In April 2009, a novel influenza A (H1N1) virus was determined to be the cause of influenza like illness in two children in the United States during March and April 2009 and the cause of respiratory illness in Mexico. The virus quickly spread worldwide through human to human transmission. The first case in India was detected in May 2009 in a 23 yr old man who flew from New York to Hyderabad. In humans three subtypes of influenza A viruses viz., H1N1, H2N2, and H3N2, resulting from genomic reassortment have been detected. H1N1 infection may present with symptoms like cough, rhinorrhea, sore throat, fever, malaise, headache, shortness of breath and chills and results in various degrees of infection classified into mild to severe to fatal. Usually reverse transcriptase polymerase chain reaction (RT-PCR) and throat swab
culture are done which are time consuming procedures, and result in significant delay in confirmation of suspected cases and their isolation.

We conducted a retrospective study of patients who presented to A.P TB and Chest Hospital, Hyderabad, with symptoms of influenza like illness during September to October 2009. The aim of the study was to find out a sensitive laboratory parameter which could play a major role in identifying H1N1 virus infection among patients presenting with influenza like symptoms while awaiting throat swab culture reports.

Material & Methods

This retrospective study was conducted on patients who came to A.P TB and Chest Hospital, Hyderabad, during September to October 2009 and presenting with any two or more of the symptoms which included cough, sore throat, fever, rhinorrhea, malaise, headache, shortness of breath and chills. All other patients who had productive cough indicating a bacterial infection or any symptoms other than those mentioned above or a positive chest X-ray indicating a lower respiratory tract infection were excluded. A throat swab culture report (obtained from National Institute of Communicable Diseases, now National Centre for Disease Control, Delhi) of each patient was obtained. Patients who did not have a throat swab culture report were also excluded from the study. The patients, who had a positive throat swab culture report for swine flu H1N1 virus were grouped as swine flu positive group (SW+ group) which included 55 patients. Fifty five randomly selected patients who had a negative throat swab culture report were labeled as swine flu negative group (SW- group). Some of them were H1N1 negative but influenza A positive, while some were negative for both H1N1 and influenza A. Laboratory data were collected for each patient in two groups which included complete blood picture (CBP), ESR and chest X-ray. Neutrophils to lymphocyte ratio (N/L ratio) was calculated for each patient. The mean N/L ratio and mean WBC count for both groups were also calculated. The data were analyzed by unpaired ‘t’ test.

Results & Discussion

There was a relative decrease in WBC count of patients in SW+ group compared to patients in SW- group which was consistent with the earlier studies8-8. The WBC count in SW+ group varied from 3000 to 10600 (mean 5714), while in SW- group it varied from 4500 to 14300 (mean 10252). The N/L ratio was less than two for 92.7 per cent of patients in SW+ group. It was greater than two for 96.3 per cent patients in SW- group (Table).

The age distributions of the two groups and their individual N/L ratios are plotted on a scatter plot (Fig.). The age distribution in SW- group was slightly higher than that of SW+ group, probably indicating resistance to H1N1 virus in older individuals (especially those aged greater than 60 yr) as indicated in earlier studies9. Only four patients in SW+ group had N/L ratio greater than two, while only two patients of SW- group had the ratio less than two. N/L < 2 as an indicator for swine influenza had a positive predictive value of 96.22 per cent and a negative predictive value of 92.98 per cent. It has a sensitivity of 92.72 per cent and a specificity of 96.36 per cent. Data were analyzed using unpaired ‘t’ test.

The majority of SW+ group had an N/L ratio less than two, while that in SW- group it was greater than two. The SW- group included cases who were swine flu negative but influenza A positive and some were both influenza A and swine flu (H1N1) negative. These were probably due to other viruses causing flu like illness, for example, influenza B or respiratory syncytial virus (RSV), etc. It was necessary to include viruses other than H1N1, which present with influenza like symptoms. RT-PCR was not done to identify the type of virus for every case in SW- group as it was not necessary because the aim of the study was to differentiate between swine influenza H1N1 positive cases and all other viral respiratory illness presenting with similar complaints. All swine flu positive patients had low lymphocyte counts. The average lymphocyte count for SW+ group was 5714 cells/mm³ while that of SW- group was 10252 cells/mm³. This may be probably due to lymphotoxic effects of the swine flu virus. Earlier studies indicated the role of lymphotoxin, monocytecytis, and lymphotoxaly to monocyte ratio in detecting swine influenza10,11, but the N/L ratio less than two observed in this study has not been considered sensitive enough.
The anti-viral treatment can also be started early thus reducing the complications and mortality due to delayed treatment. It would be especially helpful when there are a large number of suspected cases or in areas where the facilities for throat swab culture are not available.

Weather the diagnostic rule described in the present study exclusively applies to patients with swine influenza needs to be evaluated in a larger sample.

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**Reprint requests:** Dr Ajit Indavarapu, c/o I. Shankar (P.G.T Maths), Jawahar Navodaya Vidyalaya, Paleru. Khammam (Dist), Andhra Pradesh, India
e-mail: ajit.indavarapu@gmail.com