

SURGICAL OUTCOMES & SMOKING



Key Messages for Health Care Providers and Policy Makers

Overview

Cigarette smoking can cause serious complications for patients undergoing different types of surgery. Smoking affects surgical outcomes and may cause complications involving wound healing, and also intra- and post-operative complications involving the lungs and cardiovascular/cerebrovascular systems.¹ Longer periods of smoking abstinence decrease the incidence of postoperative complications.²

The Link between Smoking and Surgical Outcomes

- Smoking affects perioperative outcomes by:
 - Contributing to chronic diseases such as coronary artery disease, chronic obstructive lung disease, and other disorders leading to an increased risk of intra- and post-operative complications.³
 - The acute physiologic effects of over 7000 components of cigarette smoke, including nicotine and carbon monoxide (CO) that may contribute to risk.⁴
- Recent smoking may contribute to hypercoagulability thereby leading to acute vascular events. Recent smoking also, increases myocardial work, while decreasing oxygen delivery because of carbon monoxide and also causing coronary vasoconstriction. Wound healing may be delayed because of reduced tissue oxygenation caused by chronic changes in microvasculature or carboxyhemoglobinemia or effects on immune function.³ Tobacco-related tissue ischemia and wound-healing impairment is particularly a problem in plastic surgery, especially for elective aesthetic procedures involving the face, cosmetic and reconstructive breast surgery, abdominoplasty, free-tissue transfer, and replantation procedures.¹

Impact

- The effect of smoking on outcomes 30 days after surgery was evaluated in 520,242 non-cardiac surgical patients. It was found that among people who smoked⁵:
 - Deaths were 1.38 times more likely compared to those who never smoked;
 - Odds were significantly greater for pneumonia (odds ratio [OR] 2.09), unplanned intubation (OR 1.87), and mechanical ventilation (OR 1.53);
 - Likelihood was increased for cardiac arrest (OR 1.57), myocardial infarction (OR 1.80), and stroke (OR 1.73);
 - Odds were higher for superficial (OR 1.30) and deep (OR 1.42) incisional infections, sepsis (OR 1.30), organ space infections (OR 1.38), and septic shock (OR 1.55).
- In a multicenter randomized controlled clinical trial,⁶ postoperative complications were significantly more common in patients who were not offered a smoking cessation program during the first 6 weeks after emergency fracture surgery.
- In a study⁷ of patients undergoing otologic surgery, people who smoked had significantly worse chronic ear disease, required more extensive surgery, and developed worse hearing outcomes than those who never smoked. Subsequent surgeries were more common in those who smoked. People who had quit smoking for less than 5 years had similar outcomes to current smokers, whereas those who had quit for more than 5 years were similar to those who did not smoke.
- In a study of complications of post-mastectomy breast reconstructions, the overall complication rate for those who smoked was 39.4%, compared with 25% in patients who had quit and 25.9% in people who had never smoked ($p = 0.002$).⁸



Actions

- Surgery can provide a “teachable moment” to encourage good health behaviours, and provides an opportunity for people who smoke to quit permanently. Effective interventions to support people to stop smoking include counselling and pharmacotherapy.³
- Brief preoperative smoking intervention can motivate smoking cessation, and more intensive interventions are even more effective.^{3,9}
- Providing patient education and refusing to perform optional procedures such as esthetic or elective reconstructive surgery on individuals who smoke can serve as motivating factors for abstinence.¹ In a review of randomized trials, smoking cessation resulted in a 41% reduction in the relative risk of postoperative complications, and each week of smoking cessation increased the effect by 19%. Observational studies have shown that smoking cessation reduces wound healing complications (relative risk 0.73) and pulmonary complications (relative risk 0.81). Longer periods of smoking cessation are associated with an average reduction of 20% compared with shorter periods of cessation.²
- The CAN-ADAPTT Guideline Development Group 9 recommends that health care providers should:
 - Ask patients on a regular basis about their tobacco use status.
 - Clearly advise patients or clients to quit.
 - Assess the willingness of patients or clients to begin treatment to quit smoking.
 - Offer assistance to every tobacco user who expresses the willingness to begin treatment to quit.
 - Conduct regular follow-up to assess response, provide support and modify treatment as necessary.
 - Refer patients or clients to relevant resources as part of the treatment where, appropriate.

Helpful Resources

- National Institute for Health and Clinical Excellence. *Commissioning a smoking cessation service for people having elective surgery*. <http://www.nice.org.uk/usingguidance/commissioningguides/smokingcessationserviceelectivesurgery/commissioning.jsp>
- Ontario Anesthesiologists. *Welcome to “Stop Smoking for Safer Surgery”*. <http://www.ontarioanesthesiologists.ca/stop-smoking-safe-surgery/>

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