CASE REPORT

What is the cause of this fever? Malaria with concomitant pneumonia

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SUMMARY

A 43-year-old Hispanic woman presented to the clinic complaining of fever, chills and cough for 14 days. The patient reported a recent trip to Asia 12 days prior to presenting symptoms. Given her physical examination findings, she was treated empirically for community acquired pneumonia. Since her symptoms worsened despite the antibiotic, she was referred to the Emergency Department for further evaluation. The patient was ultimately diagnosed with pneumonia and malaria. When evaluating patients with history of recent travel, it is important to consider communicable diseases that are endemic to the areas visited, as well as multiple disease aetiologies for complicated and refractory cases.

BACKGROUND

Malaria is a mosquito-borne infectious disease by parasitic protozoans of the *Plasmodium* type.¹ About 1500 cases of malaria are diagnosed every year in the USA, mostly in travellers returning from Sub-Saharan Africa or South Asia.² Symptoms of malaria usually appear 10–15 days after infection and typically include fever, fatigue, vomiting, rigours and headaches.^{1 3} Less commonly, the disease can cause jaundice, renal failure, respiratory

abnormalities, coma or death. Because symptoms such as fever, fatigue and rigours are common to both pneumonia and malaria⁴ coinfection with pneumonia can mask the symptoms of malaria making it difficult to diagnose, especially in countries where malaria is uncommon. Our review of the literature revealed only two published cases of concomitant malaria and pneumonia.^{5 6}

CASE PRESENTATION

A 43-year-old Hispanic woman presented to the clinic with a 14-day history of fever, particularly at night, chills and fatigue as well as 4 days of productive cough with green sputum, occasional dyspnoea and chest pain when coughing. The patient reported a recent 16-day-long trip to Asia (Dubai, Abu Dhabi, Thailand, Cambodia and Laos) 12 days prior to the beginning of her symptoms. She travelled with four other people who were asymptomatic and her mother, who had recently been diagnosed with pneumonia on return to the USA. The patient had been taking Tylenol for her fever, which she reported as providing some relief, but the fever was persistent.

On physical examination, vital signs were normal. Pulmonary examination showed decreased breath sounds and crackles over the right lower base. Given her history of no insurance and physical findings, it was decided to treat the patient empirically for community acquired pneumonia (CAP) with azithromycin and albuterol. The patient continued to experience persistent fevers, chills and night sweating despite the antibiotic. She was then referred to the emergency department for worsening symptoms.

INVESTIGATIONS

In the emergency department, the patient was found to be tachycardic and tachypneic, and pulmonary examination showed rales over the right base. Workup included complete blood count (CBC), which showed leucocytosis of 12000 and chest X-ray, which revealed multiple nodular right lower lobe airspace opacities (figure 1). Given her history of recent travel and persistent fever despite antibiotics, workup included *Plasmodium falciparum* antigen, which was positive. Thick and thin blood smears were negative. However, the antibiotic which had been prescribed for pneumonia, azithromycin, also has activity against *P. falciparum*, which may have reduced the parasite load to undetectable levels by thick and thin blood film evaluation. The

Figure 1 Chest X-ray revealing multiple nodular right lower lobe airspace opacities.

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patient was admitted to the intensive care unit for suspicion of Middle Eastern respiratory syndrome, which eventually was ruled out. Further testing was performed, including tests for other infectious causes such as *Histoplasma*, *Leptospira*, *Strongyloides*, *Mycobacterium tuberculosis*, *Streptococcus pneumoniae*, *Legionella*, *Influenza*, HIV and autoimmune causes including

rheumatoid factor (RF), antinuclear antibodies (ANA) and anti-dsDNA. All the tests were negative, except for ANA, which was inconclusive. ANA was repeated in the outpatient setting and was negative.

TREATMENT

Since the patient had failed outpatient treatment for CAP and symptoms persisted, physicians from the hospital's Infectious Disease Department were consulted and the patient was started on atovaquone-proguanil 4 tablets daily for 3 days for malaria and levofloxacin intravenous for CAP.

OUTCOME AND FOLLOW-UP

Ultimately, the patient was diagnosed with both pneumonia and malaria and treated accordingly. The patient improved after completion of treatment with atovaquone-proguanil and was discharged on oral levofloxacin. The patient presented to the clinic for follow-up 10 days after discharge from the hospital. She complained of mild fatigue, but felt better overall.

