

"Success is dependent on prevention and early detection"—A Conversation with Oncologist and Researcher Dr. Thomas C. Shea

Interview conducted by Peter J. Morris

Thomas C. Shea, MD, is a retired hematologist-oncologist, researcher, and teacher at the University of North Carolina School of Medicine and UNC Lineberger Comprehensive Cancer Center. He discusses innovations and improved outcomes in cancer care in our state with NCMJ Editor-in-Chief Peter J. Morris, MD.

Introduction

In this issue of the *North Carolina Medical Journal*, authors explore the successes and challenges in combating three of the most common and persistent causes of death in our state: stroke, heart disease, and cancer. While progress has been made in identifying and treating all three groups of disease, the advances in cancer outcomes have been particularly remarkable. NCMJ Editor-in-Chief Peter J. Morris, MD, sat down with **Thomas C. Shea, MD**, to find out what has been behind this positive trajectory for cancer and what might be coming next.

Throughout his nearly 30-year career as a cancer doctor and researcher at the **University of North Carolina School of Medicine and UNC Lineberger Comprehensive Cancer Center**, Shea saw—and contributed to—tremendous improvements in cancer screening, treatment, and outcomes. Here Shea discusses what has led to improved screening rates for breast, colon, lung, and other cancers, and the multidimensional treatment approaches that are resulting in less mortality.

Peter Morris: Even though there have been advances in treatment of hypertension, heart disease, and stroke, we haven't seen the incidence of related deaths change dramatically. And yet, in cancer so much progress has been made. As someone who's been an oncologist for 30 years, can you reflect on what has changed in oncology?

Tom Shea: In some of the fairly common tumors or cancers, particularly in younger individuals and in women, I think we do a better job of screening now than we did 20 or 30 years ago. We can now detect early disease that would be very difficult, if not impossible, to treat effectively at a later stage. There's certainly some data on earlier, CT-scan based intervention with lung cancer for example, leading to a decrease in mortality. We've made similar strides in terms of early identification and prevention

of colon cancer with colorectal screening, whether it's with the stool tests that are available now without a prescription or the fact that colonoscopies have become pretty routine for people with reasonable access to care. In breast cancer, routine mammography has also led to a reduction in mortality by detecting earlier-stage disease that is curable with surgery and adjuvant therapy. Those are major epidemiologic and population-based advances that have led to a reduction in the rate of mortality from those diseases.

In hypertension, you have to look at very large populations to see much of an impact there. I do think people who are at risk are identified earlier, and they will hopefully have interventions that help to reduce long-term effects. There has been progress, but I don't think the application of medicines and changes in lifestyle have been widespread enough to really have the impact we would like to have.

Morris: We have the pap smear to determine cervical cancer, mammograms to detect breast cancer, and the colonoscopy to detect colon cancer. Have there been advances in the world of pathology in terms of determining what to do at different stages of these cancers that could be resulting in improved survival?

Shea: I think where the role of pathology has had its greatest impact in recent years has been to identify higher-risk patients with earlier-stage disease. A person whose tumor has certain high-risk mutational abnormalities and a diagnosis of stage I lung cancer would be more likely to receive immunotherapy or some other follow-up treatment like radiation in addition to their surgery. The molecular characteristics of the pathologic specimen can help identify more effective treatments, and that improves both survival and sometimes mortality rates even if it doesn't lead to cure. At the same time, surgical advances are certainly providing people with a higher quality of life and then, depending on the stage of the disease, allowing the patients to get life-prolonging or curative therapy down the road.

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Morris: So, there have been advances in surgery as well as treatments?

Shea: Yes, for example, we never used to think there was a role for surgery if somebody already had spread of colon cancer to the liver, but there's evidence now that if you have limited involvement of the liver, surgical removal of the tumor mass can prolong life. The same could be said about the surgical treatment of single, as opposed to multiple, metastases to the brain. There is also the fact that many surgeries now can be done laparoscopically or robotically with similar or better outcomes as well as shorter hospital stays and fewer complications.

Morris: What is the role of places like Lineberger in advancing the multidisciplinary approach to cancer identification and treatment?

Shea: It really is the responsibility of centers like Lineberger, the places that have funding for basic research, patient care, and epidemiology, to not just find better ways to treat individual tumors but also to provide models for a better way to manage this process. I think the multidisciplinary approach is something that has really been spearheaded by many cancer centers. Lineberger became particularly well-known for this approach in the lung cancer program 25 years ago, when we set up a process whereby experts in pathology and radiology and medical, radiation, and surgical oncology met and reviewed a patient's case prior to the initiation of definitive treatment for these patients. I think this really has become the multidisciplinary model that most programs try to mimic for the vast majority of patients with cancer whenever possible.

