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Smokers know little of their increased surgical risks and may quit on surgical advice

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Key words

health knowledge, perioperative risk, smoking, surgery, tobacco.

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Part of data was presented as poster at the Annual Scientific Meeting, Australian & NZ College of Anaesthetists, Perth, WA, May 2012.

Accepted for publication 8 January 2013.

doi: 10.1111/ans.12096

Abstract

Background: Smoking cessation before surgery improves perioperative outcomes and some smokers may quit if undergoing surgery. Quitting smoking in community settings is influenced by physician quit advice and knowledge of smoking hazards, but there are few data on whether this applies in perioperative settings.

Method: Survey on day of surgery of elective patients who reported being a smoker at the time of wait-list placement. Duration of smoking abstinence before surgery (if any) and length timing of failed quit attempts was determined. Sources of any quit advice before surgery, including from physicians, and patient knowledge on hazards of smoking and surgery were questioned.

Results: While on the waiting list, 44/177 smokers reported quitting (>24 h) before surgery and 42/177 others made an attempt. Quitting was usually brief. Fewer than 40% of smokers answered yes (correct answer) to questions on whether smoking increased wound infection rates, worsened wound healing, increased anaesthetic complications or increased post-operative pain. Incorrect answers (no) were less likely in quitters than those smoking until surgery (OR 0.41, 95% CI 0.25–0.68). Patients still smoking by admission recalled quit advice from a surgeon in 22.6% of cases, while wait-list quitters recalled surgical quit advice in 43.2% of cases (OR 2.6 95% CI 1.2–5.4 $P = 0.01$). Effects of general practitioner quit advice were significant (OR 3.2 95% CI 1.5–6.8 $P = 0.004$) while anaesthetists, nurse and hospital brochure advice were not.

Discussion: Improving patient knowledge of the perioperative risks of smoking and increased physician advice to quit may improve smoking abstinence at surgery.

Introduction

In 1944, a British anaesthetist published the first study on outcomes in smokers after surgery, showing a sixfold increase in pulmonary complications after abdominal surgery compared to non-smokers.¹ Since that time, over 300 studies have shown that smokers have increased perioperative risks across the range of surgical specialties, including respiratory, cardiovascular and wound-related complications.² Higher rates of death, unplanned and prolonged intensive care admissions, wound infection, sepsis and stroke were found when comparing smokers to matched non-smoking controls in large national studies.³ Post-operative pain is increased in smokers for a variety of reasons.⁴ While prospective, randomized controlled trials assessing this association have rarely been done for ethical reasons, such evidence does exist that patients randomized to smoking cessation programmes prior to major surgery had significantly fewer post-operative complications, particularly wound infection.⁵ While

the optimal timing for smoking cessation before surgery is not fully known, cautions sometimes expressed against stopping within 6 weeks of surgery appear weak based on recent evidence.^{6–8} Elective surgery may represent a 'teachable moment', where smokers are more likely to quit.⁹ 'Teachable moments' are health experiences that provide motivation to reduce risky behaviours and adopt positive behaviours.¹⁰ Few data exist on what patient's know about smoking and perioperative risk. Perioperative risks do not feature in the current range of health warnings on cigarette packs in Australia or New Zealand. Furthermore, few data exist on how often surgeons or other clinicians advise patients to quit before surgery and whether this advice is heeded. This study of elective surgical patients determined quitting behaviour while waiting for surgery. It also determined if smokers and those who smoked when they were placed on a waiting list knew important facts about smoking and its perioperative risks and identified sources of stop-smoking advice that were recalled by patients before surgery (if any).

Method

The Peninsula Health Human Research and Ethics Committee granted approval for the study under the low-risk provision. Current smokers and those who reported quitting smoking since being told of their need to undergo elective surgery were targeted for the survey. In order to include participants who may have quit during long surgical wait-list times, both current smokers and those who quit within the last 5 years were surveyed. Surveys took place in the admission lounge on the day of surgery at two public hospitals serving the Mornington Peninsula area of Victoria, Australia. Potential participants were identified from a preoperative health questionnaire, which all Peninsula Health patients must complete at the time they are put on the waiting list. This includes questions on smoking status, amount smoked and when quit (for ex-smokers). The health questionnaire assists waiting-list staff to identify patients referred from surgeon's rooms who should attend the hospital's preadmission clinic (PAC) before surgery, based on medical/surgical co-morbidities. Most Peninsula Health patients having major surgery attend PAC 1–2 weeks prior to surgery while only those with significant coexisting medical disease attend when having minor surgery.

