Memorial

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Andreas Roland Grüntzig: A Free-Spirited Genius

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Andreas Roland Grüntzig and his wife, Margaret Ann Thornton Grüntzig, died in a plane crash in Monroe County, Ga., USA, on October 27, 1985. They were flying to Atlanta from their home on Sea Island, Ga. (one of the coastal islands off the coast of Georgia). The weather was bad.

A.R. Grüntzig was returning to meet a cardiology fellow at Emory University Hospital where he planned to check on a patient about whom he was concerned. This account of his last day tells us two things about Andreas. First of all, the account underscores his disregard for his personal safety. I, and many others, had pleaded with him not to pilot his own plane, but he had no fear. Secondly, the account highlights his great concern for the welfare of his patients.

The rumor surfaced during the early morning of October 28, 1985. There was a plane down. Could it be the Grüntzigs' plane? The feelings of his Emory colleagues cannot be expressed in words. It was a feeling of helplessness and despair with diminishing hope. A few hours later it was definite. I called his brother in Düsseldorf, and he traveled to Heidelberg to inform his mother. The telephone rang, and messages arrived from people all over the world. This 46-year-old genius and his 27-year-old physician wife were known throughout the medical community which, for them, extended from Hong Kong to Switzerland and from Canada to Argentina.

Within hours after the crash the nauseating news was heard round the world, and the feeling of helplessness and despair paralyzed the people who knew them.

His mother, his brother, and many American and international friends were at the funeral in Macon, Ga., on November 1, 1985. His mother brought a plastic bag with her. It was filled with German soil. At the graveside she sprinkled the soil on both of their caskets. His brother and the Thorntons did likewise. His beautiful mother said softly: 'auf Wiedersehen -auf Wiedersehen'. The Emory University had a campus-wide Memorial Service on November 3, 1985, and another Memorial Service was arranged by the President of the American Heart Association at its annual meeting in Washington, D.C., on November 12, 1985.

What did he do? Andreas Grüntzig invented the miniaturized balloon-tipped catheter and developed the technique of percutaneous transluminal coronary angioplasty. He always gave Forssman, Sones, and Dotter, along with many others, credit for the platform on which he stood. He, above all, understood the 'standing on the shoulders of giants' concept which was popularized but not uttered first by Merton [1].

He performed the first coronary dilatation in a patient on September 16, 1977 [The interested reader is referred to ref. 3 for Grüntzig's account of the first coronary angioplasty in man]. This followed several years of work on animals and on the more peripheral arteries of man. He reported his results in several patients in Lancet in 1978 [2]. From that point on, he and his work

were watched in crescendo fashion by interested scientists everywhere. There were clues that he might move to America. I invited him for a visit to

190

Hurst

Emory University in Atlanta in 1980. He stated his needs clearly. He was a tough but kind negotiator. We met his needs, and he moved into one half of my office suite at Emory University Hospital in September 1980. During the 5 years he was with us, he and his associates in the laboratory performed more than 4,000 coronary angioplasties.

What was he like? Physically, he was tall and lean. His eyes were dark, and his eyelashes were long. He sported a distinctive mustache. He moved with perfect coordination. His personality was multifaceted. He was kind but tough when he needed to be tough, thoughtful of others, persistent, confident but not arrogant, elegant, charismatic, fearless, daring with his own life but protective of his patients' lives, highly skilled in the laboratory, creative and brilliant. Because he 'saw' things that others did not see he would be classified as a genius.

There are several reasons why he was successful. He invented the small balloon catheter used to dilate obstructed coronary arteries. He was the first to work inside the coronary arteries: prior to him, no one dared to do that. The following point must be emphasized. His lack of concern for his personal safety stopped there for he was greatly concerned about the safety of his patients. Although he was daring, his kindness and concern for others permitted him to utilize the technique with safety on his patients. Had he been daring without concern for his patients, the technique might have been misapplied and perhaps discontinued. Finally, the popularity of the procedure grew because he taught cardiac fellows at Emory and presented 14 courses, 4 in Zurich and 10 at Emory University, to a large number of cardiologists who were already skilled in cardiac catheterization. These courses, often attended by 400–500 people, displayed the great teaching ability of Andreas Grüntzig. He and Drs. King, Douglas, Myler, and Spitzer performed coronary angioplasty in one of the Emory University Hospital cardiac laboratories and transmitted the action by television to a large screen a block away where the large audience was seated. Finally, his honesty and integrity were so uniformly recognized by the medical community that the technique was accepted much more readily than had the reverse been the case.

