and shorter to give. However, we know that AC followed by weekly Taxol for 12 weeks is better than the AC followed by Taxotere based on a prior study initially presented several years ago.

So, at this point, we at least know that sequential therapy is best from the NSABP B-30 study, and TAC is also a reasonable regimen. It will be left to another study to sort out which is better between TAC and “dose-dense” AC followed by Taxol, another very popular regimen. The conclusion at this point is similar to before—at least six cycles of anthracyclines plus taxane-based therapy are needed for higher-risk, early-stage breast cancer.

From the esoteric to the mundane, and from the futuristic to “practice changing” advances, it all adds up over time. This conference will continue to serve as a catalyst for the exchange of information between researchers, clinical experts, practicing oncologists, and advocates. SABCs has sharpened the clinicians’ understanding of when to obtain breast MRI scans, how to interpret newer genetic

tests, and which specific hormonal and chemotherapy regimens are most effective. It has provided insights into newer drugs, helping oncologists make better decisions about available therapies and encouraging them to open and enroll patients to clinical trials.

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Questions Emerge On Proper Use of Diagnostic Tools

Today's sessions at San Antonio focused on diagnosis and detection—obviously an important topic since advances in this area with earlier detection have been one of the key reasons that more women are cured after a diagnosis of breast cancer.

Along with advances in screening has come the fact we generate “false positives,” abnormal results that force doctors to do more tests and even get biopsies that return normal. Even when a cancer is diagnosed, it is possible that a woman may have lived with that cancer all her life without it ever threatening her.

We clearly need better tests with fewer “false positives” and “false negatives,” and we also need to know which cancers may not need further attentions. Without knowing, we are probably over-treating many patients.

The use of MRI (magnetic resonance imaging) for screening or assessing a diagnosed breast cancer has risen significantly in the U.S., and many centers have documented more extensive surgery and mastectomies as a result of this. However, there is no clear proof that this is help with the cure rate.

Monica Morrow, MD, chief of breast services at Memorial Sloan-Kettering who has been very cautious about when MRI is used in breast cancer, made the point that without clear demonstrations of benefit, MRI tests should be confined to very specific situations, such as screening for carriers of BRCA mutations, further characterizing abnormal mammograms, and ultrasounds that are difficult to interpret for reasons such as very high breast density, and possible for tracking and planning surgery for patients who are receiving pre-operative (neo-adjuvant) therapy.

The first randomized trial of MRI in patients already diagnosed with cancer was reported by Dr. P.J. Drew, an investigator on the COMICE Trial of MRI. This involved over 1600 patients and showed that re-operation rates were the same in both arms, about 19 percent. About 60 percent of the “positive” MRI findings were actually cancer, with about five percent of patients having undetected cancers in the same breast and eight percent having them in the other breast, but it is too early to know if this actually translated into improved overall outcome.

While it might seem intuitive that detecting an occult cancer by MRI in another region of the breast might help in someone who is already being treated for a known cancer, this might not be the case. The nervousness and anxiety (not only to patients, but their physicians as well) created by MRI understandably leads to more surgery, but is it really necessary? This continues to be a heated debate in the medical community.

Another aspect of diagnosis is the need to properly assess risk of recurrence so

that proper systemic therapy (like hormonal therapy and chemotherapy) can be given. For patients with node-negative and hormone receptor-positive tumors, gene profiling, such as the Oncotype DX test, is being increasingly used to help gauge the recurrence risk and determine if chemotherapy should be added to hormonal therapy.

The background data and the numerical estimates that this test provides are based on past trials in which patients were treated with tamoxifen. However, in the era of aromatase inhibitors (AIs), it is not clear that the test would apply in the same way. A more contemporary trial comparing tamoxifen to the AI Arimidex (ATAC trial) was the first to demonstrate that AIs are better than tamoxifen.

Tissue from this study (available only in one third of the cases) was then analyzed using the Oncotype DX assay. It essentially showed that this test still can predict the risk of recurrence, although the scales (and hence, the actual numerical estimates) are somewhat different. This means that we can have a little more assurance that this test can also be used in patients who will take an AI, although the risk estimates will need to be recalibrated over time.

