D. Tunstall Pedoe

SUDDEN DEATH AND SPORT — PREVENTABLE OR INEVITABLE

Dan. TUNSTALL PEDOE — “Devils’ Advocate”

Is exercising a normal human activity, like eating, drinking, copulating and defaecating or is it something only to be sampled under doctors orders, a dangerous medicine? Recent press publicity given to the death of Jim Fixx and Bruce Davies’ presentation to the British Association for the Advancement of Science might suggest the latter.

Physical exertion is not now an essential part of many people’s working existence and because hard physical labour was the lot of the “labouring classes” from which many people have tried to escape by getting more genteel occupations, the correlates of exertion, heavy breathing and sweating are considered “not nice” and associated with the lower orders. A gentleman no less than a lady does not perspire. A lady makes sure that she “glows” rather than sweats by spraying on a suitable poison to paralyse her sweat glands. The exercise boom is overturning this picture of genteel and leisurely leisure and the gentlemen and ladies (and now increasing numbers of the lower social classes) are now seen sweating and panting in profusion.

CAN THIS BE GOOD FOR THEM?

Every now and then one of these panting sweating people dies. Does not this just prove that it was bad for them? All this exercise and sweating and panting must be dangerous. People should have a certificate before they are allowed to do it!

The logic of this argument seems inescapable. Here are people doing “unnatural things” and dying. They should be stopped from doing both. The logic however has to face several questions that need full answers before the case is generally accepted.

1. In a country of over 50,000,000 people even young ones die. Dying is part of living and most deaths in people under 50 are sudden. Are the exercise deaths provoked by the exercise or are they more frequent because more people are “doing it”?

2. The people who die when they are exercising may not have any overt disease. Like the car that breaks down with an electrical fault just after a garage check, the fault may not be easy to detect and may be intermittent. Can they really be detected by screening?
3. A significant number of the deaths are occurring in people who already had symptoms and in some who had been warned NOT TO take part in the activity that killed them. They were acting out a form of personal denial of their illness. If these people do not heed medical advice will the subject with NO symptoms and possibly less faith in a compulsory medical check accept medical advice to desist?
4. If compulsory medical tests are made mandatory how effective could they be and how many potential exercisers would be put off by the whole rigmarole?
5. Is there any test that can divide the population into those for whom exercise would be beneficial, with no risk and those for whom it would definitely be dangerous with no compensatory benefits?
6. Can we define what level of physical exertion is potentially dangerous to subjects at risk or is it all guess work?

Let us explore some of these questions further.

In most studies of sudden death only a small percentage of the people who die do so during exercise. Sudden death is usually defined as death within 24 hours of the onset of symptoms. Instantaneous death which is very much less common is quite closely associated with severe exertion. The risk of anyone dying suddenly on any particular day is obviously very small.

Let us take a hypothetical situation. If one had a population of middle-aged joggers, one per cent per year might be expected to present with NEW symptoms of coronary artery disease, of whom let us say 20% might present by dropping dead. So with 200,000 of these joggers, 2,000 might develop symptoms during

the year, and 400 might drop dead, roughly one per day. If they jog and shower or bath for just over half an hour per day on average than on a random basis 10 of these joggers would be said to have had "EXERCISE RELATED DEATHS" as they would die while jogging or immediately afterwards. If a far larger number died while jogging one would be entitled to say that the jogging had increased the risk of death or precipitated the event. This hypothetical case sets the problem. What sort of people jog (or play squash), how long do they spend doing it, and how many of them die compared with the predicted death rate? The only real attempt to define the population at risk and calculate the death rate for joggers from a known denominator of which I am aware is the study by Thompson et al (1982) in Rhode Island in the USA. This study was possible because Rhode Island has a well defined boundary and a single forensic pathologist (medical examiner). A telephone survey was made to assess the number of joggers. (Possible in Rhode Island because of the very high percentage of households with telephones). The estimated death risk came out as one death per 390,000 hours of jogging. This is a similar risk to that of somebody dying from a crash flying in a scheduled airline flight with about 45 years of continuous exposure (jogging or flying) before any individual is statistically likely to die. For a jogger spending 3 hours per week jogging this would be a risk of one in two thousand per year or one in two hundred for ten years, assuming a constant risk which may of course decline with additional time spent jogging (the quick ten minute jog may have a higher risk than the steady one hour jog). How does the Rhode Island result compare with the hypothetical group of asymptomatic joggers with a 1% risk of developing symptoms of ischaemic heart disease. We said that 10 out of 200,000 might have "exercise related deaths" in one year or one in 20,000.

Thompson found a mortality rate of one in 7,620 but his deaths (like most sudden death series) included a large number with pre-existing, known ischaemic heart disease whereas we were considering new unknown heart disease. In fact he has calculated risks for the asymptomatic jogger within certain confidence limits as between one death per 25 years jogging and one death per 150 years jogging. All these calculations raise a large number of questions. What sort of people jog, play squash, etc? Are they at high or low risk of coronary events? How many of them have had symptoms of angina or coronary pain before they die and if they do get symptoms do

they keep them to themselves or do they see their doctor. How many were really totally asymptomatic until the agonal event? How many had multiple risk factors for ischaemic heart disease?

Northcote and Ballantyne have performed a very useful service by publicising squash deaths and other sporting deaths. Perhaps squash is more likely to produce sudden death in people with relatively mild coronary disease? However the negative side of this publicity could be that a complex questionnaire and screening procedure could well give the impression that what is a relatively uncommon event... sudden death in sport... is common, that exercise is inherently dangerous, and that we CAN prevent these unfortunate deaths. (This remains unproven). Whilst prevention of any premature death is a worthy objective, the cost effectiveness of the whole procedure needs to be assessed. Most coronary events occur in people with relatively "normal risk factors", most coronary deaths occur in people with previous symptoms. Perhaps the main effort should be in educating the public in the symptoms of heart disease, publicising the fact that regular exercise does not render them totally immune to heart disease and that if they develop symptoms they should seek medical advice, not try to run through the pain. The Squash Association's "Get Fit for Squash" campaign dodges the issue. "Fit" people can have myocardial infarction and whilst there is increasing evidence that regular exercise reduces the risk it is important that even the fittest person appreciates that chest pain could be myocardial ischaemia, even if they had a negative exercise test a few days before. Unlike Northcote and Ballantyne I see a very limited place for exercise testing in assessing the safety of exercise. I have seen too many "positive tests" in normal subjects, some asymptomatic athletes, and seen and heard of too many negative tests which should have been positive including one done on a veteran marathon runner who died a few days later. As the highest risk appears to be associated with squash (although no-one really knows the comparative risks) perhaps a limited trial of screening should be tried for squash first before the whole of British Sport become medicalised.

Reference

- Thompson, P. D., Funk, E., Carleton, R. A. and Sturner, W. Q., 1982 "Incidence of death during jogging in Rhode Island from 1975 through 1980". JAMA 247: 2535-2538.