We, therefore, hypothesize that a low pleural fluid pH in a patient with a parapneumonic effusion indicates that the effusion is in the fibropurulent stage and that there are at least some loculi present which contain purulent material. Diagnostic thoracentesis with measurement of pleural fluid pH should be performed on all patients with parapneumonic effusion to evaluate the need for intercostal tube drainage of the pleural space.

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Human Pulmonary Dirofilariasis:
Entry Method of Infective Larvae

To the Editor:

In the excellent and interesting paper on human pulmonary dirofilariasis by Gershwin, Gershwin and Kritzman, one word calls for comment and correction. This is their reference to the “injected” larvae.

The word “injected” implies an active mechanism on the part of the infective mosquito during the course of a blood meal; such a mechanism occurs in the transmission of malaria to man, where the infective sporozoite stage of the malaria parasite is indeed directly injected into the capillaries during feeding. The malaria sporozoites develop in the salivary glands of the mosquito and are injected with mosquito saliva as the insect feeds. There are, however, important differences between the methods of transmission of malaria and the various filarial parasites capable of infecting man, including *Dirofilaria immitis*.

First, a study of the anatomy of the mosquito mouthparts and of the disposition of the mouthparts during feeding shows that the salivary ducts carrying infective malarial sporozoites lead directly into the mosquito fascicle which penetrates the human skin and enters tissue and capillaries. On the other hand, the labium, which surrounds the fascicle like a sheath, retracts during skin penetration by the fascicle and does not enter the human body. It is, however, the labium which is the site of final development of third-stage infective filarial larvae, and the route of escape of these larvae from the mosquito is not through the blood-sucking fascicle but through the labella at the tip of the labium, which do not enter the human body during feeding. Infective filarial larvae escape from the labium onto the surface of the skin at some distance from the puncture wound made by the mosquito, usually accompanied by a drop of fluid derived from the insect hemolymph. The filarial larva then actively migrates through the fluid and may attempt to enter the puncture wound after the withdrawal of the insect fascicle.

The possibilities of a larva entering the human body thus depend upon numerous factors, such as the rate of evaporation of the fluid drop, the survival time of the larva on skin, its ability to “find” the puncture wound, and the number of larvae deposited during a feed. It is possible to generalize from a number of experimental studies and say that only a small proportion of infective larvae carried by a mosquito will actually enter the body after a blood meal. Of course, the larva then faces many hazards in the human body before it successfully reaches adult life, and the percentage success is also probably very small. These factors, as well as the fact that man is an abnormal host for the parasite, contribute to the rarity of human dirofilariasis.

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