Another area of controversy is whether tamoxifen is as effective in patients who are not fully able to metabolize this drug. It turns out that tamoxifen has to be metabolized to a compound called endoxifen to be fully active, and one of the key enzymes responsible for this is CYP2D6. We all inherit slightly different versions of genes that encode all proteins, including CYP2D, and those that inherit less active versions of these genes have been found, in some studies, to have a higher recurrence rate when on tamoxifen compared to those that have versions with normal enzyme activity.

Matthew Goetz, MD, presented an analysis of CYP2D6 status from an Austrian study that compared tamoxifen to Arimidex and found that in the tamoxifen treated patients, those who had “slow metabolizing” CYP2D6 had a nearly four-fold higher chance of early recurrence. This finding may add more evidence to the need for routinely assessing CYP2D6 in patients receiving tamoxifen, and possibly using AIs in patients who are “slow metabolizers,” keeping in mind that ovarian removal or suppression will be necessary in premenopausal patients since AIs are only effective when the ovaries are not producing estrogen. It is likely that the research community will come together shortly to deliberate on whether this and other findings will warrant changes in recommendations for CYP2D6 testing.

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Looking for Answers to Recurrence Years After Surgery

The planners of the San Antonio Breast Cancer Symposium have a knack for selecting certain speakers and topics that are very timely—about one third of the program is made of up these planned sessions while the rest are abstracts that are submitted and reviewed by the committee.

One of the morning lectures delved into the question of why some patients can develop recurrence or spread of cancer many years after surgery. One of the clues might be circulating tumor cells that can remain “dormant for many years.”

Klaus Pantel, MD, PhD, from the University Medical Center of Hamburg-Eppendorf of Hamburg, Germany, has been a pioneer in the analysis of tumor cells that circulate in the blood and may involve the marrow of patients with breast cancer. In patients who do not have metastases, the presence of microscopic circulating tumor cells does not mean they already have or will automatically experience spread of their disease. However, it does put them at higher risk.

Many questions have arisen from the studies that date back over 10 years. How can some circulating cells remain dormant for years? What turns them on to develop into a true metastasis? Are these cells similar to the main tumor in the breast? Are they more like tumor stem cells that can give rise to a tumor but be resistant to many therapies?

In patients with metastatic breast cancer, the number of circulating cells can be counted with an assay called CellSearch, and this can predict outcome, but it is still not known how to use this information to make treatment decisions. New technology allows these cells to be analyzed more thoroughly, so there is hope that we may understand more how tumors remain dormant, how they evolve over time, and most importantly, how their vulnerabilities that can be targeted therapeutically.

Several studies of older and newer HER2-targeted drugs were also discussed. The use of Herceptin is now standard in HER2-positive early or advanced stage breast cancer. However, in the “neo-adjuvant” setting, where chemotherapy is given before surgery, we know that more patients will have a complete disappearance of their cancer at the time of surgery— but none of the studies went long enough or were large enough to know it would prevent recurrence longer term.

The NOAH study compared chemo alone or with Herceptin and confirmed a higher response rate, but also showed fewer recurrences. At this time, there is no significant difference in mortality. Interestingly, the regimen included Adriamycin with Herceptin, a combination that is contraindicated normally because of the high risk of heart failure—a risk that was noted very early in Herceptin development and before screening and monitoring for heart problems was routine. However, with proper screening and monitoring, the investigators reported very low risk of cardiac problems.

Two newer drugs for HER2-positive cancers were tested in patients who recurred or progressed shortly after or while on Herceptin. One of these, T-DM1, is the Herceptin antibody bound to a very toxic drug so that it is steered directly to the tumor and will not cause damage to other parts of the body. This study showed that nearly half of the patients experienced a response—much higher than is seen with other drugs, like Tykerb, that have been tested in this situation. Very few side effects like low platelet counts and mild eye irritation were seen, but these did not require stopping the drug.

Another drug, HKI -272 (neratinib), was tested in the same situation and also showed promising response rates of 26 percent and as high as 56 percent in patients who had not received Herceptin previously. This drug did cause diarrhea in most patients, and it was moderate to severe in about one third of patients who had received Herceptin before and 13 percent of those who had not.