He called research – 'new directions'. He was constantly refining his technique, developing new catheters and making notes on 'new directions'. He insisted that the cardiology fellows who trained with him have at least 3 years of cardiology training and work with him 1 or 2 years. He was not interested in training physicians to be technicians, but wanted to train individuals who would push the field ahead as he did -slowly and gently, with the patient's safety in mind. He cannot be replaced. This is the reality of the sad event. His work can and will continue. In order to insure the continuation of his work, which was destined to be in areas other than angioplasty, the Board of Trustees of Emory University has established the Andreas Grüntzig Cardiovascular Center at Emory University Hospital in Atlanta. The Center will emphasize research in the broad field of cardiovascular disease, and international scholars will convene to discuss approaches to unresolved problems. The Andreas Grüntzig Memorial Fund will be utilized to support the Center. We have discovered three chapters and the table of contents of a book he was writing on angioplasty. I will shepherd the book to completion in order to share his last views with a wider audience. We will organize the Andreas Grüntzig Angioplasty Society,

and the angioplasty courses he organized will continue. So, his work will live on, although we will miss the excitement generated by his unique free spirit.

Auf Wiedersehen Andreas and Margaret Ann.

References

Merton, R.K.: On the shoulders of giants (Har-court, Brace & Jovanovich, San Diego 1985).

Grüntzig, A.R.: Transluminal dilatation of coronary artery stenoses (Letter to the Editor). Lancet **1**: 263(1978).

Hurst, J.W.: History of cardiac catheterization; in King, Douglas, Coronary arteriography and angioplasty, pp. 6–8 (McGraw-Hill, New York 1985).

As I Knew Him

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Andreas Grüntzig was a dreamer, but, unlike most, he dared to act on his dreams. He acted when others would not dare.

Physicians who now work inside the coronary arteries to relieve obstructions may feel comfortable doing this work. I can never forget what an uncomfortable and daring step this was. The year was 1976 – the American Heart Association meeting. I was presenting a poster next to an exhibit from the University of Zurich. Paul Lichtlen called me over to meet a strikingly dashing young man wearing an ascot. The experiment he was demonstrating involved inflating a rigid balloon inside a dog's coronary artery thereby breaking a silk ligature which had been tied around it. A deceptively simple but necessary experiment to demonstrate that obstructed flow could be restored safely and that the balloon could exert adequate force to open the artery. The comments from those gathered around were consistent with our preconceived notions about coronary atherosclerosis. 'That would not work in human coronary arteries', 'The plaque would shatter and embolize', 'All the arteries would clot'. Encouragement from his own university was equally pessimistic. To give up and go on to other things would have been normal. Andreas was not a 'normal' man. Less than 1 year later he had performed the first percutaneous transluminal coronary angioplasty in man.

What was his reaction to the first success? To hide it? To protect his territory? To try to perfect it himself

1 Presented at the funeral of Andreas and Margaret Ann Grüntzig in Macon, Ga., USA, on November 1, 1985, at the memorial service at Emory University on November 3, 1985, and at the memorial service at the American Heart Association on November 12, 1985.

and keep it to himself? No! He gave it away. He developed studies to examine whether the technique could stand the rigors of scientific investigation. He invited other physicians to come and see and duplicate what he had done. And he began to teach. He taught his discovery like no other scientist had taught before. His honesty and openness at inviting all who would come to watch as he performed the technique insured his success. As he found better equipment and techniques for performing percutaneous transluminal coronary angioplasty, he gave his secrets away; at his courses, both success and failure brought applause.

But in his giving he never forgot what he had received. In January 1980, he brought 3 men on whose shoulders he stood to his demonstration course. Mason Sones, the father of coronary arteriography; Charles Dotter, who first dared transluminal dilatation, and Melvin Judkins, who collaborated with Dotter and developed percutaneous coronary arteriography. At the completion

of the course, we all hiked to the top of a small mountain overlooking the Lake of Zurich for a spaghetti and wine dinner. Andreas honored these men who paved the way for his ideas. It was a cold night, and Andreas had built a bonfire. We ended that evening walking together down the mountain in the dark, each carrying a torch lit from Andreas' bonfire. Little did we know that 1985 would take all these men. Now Andreas has joined them -what a cath lab they must have in heaven!

He could be gentle and kind. One had only to see him at his cabin in the Swiss alps playing with his 3-year-old daughter or playing the flute and singing late at night with old people to understand his need for family.

Sure he was a hard negotiator and demanding of others as he was of himself, but when he perceived

192

King

that others would be hurt, he was very sensitive. Once while looking for office space, I obtained a convenient suite of rooms for him near the cath lab. Everything was set, but when he discovered the feelings of the people who would be displaced, he refused the space. Dr. Hurst came forward with alternative accommodations.

