FEATURE

Smoking cessation:

the heart of the matter

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Asking about smoking status, advising cessation, assessing dependency and preparedness to quit, assisting the quit attempt and arranging follow up are the basic steps of the intervention that will give the greatest cardiovascular benefits in smokers.

Prevention of illness is the modern mantra and so it should be. Cardiovascular disease (CVD) is a particularly attractive prevention target because there are a number of relevant, potentially modifiable risk factors. Certain key principles must be established and maintained when discussing intervention options in cardiovascular (CV) risk reduction and prevention.

One key principle is that it is important to maintain a clear distinction between the relevance of risk factors at a community level and at the individual patient level. For example, at a community level, hypertension and all its consequences may approximate the total community harms of smoking tobacco. However, in an individual who is a current smoker, the harms of smoking or the reciprocal benefits of cessation are much greater than those associated with hypertension or dyslipidaemia, unless these are truly extreme. It can be an intriguing exercise to enter relevant CV risk factor data into a total risk model, such as the Australian absolute cardiovascular disease risk calculator, to compare future risk of CV events in nonsmoking and smoking scenarios.[1]

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Key points

- For current smokers, smoking cessation has greater benefits in terms of cardiovascular risk reduction than any other intervention.
- The aim should be complete cessation rather than smoking reduction, although smoking reduction does have a role in smokers with features of high dependency.
- Most people who are regular smokers are dependent on cigarettes and the smoking process. They are not simply addicted to nicotine.
- GPs should actively engage in their patients' quit attempts. The so-called 5 A's – Ask, Advise, Assess, Assist and Arrange follow up – provide a useful general practice framework for smoking cessation.
- If one or more quit attempts have been unsuccessful, a smoking cessation treatment should be recommended.

Another key principle is that although future risk assessment provides a structure for clinical thinking, it is the capacity to derive an individual or community benefit from changing that risk factor that is critical. Long-term smokers rationalise risk or self-exempt themselves from harm. The listing of smoking among other concerns may lead to misperception of relative harms so that a continuing smoker who increases his or her exercise or improves his or her diet may be mistakenly comforted while the health benefit is modest or absent.

Understanding the structure of smoking

Most people who are regular smokers are dependent on cigarettes and the smoking process. A better understanding of smoking can facilitate discussion of strategies that aid cessation. These people are not simply addicted to nicotine.

The elements of this dependence include the context of smoking, as well as certain smoking-related rituals, sensory stimulation and the reinforcing effects of nicotine.[2] The smoking context includes social and peer influences, and might be having a morning coffee, visiting an outdoor smoking area or something similar. On the flip side, some contexts are negatively associated with smoking, such as being in a doctor's surgery or a hospital, and cravings are typically not as great in these situations. Rituals start with the opening of a packet and the lighting process, and the touch of the cigarette and the sight and smell of the smoke provide sensory stimulation. The association of these events with the very rapid delivery of a nicotine bolus to the central nervous system establishes the addiction process.

The neural target is the brain reward system that is the common pathway for pleasure registration. Here, transient activation is followed by a gradual fall in nicotine levels until the smoker descends into a state of withdrawal that is in turn relieved by the next cigarette.

Smoking as a CV risk factor

The 1964 US Surgeon General's report included almost everything that we now

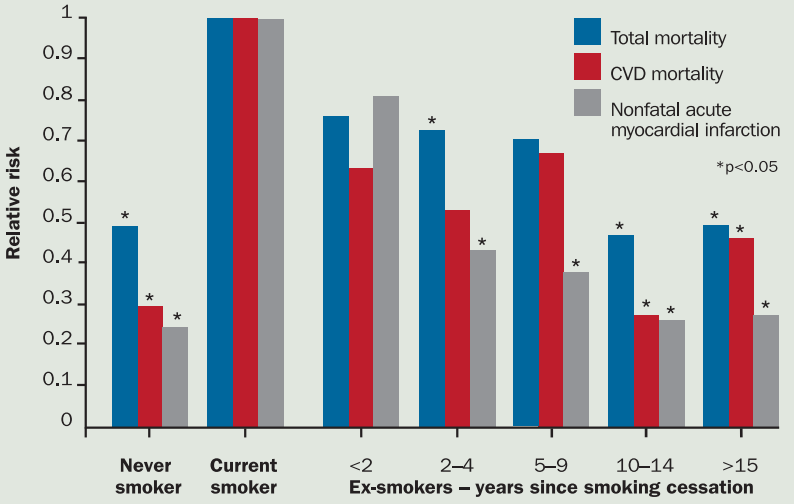

Figure. Relative risks of total mortality and cardiovascular events in never smokers and ex-smokers, classified by years since smoking cessation and each compared to continuing smokers. Current smokers have risk of 1.0. (Data are derived from publications based on the Nurses' Health Study.[9,10])

