The decline of academic cardiology is a fact throughout Europe, argues Dr Desmond Sheridan, professor of cardiology at St Mary's Hospital and Imperial College Faculty of Medicine, London, United Kingdom. “I would be hard pressed to think of any country in Europe that is dealing with this problem without difficulty. From my experience with the European Society of Cardiology (ESC), the concerns are widely felt.”

Dr Sheridan is a member of the European Affairs Committee of the ESC and is a member of the society’s task force on education and research. Last year he addressed the European Union Parliament on cardiovascular research priorities, and in 2004 he was a guest lecturer at the European Commission on the future needs of cardiovascular research.

Fall in Clinical Academic Recruitment

The most important indicator of decline is the substantial fall in recruitment of clinical academics in Europe in recent years. A good proportion of doctors who are currently leading research are approaching retirement. Dr Sheridan says, “We are facing the loss of a generation of young clinical scientists who should have been our research leaders in the future.” As a result, the bridge between the scientific bench and patient’s bedside has been weakened. He adds, “With this loss of talent, the conversion of basic scientific discoveries into innovations that benefit patients has declined, and this decline is causing widespread alarm.”

One solution, Dr Sheridan explains, is to attract and encourage young doctors to take up careers in academic medicine. Careers should have a clear path with adequate funding for each post. While there has been some movement in this direction (for example, through the European Marie Curie initiatives to encourage young researchers), much more is needed to reverse the flight of young doctors from academic medicine. Encouragement should begin with medical students who would benefit from more active mentoring and steps to foster their scientific creativity. Future academic leaders should be appointed primarily for their teaching and research experience. Dr Sheridan says, “We need more senior scientists and fewer science managers.”

In the United Kingdom, the Department of Health proposes to invest £100 million over the next 10 years to support young clinical academics. Dr Sheridan comments, “The proposals emphasise support for ‘research involving patients,’ but involvement of clinicians at all levels of research is crucial.” This added support would enable the translation of basic discoveries into innovations that benefit patients.

In the Netherlands, the integration of an academic hospital and a medical faculty has created an academic medical centre. This change has enhanced the coordination of fundamental and clinical research, and may be the way forward to restore research that translates to patient benefits.

Areas of Investment

Advances in cardiovascular medicine have produced impressive reductions in mortality from Europe’s leading cause of death (see Figure), as well as many new therapies, diagnostic tools, and devices in recent years. Despite this success, research funding has favoured nonclinical research—especially molecular research—over clinical research in the recent past. Dr Sheridan points out, “While investment in molecular research has understandably expanded greatly over the past 30 years, it seems to have occurred, at least in part, at the expense of support for clinical research.”

For example, in Sweden, grants for nonclinical research have risen by 50% (in value and number), while they have dropped by 25% for clinical research. This is an underlying reason for the decline in recruitment of clinical researchers.

For many years the ESC has been working to bring all these issues to the attention of the European Union. The ESC is concerned that funding for research does not properly reflect the burden of disease—especially coronary heart disease—and has sponsored an amendment to legislation
for the Framework Programme 7 (the main instrument for funding research by the European Union), to ensure that research funding is prioritised on the basis of the burden of disease. The amendment has passed its first reading in the European Parliament, and the final vote is awaited. The ESC also strongly supports the formation of a European research council within Framework Programme 7 to coordinate research and avoid duplication of research funded at European and national levels.

Investment in industrial research and development has shifted away from Europe in recent years, and Europe has lost its leading role in producing new drugs. The United States now attracts more pharmaceutical investment than Europe for various reasons, including more complex and varied drug regulation in Europe, delayed access to markets, and pressure on drug prices. Furthermore, the industry may perceive US-based trials as carrying more weight with the Food and Drug Administration than European trials. All of this can translate into less research investment in Europe. Dr Sheridan says, “These differences between European and other healthcare systems, methods of drug regulation, and levels of market access need to be better understood to remove disparities if Europe is to recover the dominant position in drug development it had in 1990.”