Excluded from the survey were pregnant patients, patients <18 years of age or those having non-operative procedures, for example, endoscopy.

Duration of quitting or quit attempts was by self-report only. Surveys were anonymous and data collected by staff who were not involved with the patient's subsequent care. Study participants included both major and minor elective procedures in the specialties of general surgery, vascular, orthopaedics, gynaecology, plastics, ENT and urology. Data were collected over a 10-week period in 2011. Participants were systematically identified over that period, but only 177 of 232 eligible patients completed surveys due to various reasons; for example, patient transfer to theatre before being approached or lack of a researcher to collect data due to rostering issues. There were no refusals.

Patients were surveyed on four dimensions of risk specifically concerning smoking and surgery, plus one on general smoking hazards; the correct answer being yes to all questions:

As far as you know, does smoking make any of the following more likely? (Yes/No/Don't know):

- (1) Slower healing of wounds after surgery?
- (2) Increased risk of infection after surgery?
- (3) Increased pain after surgery?
- (4) Increased complications with the anaesthetic?
- (5) Increased risk of future heart or lung problems?

Patients were asked of any of the following happened before this surgery (ticking all/any that apply):

- (1) I read I should stop smoking before surgery in written information from the hospital.
- (2) I read elsewhere (book, newspaper, internet etc.) to stop smoking before surgery.
- (3) I was advised to stop smoking before surgery by my general practitioner (GP).
- (4) I was advised to stop smoking before surgery by a surgeon.
- (5) I was advised to stop smoking before surgery by an anaesthetist.

(6) I was advised to stop smoking before surgery by another health worker, for example, a nurse.

(7) I was advised to stop smoking before surgery by another person, for example, family/friend.

Comparison of smokers and recent quitters was by 2×2 contingency tables to calculate odds ratios and chi-square test for statistical significance using Minitab 14 statistical software (State College, PA, USA).

Results

Self-reported abstinence of 24 h or more before surgery was relatively common occurring in 44/177 (24.9%) patients who smoked at the time of waiting list entry, but quit durations were usually short (Table 1). A further 42 patients (23.7%) tried to quit while on the waiting list but most attempts were brief, often ending within 7 days of surgery (Table 2). There was a trend for quitters to be older, female, smoke more heavily and be having major surgery, although none of these differences were statistically significant (Fig. 1).

While most smokers correctly identified future heart and lung problems as a risk of smoking, 'don't know' was the dominant response to questioning about the four dimensions of smoking and surgical risk that were surveyed (Fig. 2). For those patients who quit on the waiting list, the odds of incorrect answers ('No') was more than halved (OR 0.41, 95% CI 0.25–0.68) compared to patients who continued smoking.

Most patients received advice to stop smoking before surgery from at least one source (Table 3). For those who smoked until the day of surgery, this advice most likely came from written hospital information or family/friends. However, for the 44 who quit while on the waiting list, surgeons were the most common advice source, followed by GPs and written information from the hospital (Table 3). The odds of quitting on the waiting list were significantly higher if a surgeon or GP advised stopping before surgery. No other sources of advice significantly influenced the odds of quitting before surgery.

Table 1 Quitting duration for waiting-list patients ($n = 44$)

Duration of quitting	Number of patients (%)
<1 week before surgery	14 (31.8)
1–3 weeks before surgery	12 (27.3)
1–6 months before surgery	13 (29.5)
>6 months before surgery	5 (11.4)

Table 2 Failed quit attempts while on waiting-list patients. Attempt duration and time before surgery when failed ($n = 42$)

Duration of quit attempt	Number of patients (%)
<1 day	3 (7.1)
<2 days	9 (21.4)
2–6 days	18 (42.9)
1–4 weeks	5 (11.9)
1–3 months	6 (14.3)
>3 months	1 (2.4)
Time before surgery that attempt failed	
<1 week before surgery	19 (45.2)
1–3 weeks before surgery	7 (16.7)
1–6 months before surgery	9 (21.4)
>6 months before surgery	7 (16.7)

Table 3 Effect of physician and other advice sources on risk of smoking cessation before surgery

Told to stop by	Smoked until surgery n = 133 (%)	Stopped >24 h n = 44 (%)	P value Odds ratio (95% CI)
Nobody/nothing	22.6	9	NS
Written hospital information	49.6	38.6	NS
Book/magazine/other written	10.5	9	NS
Surgeon	22.6	43.2	0.01 OR = 2.6 (1.2–5.4)
General practitioner	16.5	38.6	0.004 OR = 3.2 (1.5–6.8)
Anaesthetist	9	15.9	NS
Other health-care worker (e.g. nurse)	9.7	13.6	NS
Family member or friend	39.8	34	NS

CI, confidence interval; NS, non-significant.

