



Contents lists available at ScienceDirect

Asian Pacific Journal of Tropical Biomedicine

journal homepage: www.elsevier.com/locate/apjtb

Document heading doi: 10.1016/S2221-1691(13)60118-5 © 2013 by the Asian Pacific Journal of Tropical Biomedicine. All rights reserved.

H7N9 influenza—the laboratory presentations: A letter to editor

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To the editor,

1. Introduction to new H7N9 bird flu

Influenza virus infection is an important group of respiratory infectious disease. Several groups of influenza viruses can cause human infections. However, in the recent years, there are many newly emerging influenza infections, which have never been previously seen in human. Crossing species from animal to human lead to new emerging zoonosis. Those new influenza infections are considered atypical influenza infections and have the trend of worldwide expansion^[1,2].

H5N1 bird flu and H1N1 swine flu are good examples of new emerging influenza infections^[3,4]. However, present hottest concern is on the new H7N9 bird flu^[5–7]. In fact, H7N9 influenza is the known virus causing avian disease^[8,9]. However, the observation of human infection in China is the first description in human, hence, it is mentioned as the newest emerging infection of the world^[5,6]. Due to the nature of a new emerging infection, lack of knowledge on H7N9 influenza can be expected and this is the point for further study. In this specific article, the author discusses on the laboratory presentations of new H7N9 influenza infection, which has just been described for a few months (first observed in February 2013)^[5,6]. Firstly, the pathogen was

not identified. However, the pathogenic agent was finally detected as a newly identified human influenza virus, H7N9^[10,12].

2. Laboratory presentations of new H7N9 influenza infection

The signs and symptoms of swine flu are difficult to differentiate from other influenza virus infections. The main clinical signs and symptoms include high fever, coughing and myalgia can be seen^[5,6]. Additional atypical clinical manifestations can also be seen.

Based on present clinical practice, diagnosis of specific new H7N9 bird flu is totally based on molecular laboratory diagnosis^[11,13]. However, there are also many interesting observation on the routine clinical laboratory investigations.

Focusing on the routine hematology laboratory testing, complete blood count (CBC), the important observation is on the platelet^[5,6,14]. Thrombocytopenia is the main platelet disorder. Alteration of thrombohemostasis should be the focus for further hematological study. The other observations on CBC results include leukopenia and lymphopenic^[15].

Focusing on clinical chemistry tests, there are several observations. First, the renal function test can be seen. The impaired renal function reflects the nephrological concern due to H7N9 influenza. Second, the liver function

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Article history:

Received 9 May 2013

Received in revised form 13 May, 2nd revised form 21 May, 3rd revised form 26 May 2013

Accepted 13 Jun 2013

Available online 28 Jul 2013

test abnormalities can be seen^[15]. The increased level of aminotransferase can be seen and this implies the hepatitis due to the infection^[16]. Finally, the increased myocardial enzymes showing cardiac problem can also be seen^[15].

3. What learned from laboratory presentations in new H7N9 influenza?

As already mentioned, there are several clinical laboratory aberrations in new emerging H7N9 influenza. This can confirm the observation on multiple organ failure seen in several cases of new H7N9 influenza^[5,6]. Due to the nature of new emerging infections, the nature of atypical laboratory findings can confirm the nature of atypical influenza infections. This might be helpful to a presumptive diagnosis of this newly infection in the period of the outbreak. Any case with clinical feature of classical influenza plus atypical laboratory presentations can lead to the presumptive diagnosis of new H7N9 influenza infection.

Apart from diagnosis usefulness, the basic laboratory investigation can be useful in following up management. Due to the fact that there are many laboratory abnormalities, the investigation can be useful to detect the early problems that help physician in charge plan for proper case management.

Nevertheless, further accumulated data is needed. The detected laboratory presentations might be due to other factors, which can be confounding to the presence of H7N9 influenza. Also, the concurrent of other underlying disease such as underlying cardiac diseases, underlying viral hepatitis and underlying blood cytopenia can modify the laboratory finding and severity of the H7N9 influenza infection.

Due to the nature of new emerging infections, the nature of atypical laboratory findings can confirm the nature of atypical influenza infections^[16–19].

Conflict of interest statement

I declare that I have no conflict of interest.