know about smoking and mortality.[3] Smoking kills. It kills more often with earlier age of commencement, longer duration of smoking and greater number of cigarettes smoked. Smoking cessation reduces the risk of mortality compared with continuing smoking, and this reduction is observed quickly. Smoking is hazardous at all intensities.

Even people who smoke relatively small numbers of cigarettes each day have increased CV risk.[4] So-called light or low-tar cigarettes are a marketing tool, not an instrument for risk reduction. Cigarettes have a fairly fixed ratio of tar to nicotine and low-tar cigarettes have low nicotine content. Smokers are 'nicotine-hunters', unconsciously titrating smoke inhalation to achieve a certain nicotine level. Presented with a lower nicotine cigarette, they will inhale more frequently and more deeply.[5] Similarly, smokers who reduce the number of cigarettes smoked each day will inhale more smoke from each cigarette. In the Copenhagen heart studies, reduction in the number of cigarettes smoked, even if by more than 50% from baseline, did not reduce cardiac or overall death rates.[6]

Cigarette smoking causes harm through a myriad of mechanisms. These include nicotine-induced hypercoagulability, increase in myocardial work, reduction in tissue oxygen delivery because of high levels of carboxyhaemoglobin, and coronary vasoconstriction. Further, cigarette smoking promotes atherosclerosis through a variety of mechanisms, including its adverse effects on lipids and the HDL–LDL ratio, neutrophil activation, direct endothelial toxicity and oxidant injury, catecholamine release, increased blood viscosity and thrombogenicity.[7]

CV benefits of smoking cessation

For current smokers, no other intervention approaches the extent or rapidity of onset of benefit of stopping smoking. For the reasons explained above, the aim should be complete cessation rather than smoking reduction.

Coronary artery disease and acute coronary syndromes

In the first year after smoking cessation, the risk of an acute coronary event – infarction, unstable angina or the need for revascularisation – is halved. Based on a systematic review, in patients with diagnosed coronary artery disease, smoking cessation is associated with a 36% reduction in all-cause mortality after a mean follow up of five years and a 32% reduction in nonfatal reinfarction in the same period.[8] Benefits are seen in men and in women – the time course of risk reductions is shown in the Figure.[9,10] After about 10 years, the relative risks of an ex-smoker approach those of a never smoker, although never reach them. The continuing residual risk is greater in those individuals who were heavy smokers prior to cessation.[8]

In addition to the benefit of stopping active smoking, the evidence is indisputable that exposure to environmental tobacco smoke increases the risk of developing an acute coronary syndrome (ACS). In a study by Pitsavos and co-workers in Greece, those patients presenting with ACS were 50% more likely to have been exposed to environmental tobacco smoke compared with CVD-free controls, even after matching for potential confounding variables.[11] Smoke-free legislation in publicly accessed enclosed areas in various regions and countries has convincingly been associated with rapid and significant falls in the incidences of myocardial infarction (MI), ranging from 8% in New York state and 13% in four Italian regions to 17% in Scotland. The significant fall in the incidence of acute cardiac events in England after smoking restrictions in public places were enhanced in 2007 equated to 1200 fewer emergency admissions for MI (1600 including readmissions).[12]

Stroke

In a Korean study, smoking cessation was associated with a 60% reduction in ischaemic stroke and 57% reduction in subarachnoid haemorrhage.[13] Reduction in smoking without cessation in the same

study had a small effect on risk, with some comparisons and no significant effect in others.