Fig. 1. Age histogram of surgical patients and demographic data.

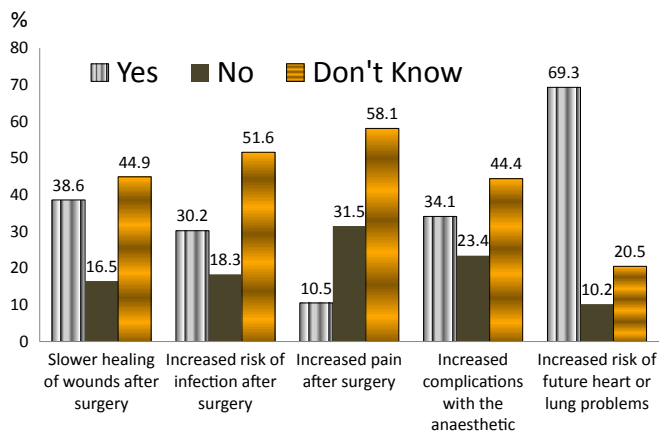
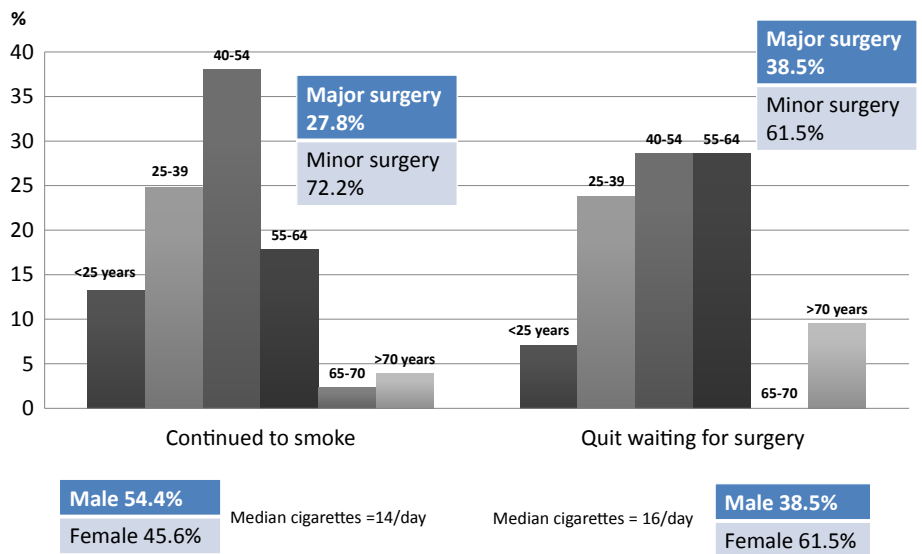


Fig. 2. Patients were asked 'As far as you know, does smoking make any of the following more likely?' (Correct answer is yes to all five questions).

Discussion

This study showed that a high proportion of smokers either stopped or attempted to stop smoking before surgery, although brief quitting (or brief attempts) was more common than sustained. Regarding knowl-

edge of smoking and perioperative hazards, the high proportion of incorrect or 'don't know' responses to these questions suggested smokers have significant knowledge deficits in these areas. Regarding patients who recalled receiving physician advice (surgical/GP) to quit before surgery, there was significantly increased likelihood of quitting. Given relatively low rates of recall of physician quit advice and the knowledge deficits identified, this study highlights opportunities to increase smoking cessation before surgery.