References

- [1] Bush RM. Influenza as a model system for studying the cross-species transfer and evolution of the SARS coronavirus. *Philos Trans R Soc Lond B Biol Sci* 2004; **359**: 1067–1073.
- [2] Sansonetti P. How to define the species barrier to pathogen transmission? *Bull Acad Natl Med* 2006; **190**: 611–622.
- [3] Trampuz A, Prabhu RM, Smith TF, Baddour LM. Avian influenza: a new pandemic threat? *Mayo Clin Proc* 2004; **79**: 523–530.
- [4] Vincent AL, Ma W, Lager KM, Janke BH, Richt JA. Swine influenza viruses a North American perspective. *Adv Virus Res* 2008; **72**: 127–154.
- [5] Disease control and prevention center of China. Emergence of avian influenza A (H7N9) virus causing severe human illness—China, February–April 2013. *MMWR Morb Mortal Wkly Rep* 2013; **62**(18): 366–371.
- [6] Tang RB, Chen HL. An overview of the recent outbreaks of the avian-origin influenza A (H7N9) virus in the human. *J Chin Med Assoc* 2013 May 4. doi: S1726–S4901(13)00103–2. 10.1016/j.jcma.2013.04.003. [Epub ahead of print].
- [7] Bertran K, Pérez–Ramírez E, Busquets N, Dolz R, Ramis A, Darji A, et al. Pathogenesis and transmissibility of highly (H7N1) and low (H7N9) pathogenic avian influenza virus infection in red-legged partridge (*Alectoris rufa*). *Vet Res* 2011; **42**(1): 24.
- [8] Pasick J, Pedersen J, Hernandez MS. Avian influenza in North America, 2009–2011. *Avian Dis* 2012; **56**(Suppl 4): 845–848.
- [9] Parry J. H7N9 avian flu infects humans for the first time. *BMJ* 2013; doi: 10.1136/bmj.f2151.
- [10] Kageyama T, Fujisaki S, Takashita E, Xu H, Yamada S, Uchida Y, et al. Genetic analysis of novel avian A (H7N9) influenza viruses isolated from patients in China, February to April 2013. *Euro Surveill* 2013; **18**(15): 20453.
- [11] Liu D, Shi W, Shi Y, Wang D, Xiao H, Li W, et al. Origin and diversity of novel avian influenza A H7N9 viruses causing human infection: phylogenetic, structural, and coalescent analyses. *Lancet* 2013; **381**(9881): 1926–1932.
- [12] Koopmans M, de Jong MD. Avian influenza A (H7N9) in Zhejiang, China. *Lancet* 2013 Apr 26. doi: pii: S0140–6736(13)60936–8.
- [13] Corman V, Eickmann M, Landt O, Bleicker T, Brunink S, Eschbach–Bludau M, et al. Specific detection by real-time reverse-transcription PCR assays of a novel avian influenza A (H7N9) strain associated with human spillover infections in China. *Euro Surveill* 2013; **18**(16): 20461.
- [14] Cong YL, Pu J, Liu QF, Wang S, Zhang GZ, Zhang XL, et al. Antigenic and genetic characterization of H9N2 swine influenza viruses in China. *J Gen Virol* 2007; **88**: 2035–2041.
- [15] Lu SH, Xi XH, Zheng YF, Cao Y, Liu XN, Lu HZ. Analysis of the clinical characteristics and treatment of two patients with avian influenza virus (H7N9). *Biosci Trends* 2013; **7**(2): 109–112.
- [16] Lu S, Zheng Y, Li T, Hu Y, Liu X, Xi X, et al. Clinical findings for early human cases of influenza A (H7N9) virus infection, Shanghai, China. *Emerg Infect Dis* 2013; **19**(7). doi: 10.3201/eid1907.130612.
- [17] Mei Z, Lu S, Wu X, Shao L, Hui Y, Wang J, et al. Avian influenza A (H7N9) virus infections, Shanghai, China. *Emerg Infect Dis* 2013; **19**(7). doi: 10.3201/eid1907.130523.
- [18] Reina J, López C. Shanghai flu (H7N9): The threat of a new avian influenza pandemic. *Med Clin (Barc)* 2013; doi: 10.1016/j.medcli.2013.04.020.
- [19] Jiang R, Chen X, Tang R, Zhang X, Liu HS, Wu Q, et al. Nursing experience for patients with severe H7N9 bird flu virus in critical care unit. *Chn Crit Care Med* 2013; **25**(6): 379.