New genetic test can predict man's risk of developing prostate cancer

February 8 2013

Figure 1: Adding genotyping to PSA testing could improve prostate cancer predictions. © 2012 Brand X Pictures/Thinkstock

Researchers in Japan have created a genetic test that will help doctors diagnose prostate cancer. When given together with testing for prostate specific antigen (PSA), a widely used diagnostic biomarker for prostate cancer, the new assay could spare men from undergoing needless prostate biopsies.

"With a super-aging society coming to Japan and other Asian countries, there will be more prostate cancer patients and candidates, and more medical costs related to prostate cancer," says Hidewaki Nakagawa of the RIKEN Center for Genomic Medicine in Yokohama, who led the study. "So we have to establish 'personalized medicine' approaches to screen, diagnose, and prevent prostate diseases more precisely and more efficiently."

The genetic test includes 16 DNA markers that Nakagawa's team previously linked to prostate cancer in a 2010 study of Japanese men with the disease2. Using genetic data from around 4,000 Japanese men with prostate cancer and 7,000 healthy controls, Nakagawa and his colleagues showed that their risk assessment model was highly reproducible across cohorts and that its predictive performance was not influenced by PSA level.

To investigate whether the test might be useful to risk-stratify patients in the clinic, the researchers considered men in the so-called 'PSA gray-zone'. These men have somewhat elevated levels of PSA, yet only 20–25% of them actually have cancer. The rest typically suffer from less dangerous maladies, such as an enlarged prostate gland, and do not require aggressive treatment. Thus, doctors have long sought additional biomarkers that can identify individuals at the highest risk of prostate cancer (Fig 1.).

Nakagawa and his colleagues showed that their test could serve this purpose. Among men with gray-zone PSA scores who, the model

predicted, had at least a two-fold increased chance of developing cancer, 42% had positive diagnoses. In contrast, only 11% of men who the model predicted were at low-risk had cancer, despite elevated PSA levels.

Given the complications and cost associated with the prostate needle biopsies needed to confirm the presence of cancer following a gray-zone PSA test outcome, Nakagawa suggests that only men at high genetic risk should immediately take that next step, whereas men who score low on the genetic test might choose to continue monitoring their PSA levels before resorting to a needle biopsy.

"We are now negotiating with a company and hospitals about the feasibility of the test's clinical use," Nakagawa says. "But first," he notes, "we have to get more data about its precision and cost-effectiveness in a prospective large-scale study."

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Provided by RIKEN