At the time of this survey, Peninsula Health routinely sent patients a brochure with only limited information about smoking and surgery at the time they were put on the waiting list. Titled 'About Your Anaesthetic', it contained two lines on page three: 'Give up smoking at least 6 weeks before your surgery to give your heart and lungs a chance to improve. You need to let the surgeon and anaesthetist know if you smoke'. Recall of this source of stop-smoking advice was not particularly high (approximately 50%), although compared to other sources, it remained one of the most significant means by which smokers recalled quit advice. The patient knowledge deficits found in this study may be partly due to the lack of institutional information to smokers that inform them of increased risks of wound infection, healing problems, anaesthetic complications and other hazards. Future research could determine if improved content and

delivery of information to smokers entering the waiting list would increase knowledge and quitting behaviour.

Smoking-related perioperative complications of increased wound infection, problems with healing and increased anaesthetic (mainly respiratory) complications are well known from the medical literature,^{2,3,5} yet fewer than 40% of smokers answered yes to these questions. This contrasted to the question of future heart lung problems, where decades of public health campaigns and pack label warnings yielded 69% answering yes. Given these pack warning labels and government-funded tobacco counter-advertising, it may seem surprising that 10% of a sample of Australian smokers would deny it 'increases the risk of future heart or lung problems'. However, other recent research showed that only 94% of Australian smokers believed it caused lung cancer and 86% believed it caused heart disease.¹¹ This is consistent with a range of research that shows that many smokers deny or minimize the risks posed by their smoking or display unrealistic optimism that the risks apply to the average smoker instead of their personal risk.¹² Whether these behavioural barriers to quitting apply to the same degree in perioperative settings when the potential risks are more immediate, for example, wound infection, is another area for future research.

A low awareness of increased pain after surgery (10.5% of smokers) was not surprising given that it is a relatively recent research finding, is a complex interaction and there is some uncertainty of its clinical implications.⁴ One reason to include this question was to help determine to what extent our five smoking risk questions (all with yes answers) were leading participants towards ticking yes to everything, thereby overestimating smoker's knowledge. The response to this question may indicate that this did occur to a limited extent. Health knowledge may be assessed in a variety of ways and one limitation to our research was the relatively low threshold we used to measure knowledge. We could have tested knowledge more precisely by asking smokers to recall smoking-related surgical complications and/or to estimate the likelihood of those complications occurring. Despite limitations, the tick-box approach we used provided valuable patient knowledge data in an area where none previously existed, and with limited resources.

Answering 'no' (incorrect) to knowledge questions was significantly less likely in waiting-list quitters than current smokers. Whether better knowledge of these risks contributed to the decision to quit while on the waiting list could not be determined by our study design but is plausible. Understanding the magnitude and nature of health risks was shown to strongly influence quit decisions in smokers.¹³ Older adults are particularly sensitive to risk perceptions from the immediate harmful effects of smoking on their health.¹³ Compared to distant future cardiac-respiratory illnesses, perioperative risks are immediate for elective surgical smoking patients and the vulnerability felt makes surgery a potentially powerful 'teachable moment' for cessation.⁹

The benefits of physician brief advice on smokers making quit decisions has been extensively researched in the community setting,¹⁴ but there are few data on how surgeons or other physicians influence this in the perioperative setting. The current findings suggest that surgeons (and GPs) may have a powerful impact on decisions to quit before surgery, while the limited hospital-supplied information, family/friends and anaesthetist advice had little impact.

Because the majority of Peninsula Health elective surgical patients are seen by an anaesthetist only on the day of surgery, opportunities from them to deliver a quit message were constrained, perhaps accounting for the lack of anaesthetist effect compared to other physicians. However, other research has shown reluctance by anaesthetists to offer quit advice due to uncertainty surrounding the optimal timing of smoking cessation.⁶

While the majority of surveyed smokers did not recall advice to quit from a surgeon or GP, these rates were significantly better than those found in a sample of 200 ambulatory surgical patients at a major Melbourne hospital, when only 6.5% of smokers were advised to quit by a surgeon and 3% by GPs.¹⁵ Although that study was conducted 11 years prior to ours, another plausible explanation for the difference in prevalence of clinician quit advice could be that our patient population included a significant proportion having major surgery. Giving (and following) advice to quit is more likely in circumstances where patients have significant existing morbidity and having major procedures.^{9,15} Quitting before surgery is less frequent in ambulatory surgical population,⁹ perhaps because of fewer perceived benefits, although even among such smokers, respiratory complications and wound infections occurred more frequently.¹⁵ At our institution, major surgery would usually mean attending the PAC within a fortnight of surgery, increasing patient-clinician contact and the opportunity to give quit advice. Quitters showed a trend towards being more likely to have major surgery (38.5%) than non-quitters (27.8%), but this was non-significant with our small sample size.

