

# Circulation

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## European Perspectives in Cardiology



### Spotlight: Stephan Achenbach, MD, FESC, FACC



#### Early Research Success in the Detection and Characterisation of Coronary Atherosclerosis by Computed Tomography

**Stephan Achenbach, professor in the Department of Internal Medicine 2 (Cardiology) at the University of Erlangen–Nuremberg, Bavaria, Germany, talks to Mark Nicholls.**

Stephan Achenbach, MD, FESC, FACC, clinical cardiologist and vice chair of the Department of Cardiology at the University of Erlangen–Nuremberg, Bavaria, Germany, has developed a global reputation for his work with cardiac imaging. Specialising in computed tomography (CT) of the heart, he has played a part in developing new techniques to offer better diagnosis. However, he believes that the physician's focus should remain on the patient. He says, "Our patients deserve to be treated by doctors who consider the clinical work more important than their research."

Born in Wiesbaden, Germany, in September 1965, Professor Achenbach enrolled at the University of Erlangen–Nuremberg to study physics, after attending high school and completing his military service. After 1 year he switched courses to study medicine at the School of Medicine, where he remained from 1987 to 1993.

#### **"I Embarked on a Rather Large Endeavour—Localising the Site of Origin of Ventricular Arrhythmias Based on the Magnetic Field of the Heart"**

Professor Achenbach initially planned to become a cardiac surgeon until his "charismatic" cardiology lecturer assigned him a topic on magnetocardiography—a diagnostic method under investigation at the time—as a thesis, and this steered him toward a career in cardiac imaging.

Professor Achenbach explains, "I embarked on a rather large endeavour—localising the site of origin of ventricular arrhythmias based on the magnetic field of the heart—which took me about 3 years to complete. Based on that project, I was offered a position in cardiology and accepted so that I could continue work in this field, even though I had originally planned to become a cardiac surgeon."

Throughout training in internal medicine, cardiology (noninvasive and interventional), and intensive care medicine, Professor Achenbach has pursued his interest in cardiac imaging and worked his way along the career path from intern, resident, and fellow to vice chair of the department starting in 2005, and along the academic path to become an associate and then full professor.

Recalling a "wonderful year of research" he experienced at the Department of Radiology and Cardiology Division, Massachusetts General Hospital, Boston, Mass, between 2002 and 2003, Professor Achenbach says, "It was a great environment to work in, just at a time when cardiac CT, my main focus of research, really took off. After 1 year, though, I felt the real strong desire to return to clinical work, and I wanted to get back into the cath lab, so I returned to Germany." Professor Achenbach looks back on his early research success as crucial in shaping his career. "I think being successful early on in my research career was key—it motivated me tremendously," he says.

#### On other pages...

##### **Spotlight: Adam Torbicki, MD, FESC**

Professor Adam Torbicki, chair of the Department of Chest Medicine, Tuberculosis and Lung Disease Research Institute, Warsaw, Poland, and past president of the Polish Cardiac Society, who set up a national media-based programme of public health education under the slogan "Mind Your Heart," talks to Barry Shurlock, MA, PhD.

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### **“I Grabbed the Opportunity to Become Involved in Cardiac Magnetic Resonance and Especially Cardiac CT When These Fields Really Started Taking Off”**

Professor Achenbach's initial work in magnetocardiography offered him the opportunity to present at conferences and publish articles when still a medical student and during his early clinical years. He recalls, “It then turned out that magnetocardiography was not so clinically useful after all, so I grabbed the opportunity to become involved in cardiac magnetic resonance and especially cardiac CT when these fields really started taking off. I was lucky to become involved with cardiac CT when the field just started, and I was able to publish some early work in the *New England Journal of Medicine*.<sup>1</sup> This was a matter of being at the right place at the right time; it was a lot of fortunate luck—I was always aware of that—but the early recognition and success did motivate me a lot to keep working hard.”

Professor Achenbach says that a number of people have helped shape his career, including the past and present chairs of his department, Kurt Bachmann, MD (until 1997) and Werner Daniel, MD (since 1997); his “attending” when he started working as a doctor, Werner Moshage, MD, who “taught me much on how to approach clinical work”; and, in the United States, Tom Brady, MD, at Massachusetts General Hospital, Allen Taylor, MD, and Daniel Berman, MD, who have served as role models of superbly successful clinician–researchers.

