Management of hospitalized patients in the season 2015 with high influenza activity

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Introduction

Influenza can cause mild to severe illness, and at times can lead to death. Complications can include bacterial pneumonia, ear infections, sinus infections, dehydration, and worsening of chronic medical conditions, such as congestive heart failure or asthma. Like older people, children often fare worse during H3N2-predominant seasons.

Based on sentinel investigations of the National Working Group for Influenza (NWGI), Influenza A H3N2 dominated the season 2015 with 62%, followed by Influenza A H1N1pdm09 (15%) and Influenza B (23 %). Mismatched H3N2 Influenza viruses continued to predominate this season, hitting older people hard. In Germany, all characterized Influenza A H3N2 were found to be antigenically dissimilar to the vaccine virus A/Texas/50/2012. [1] Therefore, overall vaccine effectiveness was reported to be just about 22 %.[2] The number of estimated consultations during the influenza epidemic in excess of the expected without influenza (influenza-associated consultations) was 6.2 million. The estimated number of influenza-associated sick certificates (or certified need for care of patients, e.g. children, who do not need a sick certificate for leave of absence) was 3.7 million and the estimated number of influenza associated hospitalizations was 31.000 (95 % CI: 26.000 – 35.000).[1]

Objective

Influenza is highly contagious with a basic reproductive rate between 2 and 6. An increased seasonal and / or pandemic influenza activity may have significant effects on:

- burden of visits on the emergency department;
- preparedness and needs for rapid identification or exclusion of cases?;
- Frequency of hospitalizations and the associated risk of nosocomial infections / hygiene management;

Rapid identification of influenza in the clinical setting is important for the prevention of nosocomial infections. Therefore, a precise case definition, real time testing and a strict hygiene management is necessary. The aim of our study was to prove the usefulness of a case definition for an early identification of influenza and to regard the effect of a two-step hygiene management including the permanent use of surgical masks for medical staff on the rate of nosocomial infections.

Materials and Methods

The present data were obtained from a prospective observational study focusing on the hygiene management of hospitalized patients with confirmed influenza during a 6week course of high influenza activity. All patients with a positive influenza A / B test at onset of symptoms were included into the study. To validate clinical symptoms of the influenza A group, PCR-negative patients with similar clinical symptoms were recruited as comparators. PCR-negative patients were continuously enrolled within the first five days of the observational period. For all patients, the indication for influenza testing was arranged by an attending physician because of suspected clinical symptoms.

Period 1 – Standard hygiene management

Within the first week of increased influenza activity, an infection control team was implemented. Patients with a positive influenza PCR-test were managed in line with the national hygiene guidelines and daily meetings were performed to judge actual data / and influenza situation. A working case definition was given according to CDC guidelines including fever ≥ 37.8 ° C, cough and / or sore throat.[3] Additional clinical characteristics were obtained regarding ill patients including fatigue, headache, enteritis and pneumonia. Contact precautions were introduced including strict alcoholic hand hygiene recommendation and the use of surgical masks for the close contact with influenza patients. Influenza infected patients were strictly isolated according to the tested influenza strain. Two medical wards including a total of 57 beds were declared as isolation areas for cohorting of influenza patients.

Period 2 - Intervention

At February 9th, hygiene management was expanded by the permanent use of surgical masks for hospital staff from the beginning to the end of each shift. Permanent use of surgical masks was particularly directed for staff working in areas 1) with influenza patients, 2) in diagnostic areas (radiology, ultrasound e.g.) and 3) for the in-house patient transportation staff. This measure seemed to be useful, because of increasing rates of nosocomial influenza cases especially outside the isolation area. Hygiene management was supervised and controlled by specially trained hygiene staff. Transmission of influenza was classified as nosocomial according to CDC criteria.[3]

PCR testing for Influenza

Nasopharyngeal and throat swabs were taken from symptomatic individuals particular when patients arrived at the emergency center. Reverse transcription-polymerase chain reaction for influenza A / B was performed with the commercial Xpert Flu™ test on a GeneXpert system (Cepheid GmbH, Frankfurt, Germany). This kit allows a differentiation between Influenza B and A (pandemic H1N1 / seasonal H1N1/H3N2). Since results were obtained after 70 minutes, patients were kept in the emergency department until test results were available.

