

Challenges in Cardiology – A High Stakes Medical Specialty

An Overview of Cardiology by Professor Saul Myerson

Cardiac disease is common, particularly in developed countries (where life expectancy is long enough for the common cardiac conditions to occur), and cardiology is a popular specialty in medicine. It requires good judgement and accurate decision making, as for other specialties, but the stakes can be higher than some areas of medicine. The chance of death or significant impairment of quality of life can be greater, although because of the older age of most patients and the higher chance of death with cardiac disease, the incidence of longstanding/lifelong disability is relatively low, and settlements for negligence do not often reach the seven figure sums seen in some other specialties (e.g. obstetrics).

It is however an area that benefits from an abundance of clinical trials and other studies, so the data available to the clinician on likely diagnosis, outcome, risk and benefit from treatments is often well known/characterised. Diagnostic accuracy is important - in addition to correctly informing the patient of the problem, it determines the predicted outcome, the appropriate treatment options, and the timeliness required for intervention. This is especially so as the treatments themselves can involve a high risk. For example, a patient considering coronary artery bypass surgery who also has poor cardiac function faces significantly higher risks of surgery (perhaps a mortality of 5-10%). The cardiologist, cardiac surgeon and patient need to know whether the weakened cardiac muscle is viable (i.e. alive and likely to recover function after surgery) or non-viable (scarred muscle, having suffered a heart attack previously). In the latter case, the surgery would be inappropriate as the patient would be facing the high surgical risk but unlikely to gain any benefit. A cardiac viability study (using echocardiography, cardiac magnetic resonance or nuclear imaging studies) would accurately advise whether the surgery was potentially worthwhile. We also know that where there is partial scarring, the degree/depth of scarring assessed with cardiac magnetic resonance imaging is directly related to the chance of functional recovery, so a precise estimate of benefit can be made. This is a good example of where the assessment of risk and potential benefit can often be made accurately using the correct diagnostic tools and the knowledge from previous clinical studies.

Timely treatment is also important in cardiology - conditions can change rapidly, and the benefit from treatment can depend on early intervention - e.g. when a heart attack occurs, treatment is needed urgently (within an hour ideally) to minimise damage, and reduce the chance of death or future heart failure.

Cardiac diseases can often be lifelong, and the cardiologist needs to consider the best long term approach. Examples include coronary artery disease (which can be treated/symptoms abated but never 'cured'), and heart muscle conditions (cardiomyopathies), which require long term management. There are some cures however - radiofrequency ablation can remove the risk of some lethal rhythm problems, and good antibiotics can settle infections on heart valves.

The cardiologist can also be faced with patients who have a heightened anxiety about their heart and potential problems, without any abnormality being detected - this is related to the nature of the heart and the understandable emotion attached to it! A good cardiologist needs to be able to distinguish patients with benign symptoms from those with potentially important conditions.

There are also particularly specialised areas within cardiology (sub-specialties), and these often require good procedural skills as well. The major sub-specialty areas are intervention (keyhole procedures on the coronary arteries or valves), electrophysiology (rhythm management), cardiac imaging, heart failure and congenital heart disease.

Common areas of expert witness work in cardiology

Litigation is less frequent in cardiology than some other medical areas, but I have outlined the more common situations where shortcomings can occur.

Failure in making the diagnosis

This occurs more commonly if a patient is not referred to cardiology services and/or the relevant examination +/- investigations are not performed, i.e. the physician doesn't place him/herself in a position to make the diagnosis. The important aspects are whether the appropriate treatment is likely to have improved the outcome for the patient if this had been given, and/or whether a patient's choices about other treatments might have been affected by the cardiac diagnosis (e.g. deciding not to have an operation).

Delayed/missed diagnosis

Given the timely nature of appropriate treatment in some conditions, a delay in making the diagnosis can lead to harm. Examples might include a general practitioner failing to recognise the initial symptoms of a heart attack, resulting in late recognition and delayed treatment, which could result in a higher mortality or more severe heart failure than if treated earlier. Recent advertising campaigns have however raised the public's (and doctors') awareness of heart attack symptoms, and this is now an uncommon area. Another example would be a patient with endocarditis (an infection on the heart valves), whose symptoms were mistaken for a prolonged viral illness, and went on to experience a stroke due to embolization of the infected tissue to the brain.

Inaccurate diagnosis

The good range of diagnostic investigations in cardiology make this unusual, but there are still instances where several possible cardiac diagnoses exist (e.g. the potential causes of a cardiomyopathy), and some of these may be treatable (e.g. a severe valve problem) while others may not be (e.g. an inherited cardiomyopathy) – understanding the relative severity of each and how likely these are to cause the cardiomyopathy is important for obtaining the correct diagnosis.

Identifying the cause of a cardiac problem

There are occasions when a heart is failing but the cause is unclear, and identifying which is most likely and the probable time course of the condition, even in retrospect, may impact on whether the clinical situation could have been improved. A recent legal case involved a patient with severe multi-organ failure (including liver and kidney failure) who had poor cardiac function. Identifying whether the cardiac failure caused the liver and other organs to fail, or that the severe liver and kidney failure (and secondary sepsis) led to cardiac dysfunction was important - the cardiac failure could have been picked up by the patient's GP ten days prior to admission when he was unwell, if an adequate examination had taken place. In this case, the severity and type of liver failure was too great to have been secondary to the cardiac failure, and it was more likely that liver failure due to hepatitis was the primary cause – this would have been more difficult to identify until jaundice had occurred (after the GP had seen the patient).