### **“We Really Had a Chance to Open a New Field and Do Groundbreaking Work”**

For the past decade, Professor Achenbach's main area of research has involved CT of the heart, including CT coronary angiography and the investigation of coronary atherosclerosis by CT. Looking back, he says he most enjoyed the early work in coronary CT angiography.<sup>2</sup>

Professor Achenbach says, “We really had a chance to open a new field and do groundbreaking work and find out how to best visualise the coronary arteries by CT. I remember the time—not even so long ago—when it took a whole day to reconstruct the first images of the coronary arteries by CT, and we were so happy and amazed when nice images appeared.” He regards his early research in coronary CT angiography and in the detection and characterisation of coronary atherosclerosis by CT as his most important work.<sup>3–5</sup>

### **“There is a Tremendous Workload That Comes as a ‘Side Effect’ of the Research Activities”**

Professor Achenbach's current clinical role includes working as an interventional cardiologist in the catheterisation laboratory, leading the cardiac intensive care unit, and general cardiology. His academic and research work focuses primarily on cardiac CT. He enjoys the mix of clinical, research, and academic work, though the administration that comes with it remains a challenge and takes him away from his family for longer than he would prefer. (Professor Achenbach lives in Erlangen in northern Bavaria with his wife and 2 young daughters, and away from medicine he enjoys music, sport, and photography.)

Professor Achenbach has concerns about cardiologists being able to combine clinical work and research work and achieving the highest standards for each. He comments, “With increasing success and being better known in the research world, there is a tremendous workload that comes as a ‘side effect’ of the research activities—not only administration, writing reports, administering grants, but also work for journals as a reviewer or editor, being involved in educational courses and professional societies, being part of committees, and giving talks and preparing them.”

Professor Achenbach serves as current secretary and past president of the Society of Cardiovascular Computed Tomography (founded in 2005) and as chair and member of several committees of that society; in addition, he also has a leadership role in the Cardiac CT Working Group of the German Society of Cardiology, and serves as associate editor for 2

journals and on the editorial boards of 2 other journals, including *Circulation: Cardiovascular Imaging*.

Some of Professor Achenbach's work receives funding through research grants or industry projects, but he also raises revenue for his department by staging training courses and conferences and then using some of those funds to support research activities.

Professor Achenbach particularly enjoys his work in the catheterisation laboratory, interpreting CT scans, and developing new ideas for research projects and analysing data, as well as participating in educational activities and running and organising conferences.

He says, “I also organise lots of training courses in cardiac CT—it is tremendously rewarding to see that one's



*Professor Stephan Achenbach has a global reputation for his work with cardiac imaging. Specialising in CT of the heart, he has played a part in developing new techniques to offer better diagnosis. Photograph courtesy of Peter Aulbach.*

own area of research made it into a true, large, clinical application, so I very much enjoy teaching that topic.”

**“It is Only Possible to be Satisfied With One’s Own Clinical Work When One Is Really Knowledgeable, Experienced, and Confident”**

Professor Achenbach advises people who want to follow satisfying careers practising cardiology while performing clinical research to never neglect clinical medicine and patient care—in fact it may often need to be placed ahead of research.

He says, “Clinical research requires good clinical skills; and it is only possible to be satisfied with one’s own clinical work when one is really knowledgeable, experienced, and confident.”

Professor Achenbach adds that success in a specialist area of research requires long hours and great effort; he comments, “One should not choose an area of research out of tactical consideration but much rather take up an area that is perceived as interesting, exciting, and fun.”

In the future, Professor Achenbach hopes to maintain the balance between clinical work and research, and says, “I would like to keep combining clinical work and research. I would like to be a very good clinician and a very good researcher (in that order), but this may become increasingly difficult. As for my field of cardiac CT, I would like to contribute to defining the exact clinical role for this modality: how it can best be applied to diagnose patients better and more economically.”

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Top, University of Erlangen–Nuremberg Hospital, Bavaria, Germany, where Professor Achenbach is professor in the Department of Internal Medicine 2 (Cardiology). Middle, Professor Achenbach on intensive care unit rounds with his colleague, Professor Christoph Garlichs, and fellows Ralph Schneider and Stefan Zimmermann. Bottom, Professor Achenbach with Gerd Muschiol, the chief CT scanner technician. Photographs courtesy of Professor Achenbach, Minka Schneider, and Peter Aulbach.