In this year of the comet, we are reminded that he came into our lives like a comet and burned briefly but brightly. Oh, how this light has ignited the imagination of others throughout the world. He changed forever the face of Cardiology and the treatment of heart disease. All future therapies for treatment of obstructive coronary artery and peripheral arterial disease will be built on the foundation he laid. He was a rebel, but not one without a cause. The light he emitted on those too short 46 years was not enough – we wanted more. It is our responsibility that the light continue to burn with new ideas which undoubtedly would have come sooner had he stayed longer.

Memorial Tribute to Andreas R. Grüntzig

Given at the American Heart Association Annual Scientific Sessions in Washington, D.C., November 12, 1985

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As a representative of Europe, I bring the condolences of many friends of Andreas Grüntzig in the Old World.

I was asked to say a few words about the first period of Andreas Grüntzig's life in Germany and Switzerland. His youth was not an easy one. Andreas was born in Dresden in 1939. When he was 5 years old, he lost his father in the war. Having gone to college in Leipzig, Andreas – by decision of the socialist regime – was supposed to do bricklaying. Instead, with his courageous mother and brother, he fled to West Germany, before the wall was built.

Andreas studied medicine in Heidelberg, but the post of assistant in social and preventive medicine did not satisfy him.

We met first in 1969 when he came to Zurich to do general internal medicine. Later he began as a fellow in angiology. He was an industrious scholar and a very good observer. Studying the Achilles tendon reflex after treadmill exercise, he showed that patients with intermittent claudication had a slowed relaxation of the calf muscles. These results prompted our early studies of negative dp/dt in the heart during ischemia.

He discussed the papers of Dotter and Judkins, whose method he went to see applied in practice by Zeitler and Schoop in Engelskirchen, Germany. It was obvious that two or more concentrically sliding catheters of increasing dimensions, with a large hole at the point of insertion in the artery, but especially with mainly longitudinal forces on the endothelium, were not the best solution to attack stenoses. Instead, a non-compliant balloon, passed empty into the stenosis, would exert radial forces when expanded, and could be mounted on a small catheter. Basically a very simple idea!

Memorials

193

A busy activity developed with catheters of different material, plastic balloons, various molds, knife and thread, adhesive plaster, glue, heat gun and water bath, partly on Andreas' kitchen table, partly in the laboratory. Contacts with the technical university for better materials and with the industry for precise fabrication followed. The balloons of various sizes were tested under all sorts of rigorous circumstances. At the end of 1973, Grüntzig applied his dilatation catheter with success in peripheral arteries in man, first in stenoses of the femoro-popliteal axis and later in iliac arteries. Patients who were supposed to have a leg amputated walked happily out of the hospital on both legs.

He was finally given a post of Oberarzt (a staff position) in angiology.

At this time, it became obvious that I had to hire Andreas for cardiology; after all, it was the same disease. Grüntzig joined our cardiology group, even though others thought that it was unwise to take an angiology fellow as an Oberarzt in cardiology. But it was a pleasure to teach Andreas the transseptal puncture, and much more of our fascinating speciality. Also the potential to use cardiac catheters for something other than only diagnosis was fascinating.

The miniaturization of the balloons with the double lumen, which we thought was necessary for perfusion during dilatation, proceeded well. We employed them on dogs with coronary stenoses in 1975; Andreas Grüntzig reported these results at the German Heart meeting.

This was a happy time for Andreas. His optimistic mind, his tenacious character – even his single-mindedness – his pragmatic approach to the problems (not abstract, but practical!), and especially his personal engagement were great. It would be wrong to forget his sense of humor. We spent many cheerful hours together with his first wife, for example during the skiing days of our cardiology group, where he was one of the speediest skiers.

He often took calculated risks. He started to take flying lessons on a Piper and later on a Cessna plane. He was a high flyer. Flying became his second hobby, the first being his professional engagement. He told me once: 'Flying means to me confirmation that I have no fear!'

In the beginning of 1976, I was called to succeed Duchosal in the chair at Geneva, and Hans Peter Krayenbühl took over the cardiology group of the Medical Polyclinic in Zurich.

Fortunately, there was

no ethical committee that could reject the project of Andreas. Although critical voices were numerous, Andreas Grüntzig had, in the person of Ake Senning, a surgeon who backed him up with his authority: 'If something happens, I operate' he said.

You know what followed: Andreas applied his coronary dilatation catheter successfully for the first time on the 16th of September 1977, in a 38-year-old salesman with severe angina of functional class III. Operator and patient were of equal age. At reangiography 5 weeks later, the area of dilatation was smooth, and the obstruction could barely be seen any more. The patient has now outlasted his operator.

Friends of Andreas outside Zurich, as Martin Kaltenbach in Frankfurt, and Richard Myler and Simon Sterzer in the US, played an important role, supporting Andreas in the further developments.

