

## Letter to the Editor

### Paragonimiasis as an Important Alternative Misdiagnosed Disease for Suspected Acid-fast Bacilli Sputum Smear–Negative Tuberculosis

Dear Sir:

We welcome the short report of Suntornsut and others, which reminds us of melioidosis, an emerging and potentially fatal infection in Southeast Asia and other regions.<sup>1</sup> *Burkholderia pseudomallei* might provoke a large variety of symptoms and mimic tuberculosis (TB). Misdiagnosis may delay initiation of adequate treatment and increase the risk for a severe outcome. Among 118 enrolled patients with acid-fast bacilli smear–negative suspected pulmonary TB, three were sputum culture positive for *B. pseudomallei*. This result enabled the lives of two patients to be saved. We agree that systematic search for an alternative diagnosis for suspected smear-negative pulmonary TB is a crucial issue.

We draw the attention of clinicians and laboratory technicians to a neglected disease, pulmonary paragonimiasis,<sup>2,3</sup> which is endemic to Southeast Asia, notably in Thailand and Laos, and is confused with TB. Paragonimiasis, which is caused by *Paragonimus* spp., is a foodborne trematodiasis and zoonosis. Human acquire infection by consuming raw or insufficiently cooked intermediate hosts, such as crab and crayfish species, or paratenic hosts, such as wild boars.

The TB-resembling symptoms of paragonimiasis, such as chronic productive cough, are most frequently misdiagnosed. Paragonimiasis has an overestimated reputation of moderate severity despite frequent invalidating sequelae.<sup>4</sup> This disease can be easily cured by a short course of treatment with praziquantel, although triclabendazole should be further explored as a treatment option.

Early diagnosis is beneficial for patients and the community and avoids the unnecessary burden of TB treatment. Paragonimiasis might be affected by eosinophilia or the presence of microcysts seen in lung radiographs. Moreover, in cases of dual infection, paragonimiasis may lead to misinterpretation of TB treatment failure when lung symptoms persist.<sup>2</sup> As in Thailand, despite anecdotic reports among migrants, the diagnosis of paragonimiasis was not accurate in Laos during the 1980s–2000s.<sup>5,6</sup>

Our group and others conducted various investigations in Laos on this forgotten disease.<sup>2,7–10</sup> We demonstrated that foci of ongoing transmission of *Paragonimus* could easily be detected in disease-endemic regions by cross-sectional surveys using a four-item questionnaire: chronic cough (more than three weeks), blood in sputum, fever, and consumption of raw crabs or crustaceans.<sup>7,8,10</sup>

Recently, we also questioned an old paradigm of medical parasitology.<sup>2</sup> Ziehl-Neelsen staining, as conducted 50 years ago, was known to deteriorate *Paragonimus* eggs. Using the World Health Organization recommended staining method, we showed that *Paragonimus* eggs were intensely stained with fuchsin, easily identifiable at low magnification, and hardly or not deformed by Ziehl-Neelsen stain. Eggs typically appear brown–red and resemble a deflated football. Examination of bloody sputum showed a higher number of eggs. Retrospective

examination of 263 Ziehl-Neelsen–stained specimens of patients with suspected TB enabled diagnosis of five patients infected with *Paragonimus*. We therefore recommended the systematic use of a 10× microscope objective for *Paragonimus* egg detection, in addition to the 100× objective for acid-fast bacilli, to reduce misdiagnosis of sputum-negative TB or co-infection with both organisms in disease-endemic areas.

Because of persistent paragonimiasis in rural Thailand and despite the decrease in eating raw or poorly cooked foods in Thailand, Suntornsut and others might consider conducting a similar retrospective examination for *Paragonimus* eggs on their Ziehl-Neelsen–stained slides.<sup>3</sup> However, in our experience, we also found a rapid fading of Ziehl-Neelsen–stained smears when they are stored in a warm and moist place, which explains the low efficiency of re-reading of slides after more six months (Barennes H and others, unpublished data). In areas where, in addition to TB, melioidosis and paragonimiasis are endemic, it is desirable to develop diagnostic algorithms in peripheral laboratories to avoid serious and costly mistakes.

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