Both of these drugs will be studied further not only as options for patients who

are no longer responding to Herceptin and possibly to Tykerb (which is what is typically used next, in combination with the chemotherapy Xeloda), but also possibly as initial therapy to see which approach leads to best control of cancer with the fewest symptoms. It is also possible that in the future, these drugs will be tested in early stage breast cancer with hopes of even further improving the cure rate over and above what Herceptin can achieve in HER2-positive breast cancer.

The last oral presentation of the day was the first presentation of a study comparing the hormonal therapy Femara alone or in combination with Tykerb in patients with hormonally sensitive advanced breast cancer. The hope was that Tykerb might block signaling pathways associated with resistance to hormonal therapy. Only patients with HER2-positive breast cancer were analyzed (this study enrolled patients regardless of HER2 status), and as expected the addition of Tykerb significantly delayed progression of cancer in the HER2-positive cases.

There was also a hint that it prolonged time to recurrence in patients with HER2-negative cancers that were resistant to tamoxifen. Further follow-up, however, may answer the question of whether Tykerb can “sensitize” tumors to hormonal therapy even if the cells are HER2-negative (read more on Femara and Tykerb [here](#)).

For more on HER2 inhibitors from this year's symposium read "[New Agents Effectively Target HER2-Positive Cancers](#)" and "[Herceptin Before Surgery Highly Effective in Locally Advanced Breast Cancer](#)."

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Fresh Insights Into Hormonal Therapies

The first full day at San Antonio began with discussions about the oldest therapy ever used for breast cancer other than surgery. The demonstration of estrogen's importance in breast cancer was first noted in 1896 when Sir George Beatson, a Scottish surgeon, noted that removal of the ovaries could make advanced breast cancer regress temporarily. In the 1940s, it was learned that a high dose of estrogen could also be effective as treatment in some cases.

The paradox that estrogen can serve both to fuel breast cancer but at higher doses to treat it is still not fully explained at a scientific level, although hormonally sensitive breast cancer cells can aut destruct at high doses of estrogen. But these high doses can cause symptoms, so a trial of lower doses of estrogen in patients who became resistant to aromatase inhibitors (AIs) was reported by Matthew Ellis, MD, PhD.

He cited data from multiple laboratories suggesting that breast cancer cells that became resistant to estrogen deprivation (as seen with aromatase inhibitors) are sensitive to lower doses of estrogen.

Stephen Johnston, MD, PhD, presented the most recent insights on the cellular machinery that leads to hormonal therapy resistance. This is a big issue, because hormonal therapy is among the most effective and with the fewest side effects, so finding ways to “re-sensitize” resistance cancer cells would be of great value. Several studies that address this will be presented later at the Symposium.

The morning session was rounded out by the latest on hormonal therapy in the

adjuvant early-stage setting. At the turn of this decade, AIs were first shown to be slightly better than tamoxifen in postmenopausal women, but there has continued to be controversy about whether to start with tamoxifen first, then switch to an AI, such as letrozole, or just start with letrozole.

The first study to directly compare these two approaches, the BIG 1-98 study, presented initial data, and this showed that both approaches were equally effective, but there was a slight (non-statistically significant) trend for patients who received letrozole first to do better (either letrozole for 5 years or letrozole for 2 years, then tamoxifen for 3 years) compared to starting with tamoxifen.

However, others in the audience felt that the presenter, Henning Mouridsen, MD, was over-reaching his conclusions that it might be better to start with letrozole. Another study, called the TEAM trial comparing tamoxifen followed by the AI exemestane to exemestane alone also suggested that it might be better to start with AI—so more time will be needed to know the definitive results of this trial (to read more about hormonal therapy, see [The Jury Is In](#)).

In the afternoon, the attention turned to the surgical issues, namely, the meaning of microscopic involvement of sentinel lymph nodes. When a sentinel lymph node contains a cluster of tumor cells less than 0.2 mm, this is technically considered negative N0[i+] and is generally not used to change treatment recommendations. Also, the term micrometastasis is used to describe nodal involvement of 0.2-2 mm range, which technically makes the node stage positive N1[mic].

A large Dutch study of 1744 patients with completely node negative as well as N0[i+] and N1[mic], however, showed that there was more recurrence with both of the N0[i+] and N1[mic], groups compared to the node-negative group, and that these groups also benefited from either hormonal therapy or chemotherapy. This study goes against earlier studies that showed that the N1[mic] group had the same outlook as truly node-negative cases and may force us to rethink how we make decisions in this group. However, larger randomized studies of sentinel node dissection will be available to confirm or reject this registry study (for more on sentinel node dissection read "[The Implications of Micrometastases](#).")