The Problem of Success

The clinical success of cardiovascular medicine is expensive for governments that have to deliver the advances to an expectant public. Increasing cost pressures in academic and healthcare arenas have resulted in attempts to measure the value and cost-effectiveness of science and innovation. Publication citation metrics, used to assess academic performance, undervalue clinical research because they take no account of health benefits or the long timescales and complex ethics involved. The UK Department of Health has recently introduced the Health Technology Assessment Programme to examine cost-effectiveness of new therapies.

“While this may produce valuable economic information about healthcare systems,” says Dr Sheridan, “it is not a suitable tool to measure the value of science and innovation.” The path of innovation is complex and unpredictable; many inventors have not recognised the value of their discovery, and most prototype innovations are superseded by later developments. He continues, “The danger is that early, over-simplistic, and misleading economic assessments will be used to direct research and further disrupt the innovation process.”

Present systems for measuring research outputs are not working, according to Dr Sheridan. “We have claims of high research productivity based on publication metrics, but there is a growing gap between basic research and applicable innovations.” It is necessary to develop more sophisticated systems that take account of the innovation process itself as an engine for development and the time scales involved. “The European Framework Programme could support this,” says Dr Sheridan, but he warns, “At present we are losing innovative capacity and much of this can be attributed to the use of inappropriate methods for assessing it.”

Science and Ethics: The Base of Medical Professionalism

The nature of medical professionalism is being reshaped. Pressures on clinicians to increase efficiency and productivity mean that doctors work in more tightly managed and target-oriented hospitals and surgeries than in the past. Dr Sheridan contends, “If medicine is transformed into a discipline of managed technicians working to targets, it will undermine not only our ability to treat our patients, but also our ability to contribute to science and innovation.”

He believes that it is essential for clinicians to maintain a professional structure that allows doctors to contribute to the direction and priorities of basic research. A multidisciplinary environment that encourages innovation, with interaction between clinicians, chemists, physicists, engineers, and biomedical scientists in related fields, is needed. Dr Sheridan concludes, “It is essential that we retain a profession firmly rooted in science and ethics with a proper balance between our responsibilities to our individual patients and to the public health.”

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References


The opinions expressed in Circulation: European Perspectives in Cardiology are not necessarily those of the editors or of the American Heart Association.
Raising Awareness of Cardiac Tumours

Mary N. Sheppard, MD, consultant histopathologist at the Royal Brompton and Harefield Hospital, London, United Kingdom, speaking to Sarah Ramsay, MA, says that, although cardiac tumours are rare, all cardiologists should be alert to their existence.

Of all the diseases that can affect the heart, cancer is one of the least likely to be encountered. Indeed, the average cardiologist will come across a cardiac tumour perhaps only once or twice in his or her entire professional life. “The heart is a rare location for tumours, which is surprising given that so much blood goes through the organ, although we believe that this is part of the reason; the blood goes through too quickly for a tumour to settle,” Dr Sheppard says. “I’ve been here at the Brompton Hospital, a specialist centre, for the past 15 years, and I’ve only seen 80 tumours in that time.” The lack of cases and specimens goes some way toward explaining why we understand so little about these uncommon cardiac lesions.

The most frequent cardiac tumours are metastases, and around 3% of patients with any type of cancer have a metastasis to the heart at autopsy. Breast cancer is the most common primary tumour that gives rise to cardiac metastases in women, whereas in men it is lung cancer. “However,” explains Dr Sheppard, “the most common site of the primary neoplasm overall is a renal cell carcinoma, which has a propensity to extend along the inferior vena cava to the heart.”

Primary cardiac tumours are extremely rare, with an autopsy frequency of 0.001% to 0.030%, and divide roughly into 2 groups. The first group, about 75% of the total, are benign myxomas situated in the atria. For some unknown reason these affect women more than men. Most occur in isolation, but some occur as part of Carney complex (an autosomal, dominantly transmitted, multisystem tumourous disorder characterised by myxomas of the heart, skin, and breast; skin pigmentation; endocrine tumours; and schwannomas). The other group of 25% are aggressive malignant angiosarcomas that normally occur in the ventricles.

