

East Alabama Medical Center **CANCER CENTER**

Site Study - 2006 (based on 2005 analytic data) Prostate Intensity Modulated Radiation Therapy (IMRT)



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Introduction

Prostate cancer rates have increased significantly over previous years due to better detection and screening exams. Screening should begin for all men at the age of 50 (age 45 in men with a history of a first degree relative [father and /or brother] with prostate cancer) and includes a prostate specific antigen (PSA) blood test and a digital rectal exam (DRE). According to the American Cancer Society, an estimated 232,090 new cases of prostate cancer were diagnosed in the United States in 2005. African-American men have the highest rate of prostate cancer in the world and are also twice as likely to die from prostate cancer as Caucasian men.

Signs and Symptoms

Some of the signs and symptoms of prostate cancer may include, but are not limited to:

- Frequent urination
- Inability to urinate
- Increased need to urinate at night
- Pain and/or burning with urination
- Blood in the urine

If the physician suspects cancer, he will perform a biopsy. If the biopsy is positive, the physician will stage the patient's cancer using TNM staging (size of tumor, node involvement, and metastasis).

Treatment Options

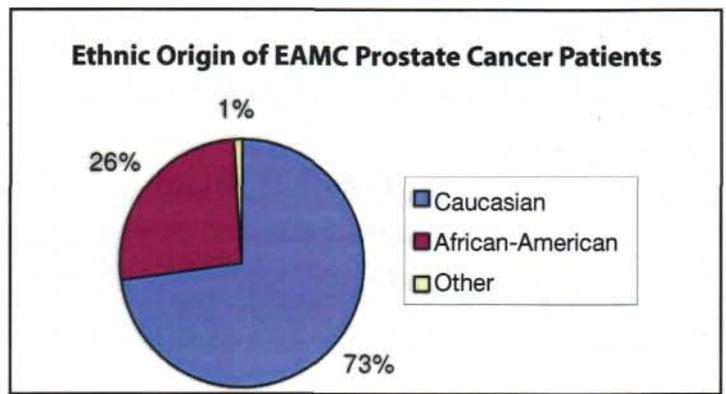
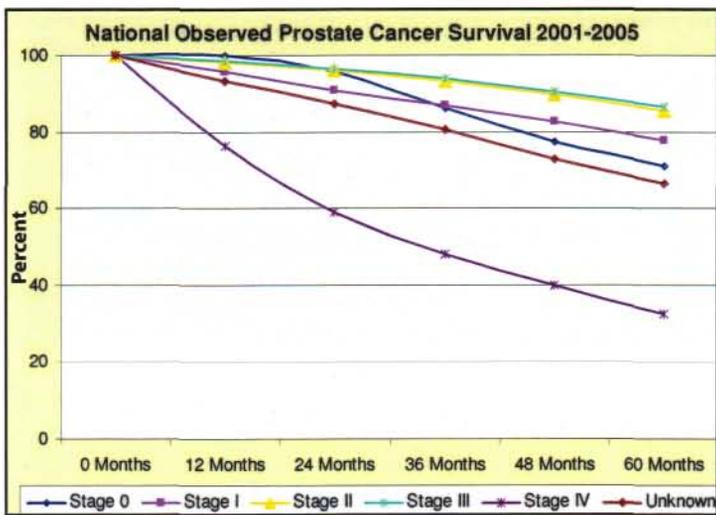
Treatment for cancer of the prostate using external beam radiation has improved dramatically over the last 10 years. This study examines external beam radiation using IMRT (intensity modulated radiation therapy). IMRT has a lower toxicity and much better accuracy than previous methods of external beam radiation therapy.

At East Alabama Medical Center, we began using IMRT in August 2006 and have treated 85 patients using this modality. Treatment of prostate cancer is the leading use of IMRT in our facility. Another mechanism included in IMRT of the

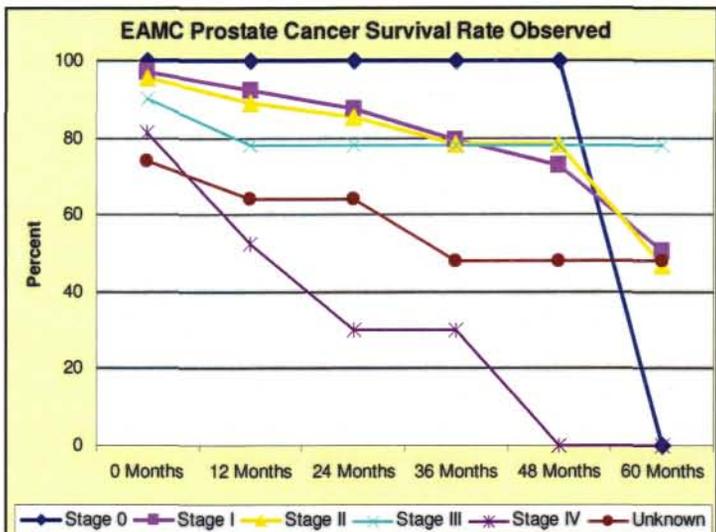
prostate is the use of fiducial markers being placed within the prostate gland by one of the urologists utilizing ultrasound guidance for placement before beginning treatment. The markers are made of gold and have a serrated edge to limit their migration after placement. A rectal balloon device is placed in the rectum prior to the CT scan and before each treatment to move the posterior rectal wall out of potential radiation fields and to immobilize the prostate. The patient has a CT scan of the pelvis, and I define the planning target volume (PTV) and the organs at risk (OAR) along with identifying the marker seeds. After I define the PTV and the OAR, the planning process is given to Gabe Hedges, CMD. Gabe assigns an appropriate radiation beam configuration to deliver the dose prescribed while limiting the dose of radiation to the normal tissues.

