Radiosurgery For Early-Stage Breast Cancer

Accuray Incorporated, (Nasdaq: ARAY) announces that studies underway at two leading academic institutions using CyberKnife radiosurgery in breast cancer treatment. These two studies, from the University of Texas Southwestern and Fox Chase Cancer Center, will be presented at the 52nd Annual Meeting of the American Society for Radiation Oncology (ASTRO) in San Diego from October 31 to November 4.

According to the American Cancer Society, breast cancer is the most frequently diagnosed cancer among women and the second leading cause of cancer death. Typically, women with early stage, localized breast cancer are treated with a lumpectomy, also known as breast conserving surgery, followed by radiation to ensure any remaining microscopic cancer cells are treated. It has been shown that women receiving radiation following surgery have more than a 15 percent reduction in recurrence rates as compared to women who did not receive radiation after their tumors were surgically removed(1).

Initially clinicians delivered radiation to the whole breast following surgery, but over the last decade a more limited radiation approach has gained interest among clinicians and patients. This approach, called partial breast irradiation, can be as effective as whole breast irradiation and is less likely to damage to the heart, lungs, and skin, leading to improved cosmetic outcomes and reduced toxicities.(2)

Partial breast irradiation can be delivered in a number of ways, including invasive options, such as MammoSite, which involves surgical implantation of a catheter in the breast to deliver interstitial brachytherapy, or non-invasive radiation therapy options such as 3D conformal or intensity modulated radiation therapy (IMRT).

Each technique has its advantages and drawbacks: For example, invasive brachytherapy can cause infection, hematoma or abscess(3-4). While non-invasive radiation therapy approaches minimize such risks, studies have demonstrated that the larger margins required to compensate for treatment inaccuracies, such as those caused by the movement of the breast with respiration, result in a higher risk for overdosing the skin and nearby critical structures such as the heart and lungs(5-7).

One recent study investigating IMRT for partial breast irradiation found 7 out of 32 evaluated patients developed unacceptable cosmesis, leading to premature closure of the study(5).

Because of the non-invasive delivery and high precision that the CyberKnife System offers in treating tumors throughout the body, clinicians see a role for it in breast cancer treatment. The CyberKnife System has the unique ability to not only track tumor movement during respiration, but to also lock onto the tumor as it moves

delivering radiation directly to the tumor and avoiding damage

to surrounding critical structures. The CyberKnife System's extreme precision enables clinicians to reduce the treatment margins that are often added with conventional IMRT Systems. For this reason, clinicians believe partial breast irradiation using the CyberKnife System holds the potential to improve toxicity and associated side effects for patients.

"We think that the real-time tracking and high conformality made possible with the CyberKnife System could result in reduced toxicity by reducing the dose to the surrounding breast tissue, skin, chest wall, lung or heart," said Charlie Ma, Ph.D., Professor and Vice-Chairman, Department of Radiation Oncology, Fox Chase Cancer Center.

University of Texas Southwestern recently launched a multi-center early stage breast cancer protocol, which is currently accruing patients. UTSW was one of the first five CyberKnife sites in the world and has remained on the forefront of clinical research.

Physicians at UTSW intend to demonstrate equivalent local control rates or to improve those seen in current treatment for early-stage disease while attempting to increase convenience, limit invasiveness, decrease toxicity and improve cosmesis compared to other methods of radiation treatment. The treatment regimen using the CyberKnife System would be five days compared to 25-30 days typically associated with conventional radiation therapy.

"In particular, we believe a very abbreviated, non-invasive, outpatient treatment would be considered a favorable option to underserved populations of women living in more remote areas for whom longer courses of treatment pose a barrier," said Robert Timmerman, M.D., professor of Radiation Oncology at UTSW and lead author of the ongoing study.

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