Myxomas can occur in all age groups and, according to Dr Sheppard, are easy to miss because the presentation varies widely. Myxomas can produce vague systemic effects of feeling unwell, weight loss, arthralgia, and pyrexia of unknown origin. “Patients with myxomas can also present with an arrhythmia, or even with obstructive symptoms and heart failure. Valve obstructions can cause unexpected syncope or even sudden death,” she comments. As far as research is concerned, there are simply too few cardiac tumours to warrant major investigative programmes, says Dr Sheppard. “Nobody even knows the cell of origin for myxomas. People have thought in the past that they are endocrine, epithelial, or neural in origin, but nothing has been established.” She adds, “I have been involved in work looking at a possible viral connection, which would account for the extensive lymphocytic inflammation seen in these tumours and accord with the general systemic malaise with which patients can present.”

Myxomas also have a propensity to embolise, particularly to the brain. “That’s why anybody with a stroke and no obvious predisposing factors such as hypertension, particularly a younger person under the age of 60, should always have an echocardiogram to ensure that there is no mass in the heart. Such a presentation should always make any clinician think, ‘Hey, I should do an echo.’” Dr Sheppard advises.

In general, increased use of echocardiography has been an invaluable aid to earlier diagnosis of these lesions. “The great thing is that, with more routine use of echo, these tumours are being picked up more often than they used to be.” The addition of magnetic resonance imaging (MRI) and, to a lesser extent, computed tomography means that identification, delineation, and resection of myxomas is now more frequent and accurate. “With skilled surgery, the prognosis for myxomas is excellent; the tumours do not recur,” says Dr Sheppard.

By contrast, the prognosis for malignant angiosarcomas is extremely poor. “They usually present in the same way as myxomas—arrhythmia, obstruction, valvular abnormality, heart murmur, syncopal attacks,” Dr Sheppard explains. “Tragically, they occur in young people from 20 to 40 years of age. Why, we do not know. And often they cannot be removed because they have infiltrated the cardiac tissue extensively, and they are generally not responsive to radiotherapy or chemotherapy.”

Detailed imaging is essential for the accurate identification of a cardiac cancer. “All tumours require an MRI scan since echocardiography will not delineate the extent of the mass,” Dr Sheppard says. As a histopathologist, she also emphasises the essential part that histology has to play in distinguishing between myxomas and angiosarcomas and informing the surgeon about how aggressive the resection should be.

Figure 1. Increasing routine echocardiography allows myxomas such as this one in the left atrium (arrowed), to be picked up more often.
Distinguishing the tumours microscopically is usually straightforward to the expert. “I can look down a microscope and usually tell immediately. Myxomas look like stars in a sea of jelly, whereas sarcomas have big, nasty-looking malignant cells and look quite different.” Dr Sheppard would like to see more research into chemotherapeutic drugs that are currently in clinical trials for sarcomas that occur in other parts of the body, because these drugs may be useful in the treatment of that majority of cardiac angiosarcomas where it is too late to consider the surgical option.

Are there any big leaps forward to come for improved treatment of cardiac tumours? “Not in the immediate future,” Dr Sheppard believes. “Transplantation has been suggested as an option, but the scarcity of donor hearts is a limitation. Similarly, xenotransplantation and stem cells may have a role to play. For now,” she advises, “the gold-standard approach is to pick up these rare and intriguing lesions at the earliest opportunity and refer them immediately for specialist tertiary-centre surgery.”

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European Perspectives

Circulation. 2006;114:f177-f180
Circulation is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2006 American Heart Association, Inc. All rights reserved.
Print ISSN: 0009-7322. Online ISSN: 1524-4539

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World Wide Web at:
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