Once I have approved the plan, the process moves into QA (quality assurance) mode. It must be verified that what we intend to deliver is actually delivered. This is the responsibility of the physicist, John Faircloth, MMSc, and the process is as follows: the patient information is sent through a software (Radcalc) process that performs an independent verification of the dose calculation performed by our planning system. The next step is to verify each beam fluence pattern (or intensity) as it is treated. This is done by radiating a panel that retains the image pattern after it is radiated and is compared to the calculated fluence pattern of the planning system. The last test in the verification process is to actually measure the radiation at a specific point with an ionization chamber. All three of these items are compared and scrutinized before the patient receives his first treatment.

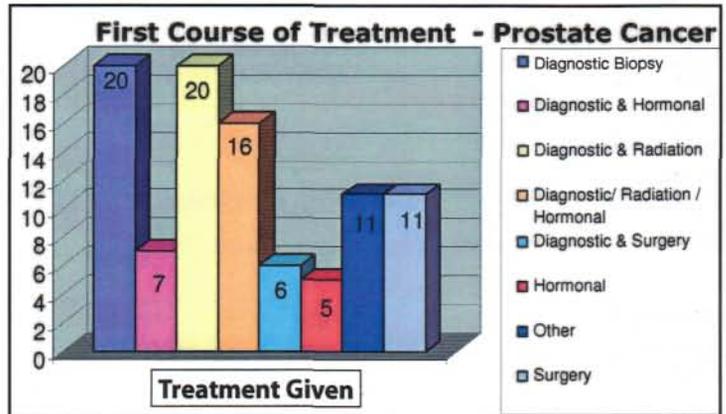
Lastly, we move to the treatment process. Our linear accelerator has a diagnostic radiography tube attached to the machine. The patient is placed on the treatment table, and a set of orthogonal images is taken using the diagnostic radiography tube. The set of images is compared to a set of images created by the treatment planning system. The overlay of images includes the fiducial markers placed by the urologist, and the table is shifted in any of three directions to align the markers. That process is termed image guided radiation therapy (IGRT). IGRT increases the accuracy of treatment far beyond any other method used previously at EAMC. Previous technology at all institutions used a retrospective approach to treatment, in that a physician reviewed films taken each week. Today, we treat using a prospective method, in that we verify each treatment before it is delivered by using IGRT. This technique allows the use of smaller treatment volumes and higher dose deliveries. The smaller treatment fields reduce side effects and lower the dose to normal tissues while providing a highly reproducible, highly accurate treatment delivery.



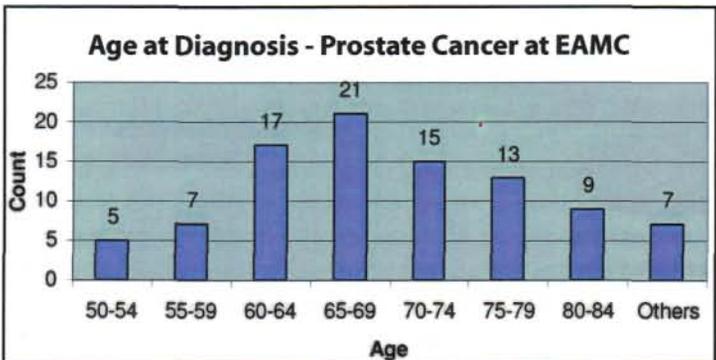
Seventy-three percent of prostate cancer patients seen at EAMC are Caucasian and 26% are African-American.



When comparing national survival rates to EAMC rates, EAMC Stage 0 had a higher survival rate until 60 months. The drop at 60 months may be due to a low N. Stage 1 was comparable through 24 months and then showed a lower rate compared to national survival data. Stages II, III, and IV indicated lower survival rates for EAMC compared to national data.



The first course of treatment options most utilized for prostate cancer are diagnostic biopsy and diagnostic/radiation therapy.



Demographics for EAMC: The largest age group seen is 65-69 years old. The age range is from 50 to 84.

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