Sports screening

This is a growing area, with potentially high stakes on both sides and difficult judgements to make. Professional sportsmen/women (and amateurs competing at a high level in sport) are often screened in advance for underlying cardiac conditions that might put them at risk of sudden death or other problems associated with high level

physical exertion. Most of those screened are young (teenage or in their twenties), and about to embark on a career in sport. The screening aims to identify inherited or congenital conditions such as cardiomyopathy (heart muscle weakness), heart rhythm problems, or rare abnormalities of the coronary arteries that might affect participation in sport. Assessment relies on the history (including family history), but particularly on diagnostic testing, especially electrocardiography (ECG), exercise treadmill testing and cardiac imaging. This is a difficult area clinically as there is considerable overlap between cardiac changes due to athletic training (termed 'athletic heart') and those due to cardiomyopathy – both can result in larger hearts with thicker walls, and both can lead to similar changes on the ECG. Differentiating the two (healthy changes from pathological hearts) requires an accurate knowledge of what is normal in an athletic population, what features are clearly abnormal, and (for the majority of findings that occur in both healthy and pathological states), the probability that a particular finding suggests a pathology. The difficulty is further compounded by ethnic differences in normal ECGs and imaging findings – particularly in black or Asian athletes, who are often over-represented in sporting populations! The consequences of the assessment for both the doctor and athlete are extremely high: the athlete needs to be protected from unnecessary risk if there is a cardiomyopathy/other cardiac condition, which could have severe consequences (including death) if they continued playing professional sport. On the other hand, over-diagnosis of a pathology (i.e. being too defensive) could result in the termination of a career as a sports-star that is potentially worth millions of pounds. Understandably, significant anxiety can occur in the athlete on the cusp of signing a professional contract after years of training, and good communication and sensitive handling are required. Some athletes are reluctant to be tested, for fear of a bad result, and sceptical of the outcome. To add to the pressure, a professional athlete that collapses while participating in sport (which is often televised) can generate huge media and public interest, as several high profile examples can testify – a notable example of this is Fabrice Muamba (the Bolton Wanderers footballer who survived a cardiac arrest during a game against Tottenham Hotspur in 2012).

Thus, a robust and accurate approach is required for the cardiologist undertaking an assessment (usually as a result of an initial screening test being abnormal). An example of the correct approach involved a rugby player who was tested prior to signing for a professional club, and a cardiac MRI scan confirmed clear evidence of hypertrophic cardiomyopathy. This would halt his career in sport altogether, and he was keen for the result to be kept

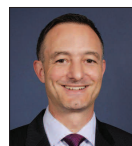
confidential. The club however refused to sign a contract without the results of the scan, and he eventually gave permission for the result to be divulged. As predicted, it resulted in the termination of his planned career (with understandable distress on his part), but may well have prevented his sudden death during a game, and he has subsequently received an implantable defibrillator to protect him from lethal arrhythmias. Another recent case highlighted the importance of good communication and appropriate handling in avoiding a legal challenge. A professional footballer for a premier league club had an abnormal ECG but normal cardiac imaging. His likelihood of a cardiomyopathy was higher than the normal population but still low (<10%), and he was allowed to continue playing. However, an appropriate consultation with him did not occur, and the abnormalities and potential risks were not discussed with him, denying him the opportunity to consider his options which included detraining for a period of time to see if the changes resolved. Unfortunately he suffered a cardiac arrest in his first professional game and although he was resuscitated, he suffered significant neurological damage and required lifelong nursing care subsequently. The family won a high court case for compensation and ongoing care costs, based on the club's failure to implement an appropriate process for assessment, and the failure of communication denying the player the opportunity of making an informed choice.

Appropriate and competent treatment

A few cases involve inappropriate or poor quality treatment, but this a rare area of legal challenge in cardiology. Cases commonly result from a failure of communication about the risks of a procedure (and subsequent occurrence of a recognised risk), or failure to communicate if a complication has occurred (a 'cover up'). It is important for patients to understand the risks of the choices they face – especially if they elect not to have a procedure – while the choice may well be the best option for them, the communication is key

My practice

I have been a consultant cardiologist for 8 years and although I'm a general cardiologist with specialist interests in valve disease, aortic disease and cardiomyopathy, my practice also includes a large component of diagnostic testing, particularly advanced cardiac imaging (I have an international reputation for cardiac magnetic resonance imaging). I am often consulted about diagnosing particularly difficult cases/diagnoses, and am asked to identify the causative processes involved and their likely time frame, as well as differentiating normal from abnormal findings. Assessing future risk/prognosis and identifying suitable patients for cardiac surgery (e.g. viability studies, and assessing severity of valve disease) also forms part of my practice. My medico-legal work therefore reflects this expertise and I have a varied case mix involving these areas. ■



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Professor Myerson is based in the internationally-renowned cardiac MRI department in Oxford and provides expert advice on all areas of cardiology including cardiomyopathy, coronary disease, heart valve disease and aortic disease.

He has a significant cardiac research portfolio including clinical trials, and has >70 peer-reviewed publications.

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