The Criterion
California Cancer Registry March, 2009

Dr. Donald F. Gleason dies at 88; pathologist devised prostate cancer rating scale

University of Minnesota

Over 40 years, pathologist Donald F. Gleason's method of predicting the course of a patient's prostate cancer has not been improved upon.

By Thomas H. Maugh II
January 19, 2009

Dr. Donald F. Gleason, the Minnesota pathologist who developed the Gleason score that is now used almost universally in the U.S. to predict the likely outcome of prostate cancer, died Dec. 28 of a heart attack at his home in Edina, Minn. He was 88.

"His work is the gold standard for prostate cancer diagnosis and treatment selection," said Dr. Akhouri Sinha, a colleague of Gleason's at the University of Minnesota Medical School. Researchers have been trying for 40 years to develop a better system to replace it, he said, but without success.

"The only thing that has happened is that people have nibbled at the edges," he said.

Virtually all of the 186,320 U.S. men who will be diagnosed with prostate cancer this year, according to the American Cancer Society, will know their Gleason score and what it means about the likelihood that they will be among the 28,660 who will die from it.

Gleason was an unknown, junior-grade pathologist at the Minneapolis VA Medical Center in 1962 when he was approached by the hospital's chief of urology, Dr. George Mellinger. Mellinger was administering a cooperative research project on prostate cancer involving 14 hospitals and asked Gleason to develop a standardized rating system for tumors to ease communication between the groups.

At the time, there was no uniform system for determining the grade of prostate tumors -- a measure of how far they had progressed and of their likely course. Each pathologist pretty much used his own system, which made comparing research results among different groups nearly impossible.

Writing about his experiences later, Gleason said he was strongly influenced by his exposure during his medical student years to the researchers who were developing the Minnesota Multiphasic Personality Inventory, the first scientifically and objectively constructed test of "soft" psychiatric data.

The researchers constructed a set of relatively simple questions given to healthy people and patients who had already been diagnosed by standard clinical methods, then determined which questions provided the most differentiation between the two groups.

He concluded that his course should be "to forget anything I thought I knew about the behavior of prostate cancer and simply look for different [microscopic] pictures which could be recognized repeatedly and taught to others."

He combed through biopsy samples from the more than 300 patients who were being studied at the medical center and eventually came up with five representative pictures that were characteristic of virtually all the

patients. When he sent the pictures to the National Institutes of Health statisticians who had all the information about the patients, they found a surprisingly strong correlation between the pictures and the patients' death rates.

In 1966, he described his system in a report on 280 patients in the journal Cancer Chemotherapy Reports. The pathologist looks at microscopic samples from the tumor and finds the two most common types of tissue in the tumor, assigning each a score from one to five depending on how closely the tissues resemble normal prostate cells.

A score of one means they are very similar to normal cells, and a score of five means they look nothing like normal cells.

The Gleason grades for the two samples are then combined to give a Gleason score between one and 10. The lower the score, the better the patient is likely to do. The higher the score, the more likely he is to die.

The system was subsequently verified in a study of more than 4,000 patients.

To assist others in learning the system, Gleason made a simplified drawing of each of the grades, "probably my most valuable contribution to the grading system. Pathologists, who tend to think in pictures, quickly grasped this graphic presentation."

The Gleason scale was slow to catch on, but in 1987, seven of the leading authorities in urology and urological oncology sent a letter to the editor of the Journal of Urology urging that it be applied uniformly in all publications on prostate cancer. Their recommendation was adopted and the scale quickly came into wide use.

Donald Floyd Gleason was born Nov. 20, 1920, in Spencer, Iowa, but was raised in Litchfield, Minn., where his father ran a hardware store and his mother was a teacher. He enrolled in the University of Minnesota, ultimately receiving his medical degree in 1944.

His medical training was subsidized by the U.S. Army and he spent his internship in 1944 and 1945 on Army duty at the University of Baltimore and at the Minnesota VA Hospital.

When he was released from the service in 1947, he and his new wife, Nancy, moved to the Left Bank of Paris to pursue his ambition to become an artist. Poverty and a lack of sufficient skill intervened, however, and when he received a job offer from the VA Hospital, he took the first boat home.

He spent all of his career at the University of Minnesota and the affiliated VA Hospital, formally retiring in 1988. His scientific interest continued, however, and in 2002, he and Sinha reported on an enzyme test that they hoped would help identify which prostate tumors would progress most rapidly.

Gleason was an ardent sailor and owned a series of boats that he sailed on Lake Minnetonka and at other locations. He and Nancy were avid bridge players, and he was also a skilled cook, often baking bread and bringing it to laboratory functions, Sinha said.

In addition to his wife of 62 years, Gleason is survived by three daughters, Donna O'Neill of Annandale, Va., Sue Anderson of Burnsville, Minn., and Ginger Venable of Eden Prairie, Minn.; a sister, Barbara Jarl of St. Paul, Minn.; and nine grandchildren.

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