Sudden death in sport

Commotio cordis

P McCrory

Instantaneous cardiac arrest caused by a blow to the chest depends on the timing of the blow relative to the cardiac cycle.

Commotio cordis is a term used to describe a rare but potentially fatal event involving a blow to the chest that causes death. It is often called "near miss" cases of commotio cordis. This may happen in two ways: either the heart is struck by an impact or the heart muscle is disrupted by the impact. The impact can be caused by a blow to the chest or by a direct hit to the heart, which can be fatal.

PATHOPHYSIOLOGY

The most comprehensive early experimental physiological studies of this condition were performed by Georg Schломka at Bonn University in the early 1930s. On the basis of more than 800 experiments on anaesthetised animals, he identified three factors that determined the induction of arrhythmias by moderate precordial impact: type of impact, location of impact, and force of impact. Schломka disproved the vagal reflex theory and proposed the "vascular crisis" concept of mechanically induced coronary vasospasms to explain commotio cordis.

The risk factors identified by Schломka in the 1930s are still relevant, whereas the identification of a fourth factor (timing of impact) had to wait for technological advances. Contemporary experimental investigations into commotio cordis with anaesthetised pigs confirmed the existence of such a vulnerable period during early ventricular repolarisation and showed the involvement of ATP dependent potassium channels in the electrophysiological genesis of this condition.

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The precordial impacts were delivered within a narrow temporal window between 30 and 15 milliseconds before the peak of the T wave, ventricular fibrillation was reproducibly induced. The vulnerable period of the cardiac cycle amounted to just over 1/100th of a second. Remarkably, ventricular fibrillation was immediate, occurring on the very next heart beat. The arrhythmia was not produced by impacts at any other time during the cardiac cycle, although transient complete heart block was sometimes observed with impacts during the QRS complex. Occasionally, with impacts delivered just outside the 15 millisecond period of vulnerability, unsustained polymorphic ventricular tachycardia was seen.

The observation that transient rhythm disturbances may occur with chest impact raises the possibility that there may be "near miss" cases of commotio cordis. This may have happened in 1998 to St Louis Blues hockey captain Chris Pronger, when he collapsed briefly, then spontaneously regained consciousness, after being struck on the left side of his chest by a puck during a playoff game. It is possible that other near miss cases have gone undetected because the arrhythmias were too brief to cause loss of consciousness.

In another part of their study, Link et al examined whether the use of safety baseballs, which are softer than regulation balls, could reduce the risk of arrhythmia in the animal model. They found that the risk was proportional to the hardness of the ball. This finding may have implications for the prevention of commotio cordis in young baseball players, as properly designed safety baseballs are feasible for use in recreational baseball and Little League. Another approach to prevention is the use of chest protectors specifically designed for protection of the precordium. As not all cases will be preventable, it is important to emphasise that rapid cardiopulmonary resuscitation, including a precordial "thump" and immediate defibrillation when possible, may be lifesaving.

Both early and contemporary research into commotio cordis appears to have been motivated by case reports of sudden death. It is sobering that a seemingly minor chest impact at an instant when the heart is suspended in diastole can have such devastating consequences.'
Revalidation

Revalidation in sport and exercise medicine

D A D Macleod, M E Batt, S Sheard

The proposed annual appraisal of practitioners of sport and exercise medicine is outlined

In 1999 the General Medical Council (GMC) of the United Kingdom agreed that “all doctors must be able to demonstrate regularly that they continue to be fit to practice in their chosen field”. This process is termed revalidation. Doctors who complete revalidation will be granted a “licence to practice”, affording them the rights and privileges currently associated with being included on the GMC register.

Each individual doctor's revalidation will be reviewed every five years by two doctors and a single lay person. This team will be drawn from a local revalidation pool of trained people. Revalidation will be based on the contents of the individual doctor’s revalidation portfolio. Each doctor's portfolio, irrespective of their specialty, will follow a standardised format. The relevant guidelines describing appropriate standards of practice will be drawn up by the Medical Royal Colleges. This immediately creates a challenge for sport and exercise medicine which does not have a single parent Medical Royal College and is not widely recognised as a specialty outside of sport and exercise medicine. Revalidation will be drawn from a local revalidation pool of trained people. Revalidation will be based on the contents of the individual doctor’s revalidation portfolio. Each doctor's portfolio, irrespective of their specialty, will follow a standardised format. The relevant guidelines describing appropriate standards of practice will be drawn up by the Medical Royal Colleges. This immediately creates a challenge for sport and exercise medicine which does not have a single parent Medical Royal College and is not widely recognised as a specialty outside of sport and exercise medicine. Revalidation will be based on the contents of the individual doctor’s revalidation portfolio. Each doctor's portfolio, irrespective of their specialty, will follow a standardised format. The relevant guidelines describing appropriate standards of practice will be drawn up by the Medical Royal Colleges. This immediately creates a challenge for sport and exercise medicine which does not have a single parent Medical Royal College and is not widely recognised as a specialty outside of sport and exercise medicine.

