

The Eye of the Smoker

Smoking has ill effects on far more than just the lungs.

BY CAROL L. SHIELDS, MD

Smoking is the single most important cause of preventable disease and death in the United States. It is estimated that smoking leads to death in 480 000 persons a year and causes chronic disease in a total of 16 million persons.¹ Both women and men are at risk to die from lung cancer, heart disease, and chronic obstructive pulmonary disease from cigarette smoking.¹

It all began back in the early 1900s when social barriers were overcome and women were allowed to smoke cigarettes. Lucky Strikes cigarettes were touted as a method for women (and men) to control weight. An ad campaign advised, "Reach for a Lucky instead of a sweet," teasing Americans to smoke rather than have a chocolate.² This campaign was successful and led rapidly to profits for the American tobacco industry in the late 1920s.

Further advertisements of women with cigarettes showed the supposed glamour and sophistication of smoking and even the independence and success accompanying this habit.¹ Longer, thinner cigarettes were supposedly attractive. Later, Philip Morris tried to create ties to physical fitness and cigarettes through sponsorship of the Virginia Slims Tennis Circuit, named for the slim cigarettes that were designed for the slim figure of a woman.¹

In 1964, the first Surgeon General's report on the causal link between smoking and lung cancer was released, a 387-page document entitled *Smoking and Health*.³ Following this report, cigarette smoking in men declined, but smoking in women responded more slowly. In the 1980s, the decline in men's smoking rate was approximately 27%, while women's smoking declined by only 14%.⁴ This slow decline in smoking was reflected in lung cancer rates: Men have shown decreasing rates of lung cancer since the 1990s, whereas the rates for women increased until 2004 before beginning a slow decrease.^{1,4}

In 2014, the latest Surgeon General's report on smoking was released.⁴ This 977-page document, entitled *The Health Consequences of Smoking - 50 Years of Progress*, is available online at <http://www.surgeongeneral.gov/library/reports/50-years-of-progress>. The document is a celebration of progress with the tremendous reduction in cigarette smoking, from 42% of adults in 1965 to 18% in 2012.

However, a warning regarding the ill effects of smoking remains prevalent. The 2014 report indicated that

the tobacco epidemic, initiated and sustained by the tobacco industry, misled the public on the risks of smoking cigarettes.⁴ In this recent report, the Surgeon General reviewed the risks of cigarette use not only for the development of lung cancer but also for the risks of chronic obstructive lung disease and cardiovascular disease.

REGARDING CANCER

The 2014 Surgeon General's report also indicated that smoking could have a negative effect for many cancers, including lung, liver, colorectal, prostate, and breast cancers.⁴ For example, smokers who develop breast cancer have been found to have higher all-cause and cancer-specific mortality and increased risk for second primary cancers.⁴

All in all, 13 cancers have now been linked to smoking.⁴ Of the 585 000 cancer deaths projected to happen in the year 2014, approximately 163 700 (28%) will be the result of smoking or exposure to secondhand smoke.^{1,4} With some hope, cancer patients who discontinue smoking can improve their prognoses.

REGARDING CARDIOVASCULAR DISEASE

Smoking is a major cause of cardiovascular disease, with approximately one-third of deaths from coronary heart disease a result of smoking or exposure to secondhand smoke.^{1,4} Heart attack and stroke can also be related to secondhand smoke, with the risk for stroke increasing by about 20 to 30%.^{1,4} Deaths from abdominal aortic aneurysm can also be attributed to smoking.

REGARDING RESPIRATORY DISEASES

It is well established that smoking is the leading cause of chronic obstructive pulmonary disease, including emphysema and chronic bronchitis. Today women smokers are 22 times more likely to have chronic obstructive pulmonary disease than women who do not smoke.^{1,4} Furthermore, more women die from chronic obstructive pulmonary disease than do men.

REGARDING REPRODUCTION

There has been a strong link between smoking during pregnancy and delivery of low-birthweight infants.^{1,4}

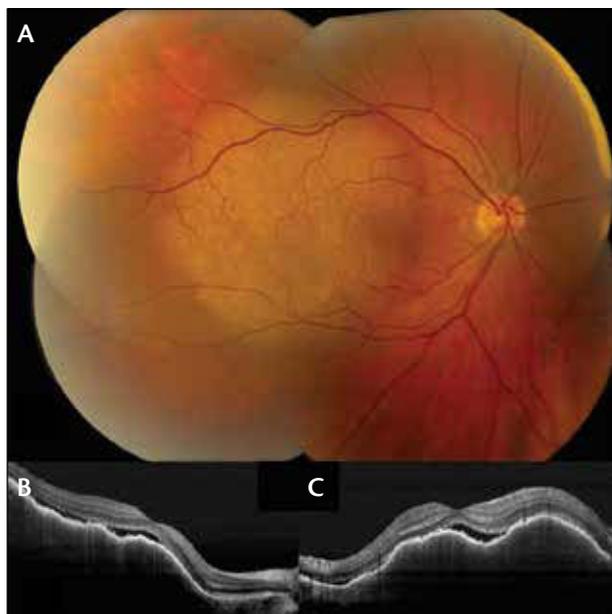


Figure 1. Choroidal metastasis from lung carcinoma (A) appearing a dull yellow color and with overlying subretinal fluid. Optical coherence tomography shows the “lumpy bumpy” surface of the metastasis and shallow subretinal fluid in horizontal (B) and vertical (C) orientation.

