Research Article

Patients with acute respiratory infection admitted to Al-Yarmouk teaching hospital during H1N1 outbreak in Baghdad 2013

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Date Submitted: 18/3/2015
Date Accepted:17/9/2015

Abstract

Background: Since August 2010 WHO announced that the H1N1 influenza virus has moved into the post-pandemic period. However, localized outbreaks of various magnitudes are likely to continue.

Methods: A hospital based descriptive study of patients with a diagnosis of epidemic influenza admitted to Al-Yarmouk teaching hospital**.** Sixtyfive adult in-patients with a primary diagnosis of epidemic flue were enrolled in this study.

Results: The mean age was 40.7±13.7 year. Only 9.2% of them were admitted to the RCU. Tachypnoea, dyspnoea, and auscultatory findings were the main presenting picture. Pneumonia was the most common complication occurring at a frequency of 44(67.7%). Positive cases for epidemic flu virus were 11 patients at a rate of 16.9% of all admitted patients.

Conclusion: Most admitted cases during H1N1 outbreak presented with the usual symptoms of flu. The course, complications, and the outcome of the disease have no direct relation with the positivity of nasal swabs for H1N1.

Key words: Influenza, outbreak, H1N1, hospitalized patient

INTRODUCTION

During the early months (late March and early April) of 2009, an outbreak of H1N1 influenza virus infection took place in Mexico, and then many cases were detected in different countries including Iraq. This pandemic was caused by H1N1 influenza virus that represents a re-assortment of four influenza virus strains, two swine, one human, and one avian strain [1-5]. On 11th June 2009 the world Health Organization formally confirmed the first pandemic of influenza for 40 years [6]

Since August 2010 WHO announced that the H1N1 influenza virus has moved into the post-pandemic period. However, localized outbreaks of various magnitudes are likely to continue [7].

Influenza viruses spread from person to person, through large-particle respiratory droplet transmission, airborne transmission via small-particle aerosols in the vicinity of the infectious patient, and indirect transmission through hand transfer of influenza virus from virus-contaminated surfaces to mucosal surfaces of the face. However, the relative contribution of the different modes of transmission to the spread of influenza viruses is unclear. [8].

According to the communicable disease control center (CDC) criteria, diagnosis of H1N1 should be suspected in any patient with acute febrile illness within 7 days of contact with confirmed case of H1N1 virus infection, or within 7 days of travel to a community where H1N1 cases have been confirmed and thirdly if a person develops an acute febrile illness in a community, where at least one case of H1N1 infection has been confirmed. The duration of illness is typically 4-6 days [9].

Most of the complications reported have been mainly pertaining to the respiratory system. However, it has the potential to cause a variety of complications involving different systems of the body [10]. The infection is associated with a high case-fatality rate [4].

This work aimed at studying the clinical characteristics of the admitted patients with epidemic flue and to find their outcome.

Method and patients:

A hospital based descriptive study of patients with a diagnosis of epidemic influenza admitted to Al-Yarmouk teaching hospital during the period from first January 2013 through June 2013. This hospital is the largest hospital in Al-Kurkh side of Baghdad. The hospital serves a wide geographical area. The total bed capacity is 990 beds in different medical and surgical branches, including an isolation ward that is well equipped to receive patients with communicable diseases.

Sixtyfive patients of both sexes enrolled in the study. The criteria adopted for admission were any patient presented with acute fever (equal or above 38^{o}c) with one or more of the following: running nose, sorethroat, muscle ache, and cough. Together with at least one of the following: auscultatory or radiological evidence of pneumonia; dyspnoea and/or tachypnoea; cyanosis; and impaired level of consciousness, according to Iraqi Communicable Diseases Center instructions.

Data about each patient was filled in a special survey forma designed for this purpose; further clinical information was obtained from the medical file and clinical follow up notes. Oropharyngeal and nasopharyngeal swabs were taken from all admitted patients, sent to the Central Public Health Laboratory (CPHL) for RT-PCR viral study. The kit used to detect the virus was the (Invitrogen) by (Life technologies) SuperScript III Platinum One-Step Quantitative RT-PCR System. This kit used for detection and quantification of RNA using real-time detection instruments; both cDNA synthesis and PCR are performed in a tube using gene-specific primers and either total RNA or mRNA.

Data was grouped, tabulated, and analyzed using SPSS software. The results presented in frequency and percentages. Chi-square test used to find the relationship when needed. P-value of 0.05 and less regarded as statistically significant.

Ethical issue:

Verbal consents were obtained from the patients to participate in the study. The permission of the medical authorities was obtained**.**

RESULTS

Sixityfive adult in-patients with a primary diagnosis of epidemic flue were in rolled in the study. The mean age of sixityfive in-patients was 40.7±13.7 (15-86) year; male patients constitute 47.7% of the sample, and female forming 52.3% of the study group.

Table-1 represents the site of admission of patients in the hospital. The majority of patients (83.1%) were admitted to the isolation ward, 6 patients (9.2%) admitted to the Respiratory Care Unit (RCU) unit, and the remaining 5 cases (7.7%) admitted to general medical ward.