Effects are seen quickly for stroke risk. In the Nurses Health Study, smoking cessation was associated with a 46% reduction in stroke risk within the first two years after stopping, this amounting to around 80% of the previous excess risk of smoking.[14]

Peripheral vascular disease

Peripheral vascular disease (PVD) is one of the most deleterious and costly sequelae of chronic smoking. In patients who undergo peripheral vascular surgery, the rate of occlusion or graft failure is three times higher in continuing smokers.[15] There is a marked reduction in progression of symptomatic PVD to amputation in those who quit completely.[16]

As patients with PVD also have an inherently high CV risk profile, it is heartening to know that in this subgroup smoking cessation is associated with a major reduction in future cardiac event.[17]

An approach to smoking cessation

The so-called 5 A's provides a useful general practice framework for smoking cessation. In various versions, the A's are assembled in different orders and with minor variations in content. Acknowledging that the order 'Ask, Advise, Assess, Assist, Arrange follow up' – is at variance with the RACGP document (*Smoking Cessation Guidelines For Australian General Practice, Practice Handbook; 2004 Edition*; RACGP, Melbourne, Vic), this order is our thinking.

Ask about smoking status

In the 1950s, that a person smoked could almost be assumed, at least for men. As smoking rates have thankfully declined, there is now, perversely, the potential error of assuming nonsmoking status. In general medical care and specifically in CV risk assessment, current smoking status should always be formally sought and documented. A nonsmoker will not be offended and a smoker can only benefit.

Advise cessation

Just as asking about smoking status should be universal, so should a recommendation for identified smokers to quit. Although smokers may understand that smoking is harmful to their health, after all it says so on the pack, they are unable to quantify that risk accurately. Smokers may acknowledge risk at a certain level but might falsely believe that they can offset that risk by some other intrinsic factor, such as keeping to a good diet, having a good family history or exercising. This phenomenon – self-exemption from the harms of smoking – is common in long-term smokers.

The belief that giving cessation advice might generate antagonism, and therefore jeopardise some other important active issue, is completely misplaced. Smokers rate doctors more highly if they ask about smoking status and then advise a quit attempt. Brief advice to quit is the most cost-effective and broad-reaching smoking cessation intervention.[18] There are excellent online training programs for health professionals seeking to increase their understanding and skills in this area.[19]

It is important to stress to patients the rapidity of the onset of the benefits of stopping smoking, and also the benefits of eliminating environmental tobacco smoke exposure in family members, people who will be at greater than average risk for cardiovascular disease.

Assess dependency and preparedness to quit

Dependence is not universal. There is a small proportion of smokers who are termed 'chippers'. They smoke small numbers of cigarettes daily and have periods on and off smoking without features of withdrawal. They may be biologically insensitive to nicotine dependence and probably do not identify with all of the public health messaging about addiction. Interventions should be different in this group and long lectures about addiction are likely to be unproductive.

For most smokers, it is useful to quickly assess dependency. The Fagerström test for nicotine dependence is the gold standard, but although short may be difficult to perform in a busy practice.[20] A quicker test is to simply ask about the time interval between waking in the morning and the first cigarette (shorter time equating to higher dependence) and how many cigarettes are smoked each day (more equating to higher dependence). The higher the dependency, the greater is the likelihood that treatment intervention will benefit a quit attempt.

Assist the quit attempt

Now that some forms of nicotine replacement therapy (NRT) as well as bupropion and varenicline are available on the PBS, GPs are expected to be actively engaged in quit attempts. Previously, it would have been enough for many patients for a GP to recommend a call to the QuitLine and perhaps over-the-counter NRT.

Without expecting every medical practitioner to be a smoking cessation expert, smoking cessation counselling is a core competency. Patients attempting to quit should be advised to make some preparations prior to the attempt and to avoid places and situations that are strongly associated with smoking. Practical tips include removing ashtrays, designating the car and home as smoke-free areas, taking work breaks indoors and choosing indoor smoke-free areas in a restaurant. Strict dieting is generally unhelpful to a quit attempt.[21] Instead, a healthy diet and light exercise should be encouraged.

Smoking cessation treatments

With the exception of smokers with features of high dependency, there is a reasonable case that the first attempt for smokers who have never seriously attempted cessation before should be undertaken without a smoking cessation medication. If one or more quit attempts has been unsuccessful, particularly if cravings were a problem, a smoking cessation medication should be recommended. The broad approach to the pharmacotherapy of smoking cessation is covered in the RACGP guidelines, which will soon be updated.[22]

Nicotine patches are now available on the PBS for people who participate in a support and counselling program. The use of NRT increases the chance of successful cessation by 70%.[23] The form of NRT is not important but higher dependency patients can benefit from combination NRT use. Relating to cardiac risk and patients with cardiac disease specifically, NRT is always safer than continuing to smoke; it is probably safe also in absolute terms. The risk of smoking while using nicotine replacement products is not greater than the risk of smoking alone, and patients with pre-existing CVD do not appear to be adversely affected by short-term use of NRT.[24] Based on a large GP database, there is no increase in acute MI, stroke or death in the 56 days after commencement of NRT.[25]