DISCUSSION

A recent case report from The Netherlands describes a similar patient who was initially diagnosed with pneumonia and then, after initial treatment failed, was diagnosed with malaria.⁶ Malaria must always be suspected in a returning traveller or a visitor from a malaria-endemic country with an acute febrile illness, even when a separate diagnosis is made. Overlapping symptoms between malaria and pneumonia, along with the rarity of malaria in certain countries, can make malaria difficult to diagnose when concomitant with pneumonia. Slide microscopy and/or the use of rapid antigen tests are standard diagnostic tools.¹

While malaria can cause respiratory complications such as pulmonary oedema,⁷ the patient's chest X-ray and respiratory symptoms were more consistent with pneumonia than malaria; thus, the patient was ultimately diagnosed with both. Malaria can be suspected based on the patient's travel history, symptoms and the physical findings at examination.² It is important to diagnose malaria early on, as early diagnosis prevents disease severity and death.¹ In the context of patients having received treatment or being partially treated prior to testing for malaria, false negative tests can occur and thus clinical judgement should be exercised. When evaluating patients with history of recent travel, it is important to consider communicable diseases that are endemic to the areas visited as well as multiple disease aetiologies for complicated and refractory cases.

Contributors LP is the resident physician who initially saw the patient in the clinic, performed the initial literature review and wrote the initial draft of the report. MCMK is the attending physician who initially saw the patient in the clinic, obtained and transcribed the postclinic visit health information for the patient, obtained the patient's consent to publish the report and helped to edit the final document. She serves as the guarantor for this report. BSS performed the expanded literature review, edited the initial draft and wrote the final draft of this report.

Competing interests None declared.

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Patient's perspective

Not even two weeks after being back home, I was sitting on a Friday afternoon at work and suddenly started feeling feverish. I felt bad joint pain and started shaking. I attributed it to the fact that I was still recouping from an awesome but exhausting trip, jetlag and tons of catching up at work. So I thought I was basically tired and maybe getting sick, hence left for and went to bed early after taking a couple of ibuprofens. The next morning after a rested night, I woke up feeling fine, but the same symptoms reappeared in the evening so I repeated the ibuprofen and going to bed early and waking up fine. And so on, until Monday when I woke up feeling like somebody had poured cement into my lungs. In a way it was a relief, since I was having symptoms of having an infection (fever) but couldn't figure out what type of infection; on Monday I 'knew' it was a respiratory infection do to felling my lungs heavy filled with something. I went to work all week, and breathing and coughing because painful. Since this didn't seem to go away and rather was getting worse by the day and the fever came back every afternoon/evening, I finally decided to go to the doctor. I had never felt that bad before, but never thought it could be Pneumonia, let alone malaria! But I'm getting ahead of myself. I went to the doctor who diagnosed Pneumonia. I followed the prescribed treatment, but after almost a week I wasn't feeling any better. Therefore the doctor suggested going to the ER where the doctors, after examining my chest X-rays, considered something else (in addition to the Pneumonia) must be going on. I guess the cyclical, very high fever was the clue. I went to the ER only to have the chest X-ray taken and ended up staying 5 days in the ICU! I really wasn't expecting that at all. I actually laughed when the ER doctor conveyed the news that I had malaria. I couldn't believe it (I had checked before travelling if I needed any vaccines or the like, and Malaria never came up). The fact that having MERS was a possibility was kind of scary since I had to be quarantined during my ICU stay. Another intimidating aspect was all the lab tests they did on me during my ICU stay which, at some point, made me think the doctors were not sure what was really wrong with me. But fortunately, everything turned out fine and eventually I was able to go home. It was an interesting experience and I hope somebody can learn from my case.

Learning points

- Malaria must always be suspected in a returning traveller from a malaria-endemic area with acute febrile illness, even when a separate diagnosis has been made.
- Overlapping symptoms between malaria and pneumonia can make the initial diagnosis of malaria difficult, especially in countries where malaria is uncommon.
- Antibiotic treatment can reduce parasite load and cause false negative test results for *Plasmodium falciparum*.
- It is always important to consider multiple disease aetiologies for cases that are refractory to initial treatment.

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