Table-1: Admitted patients to different wards in the hospital.

Hospital wards	**No.**	**%**
Isolation ward	54	83.1
RCU	6	9.2
General medical ward	5	7.7
Total	65	100.0

Different signs and symptoms shaped the clinical presentation of the disease as shown in table-2. Tachypnoea, dyspnoea, and crackles whether diffuse or localized, unilateral or bilateral, are the most common 96.9%, while hemoptysis occurred in 14 patients at a rate of 21.5%.

Table-2: Clinical presentation of the patients.

Signs & symptoms	**No.**	**%**
Tachypnoea	63	96.9
Dyspnoea	63	96.9
Crackles	63	96.9
Wheezing	61	93.8
Productive cough	59	90.8
Chest pain	59	90.8
Nasal congestion	57	87.7
Sore throat	53	81.5
Hemoptysis	14	21.5
There were overlapping in the presenting symptoms and signs.		

Oxygen saturation estimation was done for 89.2% of the patients with a mean saturation percent of 92.8±10.07. Chest X-ray performed for 64 patients (98.5%), localized or diffuse infiltration is the most common finding, seen in 45 patients (69.2%). Nasal and throat swabs were taken from all patients, the sample sent to the CPHL for RT-PCR study for identification of influenza virus (table-3).

Table-3: Diagnostic procedures.

Procedure	No.	%
Oxygen saturation	58	89.2
Chest X-ray	64	98.5
Nasal & throat swab	65	100

About three quarters (73.8%) of the patients needed oxygen as a part of supportive symptomatic management, five patients (7.7%) were artificially ventilated and only 3 patients 4.6% needed to be admitted to the RCU (table-4).

Table-4: Oxygen therapy of the admitted patient.

	No.	%
Admission to RCU	3	4.6
Oxygen therapy	48	73.8
Artificial ventilation	5	7.7

Complications occurred in 50 patients (76.9%), the remaining 15 patients 23.1% were free from them. Table-5 revealed also the main complications that occurred to the patients. Pneumonia was the most common complication occurring at a frequency of 44(67.7%), other complications like cardiac failure, acute bronchitis, and DVT were rare (1.5%).

Table-5: Occurrence of complications and their types

Occurrence of complications	**No.**	**%**
Yes	50	76.9
No	15	23.1
Total	65	100
Types of complication		
pneumonia	44	67.7
respiratory Failure	3	4.6
pneumonia & cardiac failure	1	1.5
acute bronchitis*	1	1.5
DVT	1	1.5
total	50	76.9
*** Persistent cough without clinical or radiological signs of pneumonia**		

Most of patients (81.5%) were discharged after clinical improvement, while 5 patients (7.8%) were transferred from isolation ward to general medical ward prior to discharge, and the remaining 7 patients (10.7%) died.

Table 6: Outcome of the disease

		No.	**%**
Outcome	**Discharge**	54	83.0
	Death	7	10.8
	Transfer	4	6.2
Total		65	100.0

Eleven patients 16.9% show positive test for epidemic virus, leaving the remaining 54 patients 83.1% as negative ones (Fig-1). Only one patient who needs artificial ventilation was positive. One out of seven deaths was positive. Four patients with complications were positive while the rest of patients with complications were negatives. There were no significant relationship between positive test and requiring artificial ventilation, disease outcome, and occurrence of complications (P-value were 0.432, 0.999, and 0.442 respectively) (table-7).

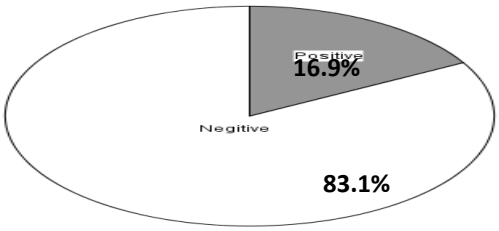

Fig-1: Results of laboratory viral study

Table-7: Distribution of H1N1 virus detection according to the need of artificial ventilation, outcome, and complications.

Variables		Positive No. (%)	Negative No. (%)	Total No. (%)	Fisher's exact test
Need artificial ventilation					
	Yes	1 (9.1)	2 (3.7)	3 (4.6)	P = 0.442 *
	No	10 (90.9)	52 (96.3)	62 (95.4)	
	total	11 (100)	54 (100)	65 (100)	
Outcome					
	Discharge	10 (90.9)	48 (88.9)	58 (89.2)	P = 0.999*
	Death	1 (9.1)	6 (11.1)	7 (10.8)	
	total	11 (100)	54 (100)	65 (100)	
Complications					
	Yes	4 (36.4)	11 (20.4)	15 (23.1)	P = 0.432*
	No	7 (63.6)	43 (79.6)	50 (76.9)	
	total	11 (100)	54 (100)	65 (100)	
*** Not Significant**					

Table -8 showed that sex has no significant relationship neither with requiring artificial ventilation (P = 0.276), nor with occurrence of complications (P = 0.159).