## Spotlight: Adam Torbicki, MD, FESC



**“We’ve Done Everything That Was Possible to Provide the Polish Population With the Necessary Knowledge [to Prevent Heart Disease] via the Media”**

**Adam Torbicki, MD, FESC, chair of the Department of Chest Medicine, Tuberculosis and Lung Disease Research Institute, Warsaw, Poland, and past president of the Polish Cardiac Society, talks to Barry Shurlock, MA, PhD.**

A cardiologist rarely has an easy job. But imagine living in a foreign country on a research fellowship, surrounded by bright young researchers and pushing forward the leading edge of the speciality. Meanwhile, at home, a revolution has begun—a social, political, and economic revolution that could change everything. You worry about your family, your job, and your friends. From the media and snatched telephone calls, you try to piece together the confused details of what is happening. But the research is going brilliantly. What do you do?

Cardiologist Adam R. Torbicki, MD, FESC, faced this situation in 1989: he was living in Italy, away from his home country of Poland. In his studies, with Roberto Tramarin, MD, he was bringing together Doppler ultrasound, echocardiography, and haemodynamics in a way that would “allow noninvasive insight into pulsatile pulmonary haemodynamics.” Even now, he has original, unpublished data from this period that he considers of interest. And he had received the offer of a permanent position in Italy, a country he calls his “second home.”

But the call of his first home proved too great. He says, “I was anxious to return to Poland because the world was changing. I had been offered a post to stay in Italy. For anyone interested in art, as my wife is, it is a treasure. And if we had lived there for 1 more year, we might have stayed. But we decided to come back—and have no regrets. We both love Italy—we understand the language, what they say, and also what they think. But, in a way, I think we have better relations with our Italian friends than [we would have] if we had stayed.”

**“There Is Obviously a Very Strong Connection Between Cardiology and Pneumology [Chest Medicine], and I Find It Thrilling and Extraordinarily Interesting to Look at the 2 Things Together”**

Professor Torbicki’s talent for languages (fluent Italian and English, good French, and some Spanish) and the fellowship in Italy form part of the rich mix of nature and accident that has driven his career. His exposure as a student to the phenomenon of commonly undiagnosed pulmonary embolism, and his marriage to Grazyna Loska, then a student of the history of art and now a critic, have also played their part. In fact, he has spent his life studying the pulmonary circulation and the right heart. After 20 years at the second Department of Internal Medicine of Warsaw Medical University,

Warsaw, Poland, he left in 1998 to chair the Department of Chest Medicine at the city’s Tuberculosis and Lung Disease Institute. He comments, “There is obviously a very strong connection between cardiology and pneumology [chest medicine], and I find it thrilling and extraordinarily interesting to look at the 2 things together.”

Because of a quirk of the system of specialist training in Poland (and in some other European countries, especially Germany), Torbicki did not earn recognition as a cardiologist until the age of 48. Until recently, Polish physicians had to undergo 5 years’ training in internal medicine before they could consider specialisation. As a result, many older physicians in Poland practise cardiology without ever having specialised, but the growth of interventional procedures has brought about changes. As of 2008, doctors no longer have to specialise in internal medicine before they can begin training in cardiology, though the new scheme still has its detractors, according to Professor Torbicki. He explains, “Even though only a cardiology specialist is able to run a cath lab in Poland, there are still some labs that have core people who are only trained in internal medicine, though they have acquired practical skills to a very high level. In the past, there was no difference between what you could do [in cardiology] as an internal medicine specialist or a cardiologist. It just depended on the attitude of the head of department.”

**“I Never Intended to Aim That High!”**

Professor Torbicki has participated actively in the Polish Cardiac Society, an organisation founded in 1954 that has more than 4500 members. Last year, he finished a 3-year stint as its president, a challenge he initially had felt reluctant to accept. He says, “I never intended to aim that high! I was not a mainstream cardiologist, but I had lots of international contacts, and knew the workings of the European Society of Cardiology [ESC] well, through my interests in pulmonary embolism and the right heart in general. I was first elected to the Polish Cardiac Society board in 1995, and I continued to be elected. Later, several eminent cardiologists asked me to present myself for election as president, but I refused twice, seeing better candidates. Eventually, I gave in and decided it was ‘unfair’ not to accept—I wanted to pay back all that the Polish Cardiac Society had given me. In the event, I was the only person in the election!”