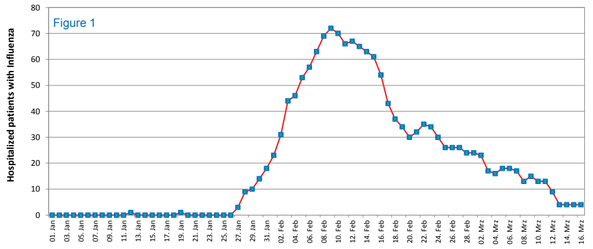
Statistics

SPSS software, version 16.0 (SPSS, Chicago, USA) was used Comparisons between means were performed by ANOVA and subsequent post hoc range tests. A two tailed p-value < 0.05 was considered statistically significant.

Results

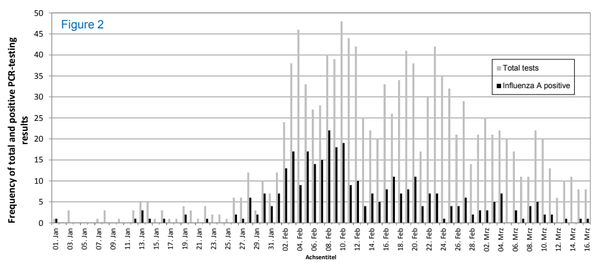
In Germany, influenza activity starts in week 2 of the year 2015 with sporadic cases. In line with the activity data for Influenza reported from the NWGI for Germany, we observed a significant increase of cases at the end of January 2015. Between January 25th and March 14th, a total of 235 patients with PCR confirmed influenza A / B- illness were included into the present study. The time line of hospitalized patients in adult wards was given in figure 1.

Figure 1



During the first 10 days of increasing influenza activity, the infectious pressure was highest reflected by a positivity rate of PCR testing up to 66 % subsequently decreasing below 50 % (figure 2).

Figure 2



Among all positive tested samples, influenza strains were distributed as influenza A with 90 % (n=212) and Influenza B with 10 % (n=23). Within Influenza A seasonal H1N1 / H3N2 dominated with 92 % (n=195), followed by pandemic H1N1 2009 with 8% (n=17).

Mean age of influenza A-positive patients (n = 212) was 75 ± 14 years. The most frequent symptom was a dry cough which was present in nearly the half of the patients. Mortality rate was 10 % among patients with confirmed influenza. When influenza A-patients were compared to a PCR-negative group with similar clinical symptoms (n=87), significant differences were found only in the frequency of cough and fatigue. Further clinical characteristics were summarized in table I. Clinical characteristics of influenza B-patients were not evaluated because of the limited number of patients.

Clinical signs	Influenza A / PCR positive adults with Influenza A (n=212)	PCR- negative adults (matched controls) (n=87)	Clinical signs	Influenza A / PCR positive adults with Influenza A (n=212)	PCR- negative adults (matched controls) (n=87)
Age (years)	75 (15)	73 (14)	Fatigue	17*	35
Gender (m/f)	44 / 56	46 / 54	Enteritis	9	16
Mean temp. (° C) >38 °C	37.6 (1.1) 30	37.6 (1.4)	Pneumonia	17	14
Cough	48*	23	Mortality	10	10
Headache	9	11	data were frequencies (%) if not otherwise indicated *p < 0.05		

Initially, hygiene management of influenza patients was done according to national guidelines including cohorting of patient within an isolation area and wearing surgical masks for the close contact to infected patients. However, within the first 10 days of the observational period, 23 of 71 patients developed clinical symptoms of influenza and were tested positive (rate 31 %). Most of these patients were found outside the isolation area. These infections were defined as nosocomial since clinical symptoms developed after three days of hospitalization. In a second step, hygiene management was expanded by introducing the permanent use of surgical masks for all medical staff during 24/7. After this intervention, the nosocomial rate was halved and only 24 / 146 patients developed nosocomial influenza until the end of the observational period (nosocomial rate 16 %; vs. first step hygiene management p<0.01) (Table 1).

Time period	Surgical mask	Ratio (nosocomial Influenza / all influenza)	Significance
until February 8th (first period)	only in case of close contact to influenza patients	0.31 (23/71)	P < 0.01
February 9th to March 5th (second period)	permanent use for hospital staffs	0.16 (24/146)	

Conclusion

Taken together, the present prospective observations from influenza season 2014 / 2015 demonstrate that a case definition for identification of influenza is not useful in the clinical setting. However, when clinical case definition is shown not to be useful because of its lack of specificity, a sensitive / specific real time testing with a rapid turnaround time is needed to identify influenza patients. Furthermore, the putative effect of the permanent use of surgical masks for hospital staff to prevent nosocomial infections was underlined which supported the potential role of staff for influenza transmission. Consequently, a meta-analyses of interventions reducing influenza transmission highlight the potential importance of facemasks, and the modest efficacy of hand hygiene (32).

References

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