BRIEF REPORT

Isolation of a Novel Coronavirus from a Man with Pneumonia in Saudi Arabia

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SUMMARY

A previously unknown coronavirus was isolated from the sputum of a 60-year-old man who presented with acute pneumonia and subsequent renal failure with a fatal outcome in Saudi Arabia. The virus (called HCoV-EMC) replicated readily in cell culture, producing cytopathic effects of rounding, detachment, and syncytium formation. The virus represents a novel betacoronavirus species. The closest known relatives are bat coronaviruses HKU4 and HKU5. Here, the clinical data, virus isolation, and molecular identification are presented. The clinical picture was remarkably similar to that of the severe acute respiratory syndrome (SARS) outbreak in 2003 and reminds us that animal coronaviruses can cause severe disease in humans.

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Coronaviruses are enveloped, single-stranded, positive-sense RNA viruses that are phenotypically and genotypically diverse.[1] Coronaviruses are widespread in bats around the world but can be found in many other species as well, including birds, cats, dogs, pigs, mice, horses, whales, and humans.[1] They may cause respiratory, enteric, hepatic, or neurologic diseases, with variable severity in various animal species. In humans, four respiratory coronaviruses — human coronaviruses (HCoV) 229E, OC43, NL63, and HKU1 — are known to be endemic. In addition, in 2003 a previously unknown coronavirus caused an outbreak of SARS in humans.[2-4] The diversity of coronaviruses is facilitated by the infidelity of the RNA-dependent RNA polymerase, the high frequency of RNA recombination, and the unusually large genomes for RNA viruses.[1,5] These factors not only have led to the diversity of known coronaviruses but also have facilitated the emergence of viruses with new traits that allow the organism to adapt to new hosts and ecologic niches, sometimes causing zoonotic events.

CASE REPORT

A 60-year-old Saudi man was admitted to a private hospital in Jeddah, Saudi Arabia, on June 13, 2012, with a 7-day history of fever, cough, expectoration, and shortness of breath. He had no history of cardiopulmonary or renal disease, was receiving no long-term medications, and did not smoke. The physical examination revealed a body-mass index (the weight in kilograms divided by the square of the height in meters) of 35.1, a blood pressure of 140/80 mm Hg, a pulse of 117 beats per minute, a temperature of 38.3°C, and a respiratory rate of 20 breaths per minute.

Chest radiography performed on admission showed low lung volumes, bilateral enhanced pulmonary hilar vascular shadows more prominent on the left, and accentuated bronchovascular lung markings. Multiple segmental, patchy, veiling