Professor Torbicki sees the greatest achievement of his presidency as setting up a national media-based programme of public health education under the slogan “Mind Your Heart.” He explains, “I worked with 2 prevention experts, Wojciech Drygas [MD, PhD] and Zofia Stońska [PhD], and the national consultant for cardiology, Grzegorz Opolski [MD, PhD]. I knew I could probably make this kind of link between the media and health education. My wife works in television—she is a critic involved in cultural affairs, especially noncommercial cinema. It gave me the idea of collaborating with Polish public television to provide an educational programme, which was a great success. We received a grant from the Department of Health and were given free broadcast time on television in an amazing number of slots—every day, every month during 2004 to 2006, the ‘Mind Your Heart’ slogan was everywhere. We even managed to sneak messages into soap operas and popular quizzes. And the whole thing was reinforced by the press and radio, and I think that overall it was one of the most active health education schemes ever done anywhere in the world.”

In 2004, the Mind Your Heart scheme first took full advantage of World Heart Day, turning it into a national television extravaganza, with sportsmen, artists, and other celebrities helping to promote healthy lifestyle messages on-screen for several hours. He believes that he managed to sell the scheme to television moguls in part because he decided not to approach producers or commissioning editors but, instead, to “go to the top” and talk with senior executives. The Polish Cardiac Society subsequently signed a long-term agreement with public television as a corporate partner and brought substantial sponsorship from pharmaceutical companies to support the World Heart Day event. The Mind Your Heart scheme has inspired a similar effort in Slovakia, and many of its ideas have gone into an ESC media package that the society offers to national cardiology societies.

A professional polling company has assessed the benefits of the programme. Before and after the first phase of the campaign, it surveyed 1000 randomly selected people. Professor Torbicki says, “The results show definite changes—for example, people have a better knowledge of the definition of hypertension and a better understanding of the effects of diet on cardiovascular disease. But it cannot be said that we made a revolution in health education and the heart. What we can say is that we’ve done everything that was possible to provide the Polish population with the necessary knowledge via the media. For me, it was the leit-motiv of my presidency.”

#### “We Experienced a Sort of ‘Double Velocity’ of Change”

After Torbicki’s return to Poland in 1989, the country changed radically. With a population of about 39 million—1.6 million in Warsaw alone—it now has, on average, 1



*“The Knights of the Right(eous) Heart.” The faculty of a session dedicated to right ventricular function at the World Congress of Cardiology in Buenos Aires, Argentina, 2008. From left to right: Adam Torbicki, Warsaw, Poland; Julio Sandoval, Mexico City, Mexico; Sergio Perrone, Buenos Aires, Argentina; Miguel Gomez Sanchez, Madrid, Spain; Sandrine Huez, Brussels, Belgium; Stephan Rosenkranz, Koeln, Germany. Photograph courtesy of Professor Torbicki.*

cardiac department per 190 000 inhabitants [39 million/208]. However, its 208 cardiac centres differ widely, according to Professor Torbicki, who estimates that only 67 of them offer the full range of diagnostic and interventional procedures. He says, “On the other hand, Poland is served 24 hours a day by 75 cardiovascular haemodynamic laboratories well spread throughout the country, performing percutaneous coronary intervention in patients with acute coronary syndromes. The network ranks among the most effective in Europe.”

Reflecting on changes in Polish cardiology of the past 20 years, Professor Torbicki says, “Not only were there immense changes after the fall of communism, but cardiology was changing very fast in the Western world, and so we experienced a sort of ‘double velocity’ of change. As a young physician, it was hard to get a Venflon, and we used to hoard them in a drawer for more difficult patients! Now, we have almost everything we need to reach the standards required by international guidelines, though we are always fighting for money to replace outdated equipment. One of the problems is that in a hospital where complex procedures are performed, only the same money comes with the patient as in a small local hospital where only basic treatment is offered. Also, there are problems with outpatient treatment, and people who could be handled as outpatients are sometimes admitted to hospital for financial reasons.”