Additionally, smoking leads to reduced fertility, increased pregnancy complications, and danger to the health of the mother, fetus, and infant. Smoking during pregnancy has been linked to birth defects including cleft palate and can lead to damaging effects on lung development in the newborn baby that last beyond childhood.

With the growing popularity of electronic cigarettes, known as e-cigarettes, which deliver nicotine to users, these risks to reproduction are speculated to continue.

REGARDING OTHER CONDITIONS

Cigarette smoking can complicate the management of diabetes, with higher risks for kidney disease, circulatory problems, and even blindness.⁴ Smoking can interfere with immune and autoimmune disorders and their treatments.

REGARDING THE EYE

Ophthalmologists should be aware of the multiple systemic and ophthalmic consequences of smoking. Galor and Lee reviewed the effects of smoking on ocular health.⁵ Smoking has been associated with an increased risk for ocular inflammation, increased severity of inflammation, and alteration of the course of inflammation.⁵ Smoking can interact with genetic susceptibility for the risk of age-related macular degen-

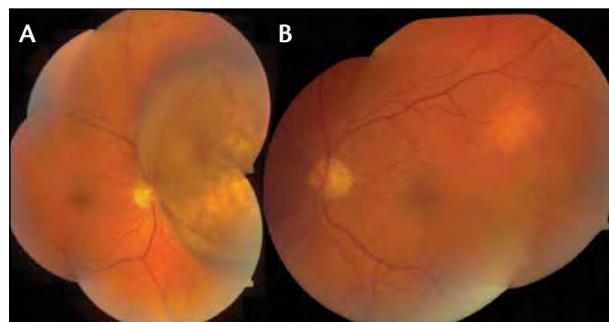


Figure 2. Choroidal metastasis from lung carcinoma in a smoker appearing as a large juxtapapillary mass in the nasal quadrant of the right eye (A) and as a subtle yellow lesion in the perimacular region of the left eye (B).

eration and other ocular diseases.⁵ Smoking has been linked to the presence and development of nuclear sclerotic and posterior subcapsular cataracts in whites and nonwhites.⁵ A further link of smoking with the onset and severity of thyroid orbitopathy has been confirmed.⁵

In the field of ocular oncology, smoking plays a major role in the development of 2 specific malignancies, conjunctival squamous cell carcinoma and choroidal metastatic carcinoma. With regard to squamous cell carcinoma of the conjunctiva, this malignancy tends to occur at the limbus in elderly white individuals.⁶ Smokers, however, tend to show this ill-defined yellow-white neoplasia in a more atypical location, in the inferior fornix, and occasionally bilaterally.

Regarding choroidal metastasis, the 2 most common primary malignancies to spread to the eye are breast carcinoma and lung carcinoma (Figures 1 and 2).⁷ With metastasis to the choroid from lung carcinoma, the metastatic focus is occasionally detected in the eye before the primary tumor is symptomatic or detected.

Our team recently published data on 194 patients with lung carcinoma metastatic to the eye. That publication emphasized that the uveal metastasis preceded the diagnosis of lung cancer in nearly 50% of cases.⁸ We found that lung cancer metastatic to the choroid appeared as a yellow, dome-shaped, or placoid lesion with mean basal diameter of 8 mm and thickness of 3 mm. Unfortunately, cancer-related mortality was high: 54% at 12 months.⁸ These patients are often preterminal by the time their ocular metastasis is discovered.

One relatively unique feature of lung metastasis to the eye is that it can produce pain, masquerading as scleritis. Pain is not commonly found with metastatic tumors to the eye in general. Our analysis found that 14% of patients complained of low-grade ocular pain, compared with only 2% of patients with metastasis

from breast cancer.⁸ We speculate that the pain could be related to infiltrative malignancy within the sclera, producing a neoplastic scleritis-like picture, or it could be due to tumor necrosis with inflammatory response.

The treatment of metastatic disease to the eye depends on the patient's systemic and ophthalmic status. If multiple sites of systemic involvement are found, systemic chemotherapy is generally provided. However, if the disease is limited to the eye, external beam radiotherapy, plaque radiotherapy, or photodynamic therapy is provided. In such cases, the clinician should keep in mind that the patient's overall prognosis is generally poor by the time ocular metastases are discovered, so therapy should be designed to control the malignancy, reduce related retinal detachment, and recover visual acuity in a timely fashion. Photodynamic therapy takes only 15 minutes, compared with 4 days for plaque radiotherapy, 20 days for external beam radiotherapy, and many months for chemotherapy.⁹

CONCLUSION

The Surgeon General's 2014 report indicated that smoking is a serious problem leading to numerous human maladies, not only lung problems. Ophthalmologists should be aware of the spectrum of negative effects that smoking can have on the eye, including the potential for blindness. ■

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