As has happened many times in medicine, a new approach goes through several phases before it finds its adequate place: First, refusal or condemnation because it is inconceivable. Second, if it works, astonishment and often jealousy of others. And third, it is taken for granted, even self-evident. So was it also with percutaneous transluminal coronary angioplasty (PTCA).

The first patient gave an interview in a tabloid. Andreas could not escape the journalists, and was interviewed extensively – he obviously enjoyed the limelight. But many physicians in Switzerland thought that Andreas' attitude was not decent for a doctor. When he submitted his first abstract on PTCA, the Committee of the Swiss Society for Cardiology was divided for emotional reasons; one vote only made the difference, so that it was accepted.

Fortunately, it was different at the American Heart Association meeting in October 1978.

Grüntzig had applause in the middle of his first report on coronary patients, something rarely seen during scientific conferences; and he quickly made many friends who visited him in Zurich.

Andreas was appointed lecturer in 1977. With great courage he demonstrated his approach in his first lively courses. But, in Zurich, Grüntzig's important work was not honored as it would have been abroad. A prophet's voice is seldom heard in his own land!

The consequences you know, as Dr. Hurst has described them.

Farewell Andreas! We bow in honor of a friend with great personal engagement and a man with courage.

Not all risks are calculable!

Memorial Tribute to Andreas R. Grüntzig

Given at the American Heart Association Annual Scientific Sessions in Washington, D.C., November 12, 1985

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On Sunday, October 27, 1985, Andreas and Margaret Ann Grüntzig were tragically killed in an airplane accident. These two dear friends and colleagues, a German-born man and his American wife, were taken suddenly from us at the peak of their vitality and productivity and it is a loss from which we will not soon (if ever) recover.

Simon Stertzer and I have had the privilege of working with Andreas during the past decade in the development of the technique and technology of coronary angioplasty, following his pioneering efforts in miniaturizing peripheral angioplasty catheters for the coronary arterial system. Indeed, the evolution of cardiovascular catheters for diagnosis and therapy has been a marriage of ideas of many physicians from abroad (especially Germany) and from the United States. Since Forssmann in Eberswald in 1929 and Coumad and Richards, 12 years later in New York, there has been a continuous interplay of invasive and interventional cardiologists and radiologists, notably, Mason Sones in 1958 in Cleveland, Melvin Judkins in Portland and Charles Dotter in 1964 and 3 years later in Loma Linda. Investigators from Nuremberg, Engelskirchen, Berlin, Frankfurt, Göttingen, Aachen, Mainz and other centers in Germany and Switzerland, merged easily with physicians from New York, Boston, Milwaukee, Rochester, Providence, Palo Alto, Miami, Kansas City, Los Angeles, San Francisco and, of course, Atlanta during the 1970s and 1980s in the development of new interventional techniques which would revolutionize the treatment of obstructive cardiovascular disease.

With Andreas' death, I lost a dear friend with whom I shared many years of trial (often by fire) and ultimately success. His courage in allowing the very beginnings of the clinical usage of coronary angioplasty to be observed by numerous objective (and often, understandably, skeptical) referees is, to my knowledge, unprecedented in medicine. His willing generosity in sharing and teaching angioplasty personifies the title 'doctor' (from the Latin 'to teach'). I will miss him as I would a brother.

Sadly, there are other great pioneers and teachers who have passed away this year: Charles Dotter (the father of angioplasty), Melvin Judkins (his early associate and, in his own right, a pioneer in coronary angioplasty) and Mason Sones (the father of coronary angiography). These four men knew each other well and took great pride and delight in each other's new ideas. Although different 'personalities', they shared several qualities in common: courage, intellectual curiosity, dogged honesty and a 'maverick' spirit. Their professional lives can teach us all things beyond their tangible accomplishments.

In 1911, before any of these men were born, Da Costa, in a prophetic and elegant passage, spoke to them...

No one knows

The haunting anxiety

The deep responsibility

The numerous self-reproaches

Of a man

Who spends his life

Developing a new procedure.

He must have A hand as light

As floating perfume An eye as quick

As a Darting sunbeam A heart as compassionate As all humanity

And a soul as pure

As the waters of Lebanon.

Memorials

195

Dr. Thomas Ryan asked me to say a prayer on the occasion of this memorial, and though somewhat ill-equipped to do so, I sought the help of anonymous Hebrew scribes of the past three millennia on the subjects of life and death:

Thou has fashioned man and knows the inclinations of his heart. Man is but flesh and blood, His origin dust. He wears out his life for his daily bread, He is like the grass that withers, The flower that fades,

Like a shadow that moves on ... Like a cloud that passes by,

Like a mote of dust driven by the wind, A dream forgotten.

Our life is but a fleeting gleam between two eternities. All of us must inevitably tread the same path.

Though we know not when the hour may come, may we so live that when the time arrives, It shall find us prepared.