Doctors who are already Members or Fellows of a Faculty or Medical Royal College recognised by the Academy of Medical Royal Colleges will be able to obtain revalidation with the support of their parent college. All doctors who practice sport and exercise medicine on either a part time or full time basis will have to meet all the GMC requirements. There are many doctors in the United Kingdom who are independent practitioners and currently practice sport and exercise medicine without being Members or Fellows of a Medical Royal College or Faculty. It will be particularly important for this group of sport and exercise medicine practitioners to ensure that they undergo annual appraisal and are in a secure position to meet the requirements of revalidation.

We have outlined the contents of the revalidation portfolio recommended by the GMC. Establishing a portfolio and preparing for annual appraisal will become an increasingly important aspect of the professional lifestyle of all doctors. The revalidation folder recommended by the GMC is divided into four sections.

SECTION 1: YOUR PERSONAL AND REGISTRATION DETAILS

This section will record personal biographical and educational details, including your current GMC number.

SECTION 2: WHAT YOU DO

This section will describe what you do and where you do it. It must cover all aspects of your medical practice, paid or voluntary, including private practice, insurance and medicolegal work, teaching, research, administration, and management. This section should give a clear outline of your caseload and case mix in all aspects of your clinical practice. It should include a job description and role profile where available.

SECTION 3: INFORMATION ON YOUR PRACTICE

This section will be based on the GMC publication Good medical practice and will require careful preparation and annual review to ensure its accuracy.

The portfolio should show good professional standards of clinical care, record keeping—for example, contemporaneous, legible, and signed notes—and availability to patients including out of hours and when dealing with emergencies.

You will be expected to demonstrate that you are maintaining and developing good standards of clinical practice by undertaking audits and showing how the audits have influenced your practice. You will be expected to record adverse clinical events and how they were resolved. All complaints should also be documented and their outcome recorded.

Communication skills will be assessed by administration of patient surveys, the results of which will be incorporated in the portfolio. Sport and exercise medicine practitioners involved in a team...
or group of athletes may find that surveys of the manager, coach, or sports participant for whom they are responsible will be expected.

You must record continuing professional development covering all aspects of your professional activities as outlined in Section 2 of your folder. The Academy of Medical Royal Colleges has issued a framework on this aspect of the portfolio.

The Academy believes its framework will improve the safety and quality of medical practice by encouraging lifelong learning and making transparent the processes required for successful implementation of continuing professional development and audit.

The GMC places great emphasis on the ability of every doctor to work effectively in teams with colleagues, nurses, professions allied to medicine, clerical staff, and other professionals as well as lay people. This includes placing responsibility on colleagues to be aware of each other’s standards of practice, conduct, or health if they may in any way be putting patients at risk.

Any doctor who teaches or trains junior medical staff, or other professionals, will be expected to show a commitment to developing educational standards and recording feedback on the teaching programmes in which they are involved.

Good medical practice also identifies honesty in clinical, research, and financial matters as being criteria against which revalidation will be measured. This includes honesty in writing reports and in the provision of references.

Finally this section of the revalidation portfolio requires the doctor to confirm that his or her own health, whether physical or psychological, is such that they are fit to practice in their chosen field(s).

SECTION 4: APPRAISAL

Mandatory annual appraisal of all aspects of every doctor’s practice will be the basis of the revalidation process. The quality of the annual appraisal should highlight deficiencies or potential problems that may restrict or prevent revalidation, thereby giving the doctor concerned the opportunity to ensure that they are addressed before any subsequent appraisal.

Section 2 of the revalidation folder will outline all aspects of medical practice for which information must be recorded in Section 3.

The person to be appraised will be expected to ensure that their folder is accurate and up to date. The appraiser, who would normally be appointed by either a primary health care or employing hospital trust, would be expected to ensure that appropriate audits or surveys of the doctor’s team working and communication skills have been completed.

The appraiser would be a doctor trained and experienced in this aspect of maintaining professional standards of practice. The appraisal interview will become a crucial component of every doctor's professional development and will be based on a 360° review of every aspect of a doctor’s practice.

At the end of the interview the doctor and his or her appraiser should record the outcome, highlighting any areas of concern that may interfere, in due course, with revalidation. Potential solutions for any problems should be outlined. Significant concerns identified by an appraiser should be forwarded to the relevant trust or other appropriate bodies.

CONCLUSION

All doctors involved in sport and exercise medicine on a full or part time basis need to establish a revalidation portfolio as outlined above and identify how their annual appraisal will take place.


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