While the proportion of waiting-list smokers who stopped or attempted to stop was quite high, we set a low threshold for defining 'quit by surgery' as >24 h only, and undoubtedly many will have returned to smoking following hospital discharge. As the survey was anonymous (to encourage high participation rates and truthfulness in responses), it was not possible to determine if cessation was sustained. A large national survey of Australians found during a single year (2010), 48.1% of smokers attempted to quit smoking but only 19.1% achieved abstinence of 1 month or more.¹⁶ That nicotine addiction is a chronic, relapsing disorder is supported by considerable data including that 96% smoke daily, few smoke less than five cigarettes daily, 50% smoke within 30 min of waking, 67% wish they could quit and 80% have tried (often several times) with 75% of all attempts failing within a week.¹⁷

Tobacco is the single greatest cause of preventable death worldwide, killing 20 000 annually in Australia and New Zealand and approximately one-half of all smokers will die as a result of their tobacco use unless they quit.⁶ Based on surgery volumes and current smoking prevalence, it is likely that around 360 000 smokers have elective surgery in Australia and New Zealand each year, creating a significant public health opportunity if more smokers were encouraged and supported to quit.⁶ Taking maximum advantage of surgery as a 'teachable moment' for smokers likely involves a convergence of situational factors, patient education and clinician-patient interaction.¹⁰ Asking about smoking, advising cessation and arranging that smokers receive cessation support from their GP or national telephone, Quitlines are core elements of Australian smoking cessation guidelines that are applicable to most clinical settings.¹⁸ In Australia and New Zealand, free multisession telephone counselling for smokers may be arranged by clinicians through fax referral (**Quitline**

fax referral form links: Australia: <http://www.quitnow.gov.au/internet/quitnow/publishing.nsf/Content/for-health-professionals-lp>; **New Zealand:** <http://www.quit.org.nz/94/helping-others-quit/health-professionals>) and such support resulted in abstinence rates of 24% at 3-month follow-up in a community setting,¹⁹ significantly higher than unassisted quitting.¹⁴ Other evidence-based supports besides physician advice¹⁴ and telephone Quitlines²⁰ include pharmacotherapies, nicotine replacement therapy²¹ and varenicline.²² Although concerns about vasoconstrictive properties of nicotine replacement therapy and surgical patients are sometimes held, its use in the perioperative setting appears supported in current literature.²³

The strength of this research is that it provides data on preoperative quitting behaviour, health knowledge and effects of cessation advice in a patient group where few data currently exist. Most previous studies on effects of physician advice occurred in general practice settings.¹⁴ Our study also has limitations. In measuring sources of advice to quit, all retrospective studies may be affected by recall bias. We did not measure the nature or intensity of the advice given. Studies have shown previously that more intensive preoperative smoking interventions are more effective than brief advice,²⁴ although our data still showed that surgical/GP brief advice appeared highly effective, at least in terms of short-term abstinence. We did not look for longer-term cessation outcomes, although it is known from other research that significant proportions of patients quitting before surgery remain abstinent afterwards at 12-month assessment periods.²⁴ We did not confirm abstinence with biochemical monitoring, relying on an anonymous survey delivered by an impartial data collector to minimize distortions of truth. However, it remains possible that an explanation for our results regarding physician advice could be that patients who recalled being told to stop by a physician were more likely to deny their smoking, while those who continued to smoke justified it by denying they were told to stop. However, the reasonable assumption that giving advice is better than not giving advice has been tested in community settings in over 28 randomized controlled trials and holds true, with no significant added effect from the subgroup of studies that included biochemical monitoring.¹⁴

In conclusion, this study shows a need to address deficiencies in the health knowledge of smokers having surgery and that surgical and GP advice to quit may significantly increase short-term smoking abstinence. Given the large numbers of smokers having elective surgery each year, surgeons and other perioperative clinicians may have a role in reducing the burden of tobacco in the community and decreasing perioperative complications in their patients through smoking cessation. Further studies are needed on how to best deliver information and quit support in the setting of impending surgery.

Acknowledgements

We thank Professor Ron Borland, Cancer Council, Victoria for assistance with developing the questionnaire and Melissa McCormack and Gillian Connell for data collection at Frankston and Rosebud hospitals.

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