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New Approaches Explored at San Antonio Breast Cancer Symposium

The 31st Annual San Antonio Breast Cancer Symposium opened today with a new pre-conference educational session that underlines the theme of this Symposium—multi-disciplinary and translational issues that address the spectrum from research to practice and from breast cancer prevention to treatment of advanced disease.

This is the first year that the American Association of Cancer Research has partnered in putting on the symposium (other partners are the Cancer Therapy and Research Center at the University of Texas Health Science Center at San Antonio and the Baylor College of Medicine). This new partnership will probably create a new flavor—infusing more basic science while preserving interaction between basic scientists and clinicians. Of course, this makes sense since the last decade has brought the clinic and the laboratory closer together.

What this means to patients is that new findings in the lab turn into better

diagnostic tests and treatments more quickly. The day's speakers included José Baselga, MD, from Vall d'Hebron University Hospital in Barcelona, Spain, who embodies the translational scientist, and he has developed a series of clinical trials where the questions asked are more than “*Does* the new drug shrink the tumor?”, but rather *how* does the drug work at the cellular level, how might we make it better, and for what tumor subtype will this drug really be effective. This is done through sophisticated studies of tissue and sometimes newer imaging techniques that provide a more complete picture of the drug's activity.

Presentations of examples of newer targeted drugs using this research model do suggest that we can learn faster with fewer patients in the early trials, and also weed out drugs or combinations that might not be that promising before they enter large-scale trials with hundreds of patients.

Douglas Yee, MD, followed Baselga with a presentation about the theory behind attacking another receptor that is a cousin of the HER2 receptor, the insulin-like growth factor receptor (IGF-1R). While this receptor has been studied for decades in breast cancer, we now know that this receptor interacts with growth pathways in breast cancer. Several drugs that block IGF-1R are entering clinical trials and will probably go through the types of “correlative” studies described earlier (read more on Dr. Yee and his studies of IGFRs [here](#)).

Carlos Arteaga, MD, amplified more on the signaling networks that cause cells to grow and how mutations and other alterations in cancer that affect these networks remain necessary over the course of the disease. This is good news, because it tells us that a firm understanding of genetic lesions that initiate cancers can still be attacked even as the cancer matures and develops additional mutations.

Anthony Letai, MD, discussed new generations of drugs that augment the natural tendency of aging and damaged cells to die through a process called apoptosis. It turns out that cancer cells have figured out ways to evade apoptosis even though the triggering events, such as radiation, cancer drugs, genetic mutations, and other signs of danger are present. Several “pro-apoptotic” drugs are now entering clinical trials although the first generation of these agents were somewhat disappointing in early phase clinical studies. There are more targeted drugs than ever before that address the many cancer-causing pathways. We can get clues as to which drugs and combinations will be the most successful in the clinic through newer tools in the laboratory, but ultimately, we have to understand the effectiveness and safety by designing human trials and hoping that we put the best agents forward based on lab studies.

As trials become more complex, we have to use more elegant statistical tools—for example, to make some sense of the data that comes from measuring thousands of genes in the tumors of 20 patients before and after an experimental drug. We must also organize trials that are larger and designed to look at specific patient subsets so that they can be completed more quickly and be more informative. This has required extensions of clinical trial networks in the U.S., Canada, and Europe, and now expanding to Latin America, Eastern Europe, and Asia. Susan Hilsenbeck, PhD, and Martine Piccart, MD, PhD, described the challenges and potential rewards of changes in trial networks, designs, conduct, analysis, and interpretation. The research community, governments, and private companies are beginning to invest in this structure, a critical element for success

that is now under threat in today's turbulent economic atmosphere.

All this material was packed into a two-hour session, just one sign of the fast-paced days that lie ahead in what I believe to be the biggest and most influential breast cancer meeting in the world. Stay tuned for daily progress and insights from San Antonio as this year's story unfolds.

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Read more of *CURE's* coverage of the 31st annual San Antonio Breast Cancer Symposium at <http://media.curetoday.com/html/email/sabcs>.