finding Peace from Hiroshima

by Matthew N. Skoufalos

One oncologist's fight to rectify the damage caused by radiation

In a small town just outside Osaka, Japan, Ritsuko Komaki was born, quite literally, into the atomic age. She was just an infant in 1945 when the first atomic bomb ever detonated on a human population devastated her family's ancestral home of Hiroshima. At that moment, Komaki became one of a generation of Japanese for whom life was forever altered by the fury of a sun brought to earth.

Half the relatives on her father's side of the family were slain in the blast itself. Despite having been pinned under a collapsed wall, her maternal grandmother survived the explosion, but later presented every side effect of total-body radiation exposure. So did Komaki's then-19-year-old aunt. When Komaki's father returned to the city to search for his in-laws, black rain carrying soot, ash and radioactive particles from the firestorm contaminated a vast area stretching northwest from the hypocenter of the explosion. The toxic downpour made him another victim of exposure.

Yet, when Komaki was only 4 years old, her family — parents, older brother and sister — relocated to Hiroshima, bound by a responsibility to care for survivors of the attack and to rebuild the devastated city. Food was in short supply, and the reconstruction took a long time in a nation that had been rationing supplies during wartime.

Public health concerns might have dictated that the re-settlers avoid the city for as many as 20 years to safely avoid contamination, yet Hiroshima residents returned after six months merely to defend the rights to their property. Land was so precious in Japan that squatters and opportunists frequently turned the confusion in the wake of the disaster to their advantage. With all the deeds, titles and documents of ownership destroyed in the attack, many of those leaving the city for treatment returned to find their land seized in their absence.

Such was the case with Komaki's grandmother, who found most of her family's property usurped by developers in her absence. "My childhood was very depressing, I have to say," Komaki recollects.

Just as England had done during the early days of World War II, most of the children of Hiroshima were scattered throughout the countryside to keep them away from urban centers that were the most likely military targets. "[The children] returned to find most of their parents dead," she says. "Most of my friends grew up in orphanages."

A Friend Remembered

Tragedy was nothing new to the families who lived within the cities of Hiroshima and Nagasaki, the other Japanese city that experienced an atom bomb attack a few days after Hiroshima. But nowhere was anguish more personified than in the death of Komaki's elementary school classmate, Sadako Sasaki. Sasaki was born just a short time before the Hiroshima bombing. Komaki remembers her as a cheerful, upbeat child upon whom family members

recuperating from the effects of radiation sickness relied greatly. Even at a young age, both she and Sasaki were runners and often competed against one another.

"Sadako loved to run," Komaki says. "She was so active. The most memorable thing about her was her activity and sense of competition." When she was 10, Sasaki began to suffer from shortness of breath that sidelined her from the physical activity she so enjoyed. A physician's diagnosis found that she was anemic, but her condition soon deteriorated beyond that mere explanation. Sasaki was diagnosed with leukemia, and was later hospitalized with bone marrow suppression. She was only 11 years old when she died.

Sasaki's death puzzled Komaki. Her grandmother had been exposed to the same chemical radiation that Sasaki had, yet never contracted leukemia despite presenting with all the other side effects of exposure. "I'm a very curious person," Komaki says. "Why did my grandmother never have any leukemia, but Sadako did? She never had any cancer, but she had all the symptoms of exposure — hair loss, diarrhea and bone marrow problems. This was a very curious phenomenon for me because we knew so many different stories about the post-exposure effects."

"It was a very sad time," remembers Komaki. "Sadako really wanted to get better and run again, but she couldn't make it. It was striking to me that a person who was so alive, so beloved by family members and classmates should die so young."

"In Japan, they hate radiation," Komaki says. "This mood is changing somewhat, but for so many years, they did not want to hear about radiation therapy. Patients had an illogical fear of it that delayed offering it as treatment there."

Sasaki's memory was then immortalized, with a little help from her friends and ancient Japanese lore. When Sasaki fell ill, her friends offered hundreds of prayers for her recovery. One classmate reminded her of an old custom that centered on the crane, a Japanese symbol of happiness and longevity, and origami, the art of paper folding: If she could

Ritsuko Komaki was just an infant in 1945 when the atomic bomb devastated her family's ancestral home of Hiroshima. She grew up to become one of the chief physicians at a leading cancer care centre in the US.

craft 1,000 origami birds, Sasaki was told, the prayers for her recovery would be answered and she would get well.

In the hospital, the medication with which Sasaki was treated for her bone marrow suppression was wrapped in wax paper. Every time she took the medicine, she folded a crane from the wrapper. In fact, some of Sasaki's cranes are still displayed in Hiroshima at the Peace Memorial Park. On her own, she folded 644 origami cranes before succumbing to the leukemia; her classmates helped craft the remaining 356 cranes to achieve the 1,000 that was her final goal.

"When Sadako died, we decided to build a statue in memory of her and the other children who suffered because of this exposure to radiation," says Komaki. "We made a documentary about her story, *1,000 Cranes,* to raise money for the memorial, and we raised a lot of money. We wrote letters to the deans of the elementary, junior and high schools in the city. We stood on the street to collect donations. We just hoped that children in the future would not suffer these problems. That's the way I grew up."

"When Sadako died," Komaki recalls, "I knew I wanted to become a physician."

A Life-long Mission

During medical school, Komaki volunteered her summers at the Atomic Bomb Casualty Commission, the institute the United States built in Japan to examine the victims of atomic exposure. Anyone diagnosed as anemic underwent a bone marrow exam, and Komaki learned a great deal

Dr. Ritsuko Komaki was inspired to become a physician after her friend and classmate, 11-year-old Sadako Sasaki, died of leukemia caused by exposure to radiation from the atomic bomb dropped on Hiroshima. After Sadako's death, 12-year-old Komaki led her classmates on a fund-raising campaign that raised $100,000.