Table-8: Distribution of sex according to the need of artificial ventilation and complications.

Variables		Male **No. (%)**	Female **No. (%)**	Total **No. (%)**	Chi-Test
Need artificial ventilation (RCU)					
	Yes	5(83.3)	1(16.7)	6	X = 1.18 P = 0.276*
	No	26(44.1)	33(55.9)	59	
	Total	31(47.7)	34(52.3)	65	
complications					
	Yes	22(44)	28(56)	50	Yates' correction = 1.98 P = 0.159*
	No	9(60)	6(40)	15	
	Total	31(47.7)	34(52.3)	65	
* Not Significant					

DISCUSSION

Influenza A (H1N1) infection represents a challenge due to the fact that young healthy people were affected [11]. The mean age of the patients in the current study was 40.7 years. Most of the patients in Mohammed *et al* study were below 40 years of age [12]. The result of the present study differs from the median age of the 701 hospitalized cases reviewed by Xu C *et al* during the winter season of 2010–2011 which was 22 years [11]. In Patel *et al* study the median age was 34 (3-69) years [13].

Female patients in the present study were 34(52.3%) slightly higher than male patients (47.7%). A study conducted in China the proportion of male patients was 58.6%, which was significantly higher than that among the general Chinese population (51.4%) [11]. Also, male patients in that study were found to be more likely to develop severe illness, which was consistent with a previously published study in China during the 2009–2010 pandemic periods [11], while Abdulaty in 2013 found that, patients with severe outcome were more likely to be female sex [12]. But in our study we couldn't find such relationship (P = 0.276, P = 0.159).

Most of patients in this study were admitted to the isolation ward, the remaining patients were admitted to either RCU or general medical ward according to severity of the illness, in both personal precautions were put into consideration.

The majority of our patients presented with tachypnoeah, dyspnoea, and auscultatory findings (crackles) because of the nature of the study being hospital based study, this agrees with *Patel et al* study [13]. While in Mohammed *et al* study in 2013 the most common presenting symptoms were cough and fever [14].

All of patients in the present study empirically received the antiviral therapy after throat and nasal swabs had been drawn. Empirical antiviral treatment should be initiated within the first 48 hrs of the onset of symptoms and is recommended for all hospitalized patients admitted with a suspicion of influenza [15, 16], as those who receive antiviral drugs within 2 days of the onset of symptoms have better outcomes [17].

Complications occurred in more than three quarters of our patients which is obviously high; this could be related to the criteria for hospital admission, and late self-presentation or referral of cases. Pneumonia was the most common complication occurred in about two thirds of the patients, other complications like cardiac failure, acute bronchitis, and deep veins thrombosis had been reported but they were rare. Pneumonia was also found to occur at high proportion in a study from Santiago, Chile [18]. In a study from South Korea, Rhim *et al* concluded that pneumonia was more predominant in adult females than in adult males[19].

In Martin-Loeches *et al* study in 2011 co-infection was identified in 18.3% of the patients, and in another analysis of 77 fatal cases of pandemic (H1N1) infection in 2009 bacterial co-infection was found in 29% of patients [4].

Extrapulmonary manifestations of pandemic (H1N1) influenza infection have been reported to be associated with more severe presentations [20].

A striking observation in Martin-Loeches *et al* study is the presence of patients who were admitted with fulminant myocarditis [4]. In this study only one patient had developed heart failure.

In the current study patients were discharged after clinical improvement, only seven patients died (10.7%). This is close to Xu C *et al* study, where the death rate was 11.0% [11].

In the current study only 11(16.9%) of all hospitalized patients were positive for epidemic flue virus by RT-PCR test. In a study conducted in Hungary 8 patients (57.1%) tested positive for H1N1 by RT-PCR of nasal swab samples [3]. In an investigation of an influenza A (H1N1) outbreak in France, about 10% –20% of people tested by PCR for H1N1 were positive and asymptomatic [21].

Surprisingly the outcome of the disease in this study was not related to the documentation of H1N1 infection by RT-PCR; in fact most dead cases were PCR negative for H1N1. So forth the need for RCU and artificial ventilation was also not related to the presence or absence of H1N1 virus. This is comparable with Ayatollahi J *et al.* study in 2013, in which 6945 out of 63,479 cases were confirmed to be H1N1 positive, only 475 of them (7%) needed admission and less than 1% of positive cases (63) died [22]. This also comparable with Affifi *et al* study in 2012 who found that there was no significant difference in the frequency of RT-TPCR positive versus negative results among male and female patients and that there was no significant relationship between gender and survival [23].

The findings in this study should be interpreted with caution because of small sample size and the retrospective study design.

Conclusions

Most admitted influenza cases in H1N1 outbreak presented with usual symptoms of flue. The course, complications, and the outcome of the disease have no direct relation with the positivity of nasal swabs for

H1N1. That is why even negative cases should be treated energetically and followed strictly. At the same time it is necessary to do sputum and blood culture for all admitted patients regardless to the result of PCR test looking for existence of other bacterial infection.

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