RECENT ADVANCES IN THE DIAGNOSIS OF PROSTATE CANCER

Mary Boudreau Conover BSNed

Prostate cancer is second only to lung cancer as a cause of death in men. In 2010 nearly 300,000 men will be diagnosed with prostate cancer and in a quandary as to their personal course of action. Every treatment option, from radiation to surgical therapies, will bring significant side effects for these men and their loved ones.[1]

It is important to understand that 85% of prostate tumors are slow-growing and will not require surgery; 15% are aggressive and lethal. Inability to make the distinction may cause those with aggressive tumors to make the fatal decision not to have surgery. On the other hand, many men with low-risk prostate cancer will have unnecessary surgery and risk the sequelae of urinary incontinence and sexual impotence. Right now, it seems such an unacceptable quagmire, especially since the prostate-specific antigen (PSA) will not necessarily be elevated when there is relatively high-grade prostate cancer, nor do elevated PSA levels always signify disease progression.[2] However, definitive diagnostic DNA tests are on the way and may be available in the very near future.

Already scientists have identified at least 24 types of prostate cancer and are able to distinguish between low- and high-risk types.[3] Additionally, a rare gene fusion has been identified in 1-5% of lung cancers, prompting scientists to search for a similar rare gene fusion in prostate cancer. Palanisamy et al[4] found that, although rare, recurrent rearrangements of a certain gene pathway tend to occur in advanced aggressive prostate cancers, gastric cancers and melanoma. Once identified this aberration becomes "targetable" and treatments can be and are being developed.

The scientists at Memorial Sloan-Kettering Cancer Center (NYC) have published the genomic and clinical outcome from the patients in their study and made them available online as a public resource. This is the first-ever database to help scientists distinguish among the genetically different types of prostate cancer, improving treatment decisions, and ending the agony of indecision and the suffering for thousands of men who needlessly decide to go ahead with surgery. An integrated, comprehensive approach was used to analyze 218 primary and metastatic samples from patients treated by radical prostatectomy. The data revealed that the number of gene copy alterations "robustly define clusters of low- and high-risk disease beyond that achieved by Gleason score." ‡ This information is of great prognostic value in that the physician would be able to tell from a biopsy whether or not aggressive therapy is indicated according to the cluster number. For example, if cluster five--surgery and radiation; if cluster two--come back in another year to check. This is huge—finally something definitive!

---

‡ The Gleason Grading System is based on cellular content and tissue architecture from biopsies, which provides an estimate of the destructive potential and ultimate prognosis of the disease.

According to Charles L. Sawyers, M.D., chairman of human oncology and pathogenesis at Memorial Sloan-Kettering Cancer center, it will only be "several years--not a decade" for new prostate tests to become available. This is moving at a much faster pace than has the technology in the field of breast cancer. "Ultimately, what we have learned could lead to the creation of a genetic-based test to determine which prostate cancers might become more virulent and require aggressive treatment and which tumors may not." [5] Arul M. Chinnaiyan, M.D., Ph.D, tells us that "...within the next year, we hope to have a clinical lab test where we can predict what kind of cancer a man has."

Resources

More information on the ongoing studies for prostate cancer diagnosis and treatment are available at **mskcc.org/mskcc/html/44.cfm .** Also, in the June 29, 2010 edition of the Wall Street Journal there appeared a well written and researched articles on prostate cancer by Melinda Beck titled *"The Prostate Quandary",* (www.wsj.com/health) in which the most recent advances in the differential diagnosis among the 24 types of prostate cancer are explored and supported with interviews from the scientists involved.

mc:1 July 2010

REFERENCES

[1] Dept of Urology, University of Michigan, 2010.

[2] Terris MK, Rhee A, Qureshi SM: **Prostate cancer - Metastatic and advanced disease: Differential diagnoses & workup**, eMedicine, May 4, 2010.

[3] Taylor BS, Schultz N, Hieronymus H, et al: **Integrative genomic profiling of human prostate cancer,** Cancer Cell 2010 Jun 23 [Epub ahead of print].

[4] Palanisamy N, Ateeq B, Kalyana-Sundaram S, et al: **Rearrangements of the RAF kinase pathway in prostate, gastric cancer and melanoma,** Nature Med, 6 June 2910. Published online.

[5] Sawyers CL, in: **Genomic analysis of prostate cancer unveiled**, ANI, 26 June 2010, 21:41.