#### Identifying “a New Echocardiographic Sign That Is Relatively Specific for Pulmonary Embolism”

Professor Torbicki’s research career took off in the late 1980s when he published his first articles in English in collaboration with Jan Zielinski, MD, a Polish expert on chronic obstructive pulmonary disease haemodynamics. It developed further throughout the period of 20 months he spent in Italy, during which time Lech Walesa and Solidarity were rewriting history in Poland. He received a fellowship funded from the Fondazione Clinica del Lavoro, a group affiliated with the University of Pavia, Pavia, Italy. He says, “Using Doppler and echocardiography is the great adventure of my professional life. I worked on the prototypes in the early days and was one of the people who introduced transoesophageal ultrasound into cardiology practice in Italy and Poland. I still use echocardiography, and it is always a pleasure when I have a transducer in my hand! In Italy I

was looking, for example, at pulsatile pulmonary haemodynamics. Looking at simultaneously recorded pressure and Doppler tracing I could see that the Doppler indices were not related to the pulmonary arterial pressure but to its input impedance. At that time, I underestimated the significance of my findings and submitted the paper to the *American Journal of Noninvasive Cardiology*, which was not the best choice, because it closed a month after my publication without even appearing in PubMed!”

Looking back at the articles he has written in the past 25 years, Professor Torbicki feels particularly proud of one published in the *European Respiratory Journal*<sup>1</sup> that “showed that certain changes in the pulmonary artery—such as the presence of thrombi—were detectable in Doppler flow velocity tracing of right ventricular ejection due to the effect of reflected wave.” This enabled his group to identify “a new echocardiographic sign that is relatively specific for pulmonary embolism.” He explains, “It is based on a significantly disturbed right ventricular ejection (acceleration time greater than 60 ms) despite only mild pulmonary hypertension as assessed by the tricuspid insufficiency jet method (pulmonary artery systolic pressure less than 60 mm Hg).” Another article he identifies as one of his best appeared in *Circulation*<sup>2</sup> and showed that serum plasma troponin, a sign of myocardial necrosis, serves as a marker of poor prognosis in patients with chronic precapillary pulmonary hypertension. One cannot detect the troponin in plasma after effective drug treatment.

In 1990, Torbicki began his involvement with the ESC; he says he entered “by the research door,” chairing a working group on the pulmonary circulation. Henri Denolin, MD, a one-time ESC president, recruited him for this position on the recommendation of an Italian friend, Mario Morpurgo, MD. Professor Torbicki identifies the highlight as chairing—in 2000 and 2008—the task force on the ESC Guidelines on Pulmonary Embolism.<sup>3</sup> He says, “Pulmonary embolism is a very important disease that is poorly diagnosed. As a research physician, I feel that trying to educate people about this is the most important thing I can do. As a medical student in the autopsy room in Warsaw in the 1970s, I could see that most cases of fatal pulmonary embolism were not being diagnosed. And, from the literature, I learned that this was a universal worldwide problem. You have to be aware that it is a common life-threatening yet treatable condition but that the signs and symptoms are not very specific. With modern diagnostic tools—and particularly angio computed tomography—this should no longer happen. The diagnostic

strategies of the European guidelines are easily implemented and should be followed—the real problem is one of awareness, which comes from motivation. Because almost no autopsies are now being performed, students and doctors no longer learn from their mistakes!”

### “I Am Now Fighting for Patients With Pulmonary Arterial Hypertension”

Professor Torbicki has clear ideas about how he wants to continue with his career. He says, “The most important thing, from my viewpoint, is to work [at something] without linking it to what you earn. I’m happy to continue to do what is interesting, and, if it’s also useful, that’s nice. I feel I’ve done all I can for the moment to spread the word on pulmonary embolism, and I am now fighting for patients with pulmonary arterial hypertension, which is a terrible disease that often kills people at a very young age. It’s a rare condition—the best registry is probably that in France, which shows a prevalence of 15 per million and an incidence of 2.5 per million. This condition can be medically treated. There is also a place for intervention, by making an opening between the atria [septostomy], to allow more blood to flow to the left heart and thereby improve cardiac output. And, if all fails, you can try to transplant the lungs. That is what I, together with my team at the institute, are trying to offer our Polish patients.”

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Professor Torbicki frying fish with his wife Grazyna at a camping in Mazurian Lake District, northern Poland. In his spare time, Professor Torbicki walks the dog, rides a bike, and plays piano and accordion. Photograph courtesy of Professor Torbicki.

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