NRT can also be used in the 'Cut Down Then Stop' (CDTS) paradigm.[26] This way of achieving sustained smoking reduction is suitable for patients who wish actively to reduce their risks but cannot engage in a formal quit attempt. Patients using NRT in this way have reduced exposure to tobacco smoke. The extent of benefit from this is unproven and may be small in those with established cardiac disease. CDTS does, however, increase the number of total and successful cessation attempts, and this is its real attraction.[27] It is never a valid alternative to a formal quit attempt, and the eventual aim should always be complete smoking cessation followed by termination of NRT, rather than its continued, chronic use.

Bupropion is used infrequently in Australia at present but is as effective as NRT.[28] Known epilepsy or increased seizure risk is the major contraindication. Varenicline achieves superior quit rates to bupropion.[29] It is the most effective single smoking cessation therapy, again in suitable patients (until more safety data are available, its use should be restricted in patients with active or significant psychological disease and there should be heightened vigilance for new mood symptoms). Both bupropion and varenicline are effective in patients continuing to smoke in the face of diagnosed CVD or PVD, and there were no signals suggesting cardiac safety issues with either treatment.[30,31]

Hypnotherapy, acupuncture and so-called laser therapy do not increase the chance of successful smoking cessation. Their only utility is in patients who will not contemplate an attempt at smoking cessation without that specific assistance. In that circumstance, benefit derives from the creation of a quit attempt rather than improving the success rate.

Arrange follow up

Few quit attempts are straightforward. Proactive follow up, whether by telephone, follow-up visit or active engagement with the QuitLine, is strongly recommended. This is required when smoking therapies are prescribed under the PBS. The benefit of initial and follow-up counselling on smoking cessation multiplies the benefit of drug interventions.

Care of the nicotine-dependent hospital inpatient

Of people in the community with CVD, smokers are likely to be over-represented in those admitted to hospital. Most hospital systems now have policies in place to assist these patients. NRT produces much lower peak arterial nicotine concentrations than smoking and mean steady state venous nicotine levels are also lower.[32] Only if administered to people who are light smokers or with the use of a high-dose strategy should nicotine exposure be higher with NRT than with smoking. Therefore, if the active alternative is smoking, NRT should be considered safe.

There is a reasonable argument that a smoker with recent arrhythmia or infarction who is bed-bound and experiencing nicotine withdrawal symptoms would be better having those symptoms palliated with NRT than being left in uncomfortable withdrawal. For such a patient who is ambulant, use of NRT is infinitely preferable to having him or her smoking in the outdoor precinct of the hospital.

Smoking in the pre-operative setting

For current smokers, cessation for a period of six to eight weeks before any surgical procedure is essential for safe elective surgery. This relatively brief cessation period markedly reduces CV, respiratory and surgical risks, particularly wound infections.[33] Sadly, many smokers will not have been identified in the surgery planning process, and long elective surgery waiting periods can compound this.[34]

Smoking cessation should be mandatory before cardiac surgery. A combination of operative risks, wound infections and inferior medium-term outcomes require this. For some patients, the margin of benefit offered by cardiac surgery may be offset by ongoing smoking such that a more appropriate course could be medical management. Denying the ongoing smoker access to surgery on the basis of poor treatment outcomes is a matter of controversy.[35] It is, however, arguably rational for joint replacement and plastic/reconstructive surgery.

Conclusion

In terms of CV risk assessment and intervention, the population can be divided into a nonsmoking majority and the smoking minority in whom the risk factor given the greatest attention should be smoking. Just as it is the standard practice to identify dyslipidaemia or hypertension in every relevant case and to then discuss risk and be proactive in addressing that risk, so it should be with smoking. Active engagement in smoking cessation attempts should be a core competency for a practising clinician. There are still millions of people in Australia at risk from smoking, the diagnostic test is cost-free and the threshold for action is certain. Also, for interventions across a range of intensiveness in smokers, smoking cessation is both more effective and substantially more cost-effective than attempts to reduce the impact of other CV risk factors.[18] CT

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A list of references is available on request to the editorial office.

COMPETING INTERESTS: Dr Peters has served on advisory boards for smoking cessation products and received honoraria for CME lectures. Professor Kiat: None.

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