Al-ayen Iraqi university

College of Health &Medical Technology

Department of Anesthesia

Lecture :7

By: MSC Khitam AL –Mohammed

Stage :2

preoperative smoking and physiological effect of cessation of smoking

SMOKING AND PERIOPERATIVE COMPLICATION

Although smoking contributes to many perioperative complications, 3 are of greatest clinical importance: **pulmonary complications**, **cardiovascular complications**, and **complications related** to **impaired healing of bones and surgical wounds.**

Cigarette smokers are at increased risk of postoperative complications such as pneumonia and respiratory failure.

Although some of this risk may be explained by smoking-related respiratory pathology such as chronic obstructive pulmonary disease, complications may occur even in smokers who do not yet have overt lung disease. Contributing factors include retained secretions, caused by impaired ciliary function and enhanced mucus production, and alterations in lung immune responses. For example, alveolar macrophage function is impaired notably in smokers, weakening normal defense mechanisms against postoperative infection.

Smokers have increased risk of perioperative cardiac complications such as myocardial ischemia and infarction.

Similar to pulmonary complications, this risk arises in part because of the higher prevalence of cardiovascular disease related to tobacco dependence. For example, smoking promotes atherosclerosis by affecting lipids and producing

endothelial damage, oxidant injury, neutrophil activation, and enhanced thrombosis.

However, short-term exposure to cigarette smoke also can contribute to vascular events by increasing coagulability, increasing sympathetic tone (which increases myocardial work and constricts coronary vessels), and decreasing the capacity of blood to

carry oxygen (via exposure to carbon monoxide).

Biological effects of smoking:

Vascular

Perfusion of skin and peripheral tissue decreases during smoking. This is partly due to the vasoconstricting effect of nicotine. This vasoconstriction may affect the regulation of body temperature, and low body temperature may cause other complications such as shivering. Central haemodynamics are also altered among smokers. All these vascular effects may disturb the normal physiological effects during anaesthesia.

. **Coagulation**

Nicotine causes increased aggregation of platelets, which

may lead to thrombosis. CO causes hypoxia, which increases the production of red blood cells and the permeability of the endothelium, which in turn leads to higher viscosity and platelet aggregation.

Already after two weeks of smoking cessation, platelet functions appear to be partially restored.

Immune system

Smoking increases the release of inflammatory markers in the blood and the white blood cells do not function properly. Pulmonary macrophages are altered and lymphocyte suppressor cells are increased. All these findings may facilitate inflammatory processes.

Oxygenation of tissue

Smoking decreases the partial pressure of oxygen by 22–48%, which causes a chronic oxygen deficiency in peripheral tissue. CO occupies the binding sites of oxygen in the haemoglobin molecule and the extent of this is dependent on the amount of tobacco consumed and the time elapsed since last cigarette. Deoxygenation of tissue has also been associated with an increased risk of postoperative wound infection. Global postoperative desaturation is also more common among smokers and desaturation is associated with myocardial ischaemia.

Besides affecting oxygenation in tissues, smoking also causes local pulmonary effects. Everything from chronic obstructive pulmonary disorders to reduced ciliary movements and changes in surfactant properties have been observed.

Wound healing

Smokers have a distinctly lowered production of collagen. Collagen is of great importance to the wound healing process and collagen synthesis is dependent on oxygen. There is experimental evidence that the disturbed protein deposition may be restored after ten days of smoking cessation, collagen synthesis does not seem to recover in such short period. It is not clear which compound in smoking that causes this effect, but it does not seem to be nicotine that impairs wound healing.

Bone healing

Smoking is associated with osteoporosis and thereby an increased fracture risk. Bone healing after a fracture is also impaired. There is experimental evidence that other substances than nicotine cause the delayed bone healing