

Background and Evidence Supporting Policy on Tobacco Cessation Treatment for Surgical Care

Introduction

Tobacco use is one of the most impactful and modifiable risk factors related to poor surgical outcomes. Nicotine, the main addictive component in cigarettes and other forms of tobacco which are not inhaled (e.g. chewing, snuff, snus, and dissolvable), is a vasoconstrictor of the coronary arteries and vascular beds in the skin, and has been linked to increased cancer risk, compromised immune function, and reduced tissue oxygenation ^[1,2].

Studies have consistently demonstrated that users of tobacco products have a higher than usual rate of serious complications following surgery. These complications are related to wound healing, cardiopulmonary events, and the need for postoperative intensive care ^[2-6]. Smoking also significantly increases the chance of non-union or delayed union in bones after fracture ^[7].

Cessation of tobacco products before an operation has been shown to decrease the incidence of numerous postoperative complications. In studies examining patients who received tobacco cessation treatment before surgery, the risk of complications was reduced by as much as one-half to two-thirds ^[8-10].

Evidence for Treatment

Medication

The tobacco cessation interventions most highly supported by existing medical literature include varenicline, Nicotine Replacement Therapy (NRT), and bupropion. Varenicline or combination NRT (e.g. patches + gum) have been shown to be the most effective quitting aids, with bupropion and individual NRT products being less effective but still superior to placebo interventions ^[11]. These interventions are described in more detail below:

Varenicline

Varenicline, popularly known by its brand name Chantix, has been shown to be one of the most effective interventions for tobacco cessation ^[11,12]. Across multiple studies it has been shown to outperform individual NRT products as well as bupropion ^[11].

Special care should also be taken if the patient consumes alcohol, as varenicline can decrease alcohol tolerance and in some cases increase aggressive behavior. Though some adverse neuropsychiatric events or cardiovascular events have been posited, a recent systematic review found no increased risk of these adverse events ^[11]. Additional caution should be taken when

prescribing varenicline as it is contraindicated in patients who are taking NRT due to its partial nicotine agonist properties ^[13].

Bupropion

Bupropion, known by its brand name Zyban, is an antidepressant that has been shown to be effective in aiding tobacco cessation compared to placebo interventions, and is equally as effective as NRT alone ^[11].

Possible side effects of this intervention may include agitation, insomnia, and very low but increased seizure risk. Though some adverse neuropsychiatric events or cardiovascular events have been posited, a recent systematic review found no increased risk of these adverse events ^[11].

Nicotine Replacement Therapy

Nicotine Replacement Therapy (NRT) involves the use of nicotine containing products to provide a tobacco user relief from the symptoms of nicotine withdrawal to aid quitting. Specific NRTs that have been studied include patches, gum, and "other" forms (inhaler, spray, tablets, or lozenges). Different types of NRT are generally equally effective but a combination of NRT (e.g. patches + gum) is demonstrated to be more effective than individual NRTs, and shown to be as effective as varenicline in tobacco cessation ^[11].

NRT has a good safety profile, and has proven effective in cessation for many tobacco users ^[11, 14]. Side effects from NRT are similar to those from smoking, but the dose of nicotine delivered from NRT is smaller than what a moderate smoker receives from cigarettes ^[15, 16].

Behavioral Therapy

Behavioral therapy alone or in combination with medication can substantially improve the likelihood of tobacco cessation, as the inclusion of some form of behavioral support is likely to increase the chance of quitting by about 10% to 25% ^[17, 18]. Preoperative smoking interventions which include behavioral support and offer NRT have been shown to increase short-term smoking cessation and may reduce postoperative morbidity ^[10, 14, 19]. The optimal intensity and timing of the behavioral intervention remains unknown, but interventions with weekly counseling and NRT four to eight weeks before surgery are more likely to reduce surgical complications and assist with long-term smoking cessation ^[20]. There is a strong dose-response relation between session length of in-person contact and successful treatment outcomes. In-person treatment delivered for four or more sessions is especially effective in increasing tobacco cessation ^[13].

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