

Little Black Bags, Ophthalmoscopy, and the Roth Spot

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Throughout my medical training in the early- to mid-1950s, most students, many house officers, and some faculty members carried little black bags as they scurried about the hospital. The bags typically contained a sphygmomanometer, tuning fork, reflex hammer, stethoscope, otoscope, and ophthalmoscope— instruments that we routinely used during the physical examination of our patients. In the 1960s, pharmaceutical companies gave these bags to medical students. Things changed, however, in the mid-1970s, when advanced medical technology burst upon the scene. From that point forward, emphasis on the physical examination steadily diminished, and attention turned to a battery of laboratory tests and sophisticated imaging techniques for diagnosis. As a result, clinical skills plummeted, the little black bags disappeared, and regular use of the instruments they contained came to an end.

Today, for example, ophthalmologists are practically the only physicians who still regularly use the ophthalmoscope when examining patients. To me, that reflects poorly on our profession, because ophthalmoscopy is easy to learn, takes little time or effort to perform, and often yields valuable clinical information. In addition, the ophthalmoscope is the only convenient device that enables direct inspection of blood columns and neural structures *in vivo*. Its use can also yield, at times, the first evidence of glaucoma, diabetes mellitus, intracranial hypertension, hyperlipidemia, emboli of various sorts, and a host of infectious, hematologic, and vascular disorders.¹⁻¹⁰ Even after a diagnosis has been established, some ophthalmoscopic signs are uniquely useful in evaluating the chronicity, severity, vascular effects, and prognosis of the disease.¹

One retinal abnormality that is relevant to several clinical disciplines and that deserves clarification is the white-centered hemorrhage known widely as the Roth spot.^{1,2,5-9,11-20} Not widely known or appreciated, however, is the fact that 3 common erroneous beliefs relate to this storied lesion¹¹: 1) Roth described the white-centered retinal hemorrhage that bears his name; 2) the Roth spot is specific for, if not pathognomonic of, bacterial endocarditis^{18,19}; and 3) leukocyte accumulation accounts for the white center of the hemorrhage.

Regarding the first erroneous belief, Moritz Roth was a Swiss pathologist who, in 1872, described retinal white spots and separate retinal red spots (hemorrhages) near the optic disc and macula of patients with septicemia.^{12,15} He did *not* describe white-centered retinal hemorrhages, nor did he associate them with bacterial endocarditis or any other illness. It was Litten¹³ who first described white-centered retinal hemorrhages,^{6,8,11} documenting their occurrence in patients with endocarditis.^{11,19} He also is the one who applied Roth's name to the retinal white spots that Roth had first described 6 years earlier.⁵ In truth, therefore, the "Roth spot" is a retinal white spot without surrounding hemorrhage; in today's terminology, it probably would be called a cotton-wool patch.⁵ The correct eponym for a white-centered retinal hemorrhage is Litten spot or Litten sign.

As for the second erroneous belief, a white-centered retinal hemorrhage is not specific for, or pathognomonic of, bacterial endocarditis or any other disease. In fact, it has been associated with numerous conditions of diverse origin.^{6,11,19}

Third, except in cases of leukemia^{16,17} and some cases of bacterial endocarditis,^{14,15,20} the white centers of retinal hemorrhages are not leukocyte accumulations but rather fibrin-platelet plugs.^{18,19} These plugs presumably form in response to vascular leaks brought about by elevated intravascular pressure, ischemia, increased capillary fragility, or combinations thereof.¹⁸ In most cases, emboli appear to play no role.

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Competent use of the ophthalmoscope can be an enormous asset to all primary care physicians and to practicing cardiovascular specialists as well.^{3,10} Moreover, making a diagnosis with the ophthalmoscope is rapid, inexpensive, safe, gratifying, and fun.

Epilogue

In his prize-winning book published 33 years ago, Maxwell Wintrobe wrote, “. . . many look, but few see.”²¹ Today, few see because few look.

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