The money was used to build a statue in Hiroshima's Peace Memorial Park. The monument, which depicts Sadako holding aloft an origami crane in a gesture of peace, has become an international symbol of hope for a world without war.

The Japanese statue has since inspired several memorials in the United States, and Sadako's story has been told in books, plays and films.

about chromosomal abnormalities by performing blood tests alongside visiting researchers from Yale University and other American hospitals. But when a nationwide strike by medical students closed the more than 40 hospitals attached to the Japanese university system for almost three years beginning in 1969, Komaki decided to travel to the United States for her post-graduate education and enrolled at the University of Wisconsin in Madison to study radiation oncology.

"I started to do some general internal medicine," says Komaki. "I had wanted to be a hematologist, but I was still very curious about the effects of radiation. I had seen patients cured by radiation treatment, and I started to see the difference between focused, localized radiation treatment and the lethal dosages to which my grandmother had been exposed." The bombings of Hiroshima and Nagasaki had fostered a national paranoia about radiation and radioactivity that Komaki says reverberated in the national consciousness of Japan for decades.

"In Japan, they hate radiation," Komaki says. "This mood is changing somewhat, but for so many years, they did not want to hear about radiation therapy. Patients had an illogical fear of it that delayed offering it as treatment there." In Japan, the majority of cancer treatment culminated in surgery, Komaki says, which was befitting of the culture. Japanese surgeons were renowned for their skill and attention to detail, and the Japanese people, who did not have much coronary heart disease, could generally tolerate the physical stress of surgery.

Radiation oncology was not a recognized specialization; oncologists were grouped in with diagnostic radiation techs. Neither did the nation have any medical physicists, which delayed the adoption of most standard radiation treatments in the country. Japan's Ministry of Technology commanded a vast budget that awarded physics grants and purchased high-tech devices, but did not improve the quality or pace of oncology studies — or dispel any of the longstanding fears about the therapeutic use of radiation. Since technology was given the highest priority among national spending, physicists came to research advanced proton and carbon treatments, passing on the more elementary radiation therapies upon which radiation oncology is founded (and in which Komaki was trained).

Yet today, Ritsuko Komaki, MD, is the chief operating officer of one of the most sophisticated radiation oncology treatment facilities in the United States: the $120 million M. D. Anderson Cancer Center in Houston. And ironically, the technical equipment that forms the cornerstone of M. D. Anderson was built in Hitachi City, Japan.

The system is composed of three rotating gantries, a fourth that produces a fixed beam and a fifth specifically devoted to experimentation. They are used to accelerate protons to a very low-radiation dosage that penetrates the skin at an

adjusted depth — only 10 to 20 % of the radiation enters the tumor at first. The proton effect is very similar to that of an X-ray: almost no radiation spreads through the body beyond the localized penetration of the tumor. The greatest efficacy of proton therapy lies in its ability to confine the treatment field to cancerous cells without disturbing normal cells, which is especially important when treating cancer in developing children.

"This procedure is most effective with cancers in the middle of the body," says Komaki, "[such as] prostate cancer, brain tumors, lung cancer, some pediatric tumors, head and neck tumors — localized cancers. If we put a lateral beam in the prostate area, for example, it spares any damage to the rectum or bladder. Even [intensity-modulated radiation therapy] scatters radiation around that can damage bone, blood and the surrounding area, but the proton treatment spares normal tissue."

Usually the treatment takes six to seven weeks of 10- or 15-minute sessions before the beam can safely be brought up to full strength, and although the procedure is approved by the US Food and Drug Administration, it is costly: as much as $150,000 to $200,000 depending upon the complexity of the treatment. However, Komaki points out that the cost of a radical prostatectomy is nearly identical to this figure and far more invasive.

Finding Peace

Giant origami cranes soar, frozen in flight, above the entranceway to the patient waiting room at M. D. Anderson. They are steel mobile replicas of a bird Komaki herself folded; a remnant of her memory of Sadako Sasaki and a looming reminder of the hope with which she entered her chosen profession. They echo the "peace" inscription that adorns the memorial statue of Sadako in the Hiroshima Peace Park, and Komaki believes they help to comfort and protect the children entrusted to her care.

In addition to educating others about her cause and overseeing treatment at the center, Komaki is also involved in a few prospective proton therapy trials that must be overseen to their maturity. Even at 61, it seems the work she has been called to do is even now barely escalating.

Yet, of the numerous roles she has been called upon to assume since her initial experience with radiation — student, advocate, researcher, philanthropist and mourner — what matters most to Komaki is her life as a clinician. Her passion to provide the highest standard of care for her patients drives her to progress and improve the treatment options in a field to which she has already given so much, both personally and professionally.

"I cannot cure every patient I see," Komaki says, "and every time I fail, I really feel like I should have done something better. I have learned so much from my patients, and I care about [them]. I would like to be remembered as a good physician, as a good doctor to my patients."

But what drives Komaki and has always underscored the story of her life is her uncompromising curiosity at the strange gift of her birthright. Even as it spurs the research that steers the future direction of her career, the power of the atom traces a line through Komaki's life that extends back to Hiroshima, back to her childhood. It is why, among all the lectures she delivers worldwide, she still honors invitations to speak at the elementary schools of her coworkers' children.

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"My friends and coworkers have all those kids, and they are all reading Sadako's story," says Komaki. "So when they hear that I'm from Hiroshima, a lot of people feel it's strange that I became a radiation oncologist."

But Komaki knows this much: If 10-year-old Sadako Sasaki were diagnosed with juvenile leukemia in 2006, she would have a great chance at life.

"I'm just lucky," she says. "Whatever I'm doing is very rewarding. I feel like I'm doing something for Sadako, and, hopefully, my message will be heard."

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