Morris: We are seeing a lot of advances in immunology. How has that evolved during your career as an oncologist?

Shea: People have tried for a long time to treat cancer effectively by re-harnessing the immune system. Everyone develops malignant cells in the body all the time, and part of the body's normal housekeeping is to identify those individual cancer cells and get rid of them before they turn into a clinical malignancy. Researchers have asked, 'If we could just fix that mechanism that clearly has gone haywire, would it be a way to avoid chemotherapy and some of the toxic effects of treatments?' I think that we're in a time now where the science has advanced enough that people are starting to make serious gains by not only identifying these tumors at an early stage based on the pathology, but also then re-directing the killer cells that are part of the normal immune system and expanding them so that they can be targeted against the tumor.

There have been some dramatic breakthroughs, predominantly in lymphoma, certain forms of leukemia, and multiple myeloma. What we've not really been able to do very well yet is to translate those findings into effective therapies for the more common solid tumors, like lung, breast and colon cancers. That's really where I think the field is trying to move at this point, and while it's not without risks, the potential for more effective treatments and cure is enormous.

Morris: The Center is funded predominantly by the National Institutes of Health, but you're also a successful fundraiser. What is the role of donations from individuals and philanthropies?

Shea: When you think about MD Anderson or Sloan Kettering, you think about how they provide a very high quality of care for lots and lots of people who have been diagnosed with cancer. At UNC, the North Carolina Cancer Hospital is not owned or run by the Lineberger Center; it's part of the university and therefore the state, but as with Sloan Kettering or MD Anderson, many people identify the Lineberger Center and NC Basnight Cancer Hospital as the place to go for cancer care at UNC. This is all very expensive care, and most of the revenue that's generated goes to pay for the routine cancer care that these people receive and not into the cancer research program. The other pieces of what we do, the epidemiology, the clinical trials, the basic laboratory research, is paid for with funding from grants, whether federal from the NIH or the National Cancer Institute or from large organizations like the American Cancer Society or Leukemia and Lymphoma Society, and by philanthropic donations. Those funds are usually for specific projects and do not cover the costs of routine care.

A great example would be the Mary Anne Long Patient and Family Resource Center at the NC Basnight Cancer Hospital, which has almost entirely been based on philanthropic funds. It has a staff of 5-10 who help patients, whether it's to give them information about their illness, provide counseling, acquire wigs for women, identify transportation, or help access housing at facilities like the SECU Family House at UNC Hospitals for a family while their loved ones are receiving care. All of those are things that family members and patients really benefit from, but the money required for this free service usually comes from donations and not from clinical funds or research grants. Likewise, a significant portion of the funding for early-stage research in fields such as immunology has also come from the directed donations of grateful patients and their families.

Morris: If you were to speak to the general public, many of them would say they are concerned about the potential cancer impact of environmental toxins. Do you think that's the new frontier of cancer detection and cancer care?

Shea: Clearly the incidence of many cancers has increased over time. I think that part of this is the significant association between the occurrence of cancer and aging; cancer occurs in 70 and 80 year olds much more often than it occurs in 20 and 30 year olds. So, I think as the population ages we're going to be seeing more cancer. Whether this is the result of people being exposed to toxins for a longer period of time isn't clear, but there's certainly data that some carcinogens, like benzene used in dyes and asbestos in insulation, have been incorporated into our bodies over time. Unfortunately, we don't often realize until we start to see evidence of bad things occurring, and then we have to work backwards to identify the causes and how to avoid them. Answering this question about toxins is going to require

both the epidemiology and the investigation of what the etiologies might be.

Morris: What is coming next for cancer research?

Shea: *It's clear that successful therapy in the world of cancer is going to continue to be dependent on prevention and early detection of non-malignant disease states that may be associated down the road with cancer, and trying to treat them early before cancer is ever identified. Ideally, most people would say that treating cancer is not where we need to be and that we need to prevent cancer more than treat it. But having said that, I'm certain that within my lifetime we're never going to prevent all of them. So, I think continued efforts to improve therapies will*

play a huge role in the successful treatment of cancer for years to come.

We are definitely making progress. We're now doing better, although not as well as we'd like, with many different tumors, and as we identify the individual molecular aspects of cancer cells better, certain therapies are going to become very effective against smaller populations of patients. That also becomes a political and economic discussion, because it gets very expensive to develop so-called designer treatments for small populations of patients. We'll have to figure out a way to address this issue, because that sort of patient-specific therapy is really the next frontier in cancer care. NCMJ