

# Lymphopenia in severe acute respiratory syndrome: a summary on its frequency

Viroj Wiwanitkit

Department of Laboratory Medicine, Faculty of Medicine, Chulalongkorn University, Bangkok Thailand 10330

## ABSTRACT

Severe acute respiratory syndrome (SARS) is a new human infectious disease caused by coronavirus. The first world outbreak occurs in 2002, starting from China and then thorough many countries. Abnormal hematological variables were common among patients with SARS. Concerning lymphocyte disorder, there were some previous studies reported the low lymphocyte in the patients with SARS. Here, the author performs a further analysis to document the frequency of the lymphopenia in SARS by the way of metanalysis study. Five available reports concerning the prevalence of lymphopenia in SARS among different populations were selected for further analysis in this study. Overall 637 SARS patients were retrospectively analyzed and 492 cases presented lymphopenia. According to this study, the overall prevalence rate of lymphopenia in SARS is 77.2 %. No significant correlation between the population ethnicity and the prevalence rate was detected in this study ( $P > 0.05$ ). Here, the lymphopenia can be documented as an important characteristic of blood picture in the patients with SARS or it can indicate that "SARS is a viral – induced lymphopenia disease".

**Keywords:** ?????

## INTRODUCTION

Severe acute respiratory syndrome (SARS) is a new human infectious disease caused by coronavirus. The first world outbreak occurs in 2002, starting from China and then thorough many countries.<sup>1,2</sup> The incubation period for this disease is commonly 3-5 days. The disease usually begins with simple respiratory symptoms describing as fever and cough for 2-3 days and atypical pneumonia develops on day 4-5.<sup>1,2</sup>

Similar to other viral infections, this disease has many effects on the hematology system. Yang *et al*<sup>3</sup> proposed that the possible mechanisms of SARS for this hematologic findings may include directly infect blood cells and bone marrow stromal cells via CD13 or CD66a; and induce auto-antibodies and immune complexes to damage these cells. Lymphopenia among the SARS patients has been reported.<sup>4</sup> It is noted that the depletion of T lymphocyte subsets might be associated with disease activity. Decrease platelet count, prolong partial thromboplastin time and disseminated intravascular coagulation (DIC) can be seen as well.<sup>4</sup> Here, the author performs a further analysis to document the magnitude of the lymphopenia in SARS by the way of metanalysis study.

## MATERIALS AND METHODS

**Data mining:** The author performed a literature review on the previous descriptive study concerning the prevalence of lymphopenia among SARS patients from various countries using PubMed ([www.pubmed.com](http://www.pubmed.com)) as search engine. For searching, the keywords are "SARS" and "lymphopenia". The reports with complete data on the prevalence of lymphopenia among SARS patients are selected. The prevalence rate reported from all detected reports were recorded and used as primary data for further analysis.

**Metanalysis:** Overall prevalence rate was calculated by pooled summary of the reported prevalence rate from each included report. The correlation between the ethnic group population and the prevalence rate was also assessed using the regression analysis. A p value equal to or less than 0.05 was accepted as the statistical significant level.

## RESULTS

Five available reports concerning the prevalence of lymphopenia in SARS among different populations<sup>4-7</sup> were selected for further analysis in this study. The quoted prevalence rate pattern is shown in Table-1. Overall 637 SARS patients were retrospectively analyzed and 492 cases presented lymphopenia. According to this study, the overall prevalence rate of lymphopenia in SARS is 77.2 %. No significant correlation between the population ethnicity and the prevalence rate was detected in this study ( $P > 0.05$ ).

## DISCUSSION

As a result of the SARS epidemic, coronaviruses can now be considered as an emerging pathogen.<sup>8,9</sup> Outbreaks of SARS affected more than eight thousands people, and caused nearly one thousand deaths worldwide.<sup>10</sup> However, the recurrence of SARS epidemics in winter is possible. The symptoms of SARS resemble those of influenza.<sup>10</sup> Therefore, a simultaneous epidemic of both may cause great confusion.<sup>10</sup> The effect of SARS on the hematology systems has widely mentioned.<sup>4</sup> Abnormal haematological variables were common among patients with SARS.<sup>4</sup> Some concerns on the lymphocyte disorder have been set as well.

Huo *et al*<sup>11</sup> investigated the clinical characteristics among a total of 45 clinical diagnosed SARS patients in Beijing and found that 33.0% of overall patients with leukopenia and thrombocytopenia.<sup>8</sup> Bitnun *et al* reported that lymphopenia; neutropenia; thrombocytopenia; and elevated alanine aminotransferase, aspartate aminotransferase, and creatine kinase were present in some SARS cases.<sup>12</sup>

Recently, Wong *et al*<sup>4</sup> studied the hematologic alteration in 157 patients with SARS in Hong Kong and they found that 98.0% of these cases have lymphopenia.

However, some these patients had neutrophilia.<sup>4</sup> Lee *et al*<sup>6</sup> noted that 69.6% of their SARS cases had lymphopenia. Choi *et al* reported that more than 70.0% of their SARS cases had lymphopenia.<sup>13</sup> More than 70 % of SARS patients was found to have thrombocytopenia according to the report of Jang *et al*.<sup>5</sup> However, this rate is higher than that reported in the study of Lim *et al*.<sup>7</sup>

Here, the author retrospective looks at the frequency of lymphopenia among the patients with SARS. The wide range of frequencies from about 57.0% to 98.0% can be seen. The overall summarized frequency in this study is about 77.2%, reflecting that the lymphopenia is an important finding in SARS. This hematologic finding can be included in criteria for SARS identification. Recently, Chen *et al*<sup>14</sup> that lymphopenia accompanied with thrombocytopenia detect SARS with 100.0% sensitivity and 86.3% specificity. Here, the lymphopenia can be documented as an important characteristic of blood picture in the patients with SARS or it can indicate that “SARS is a viral – induced lymphopenia disease”.

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**Table-1:** Reports on the prevalence of lymphopenia in different populations.

Author	Subjects		Prevalence of lymphopenia	
	Country	Number	%	95.0% confidence interval
Wong <i>et al</i> , 2003 <sup>14</sup>	Hong Kong	157	98.0	82.0 – 100.0
Lee <i>et al</i> , 2003 <sup>9</sup>	Hong Kong	138	69.6	52.6 – 86.6
Choi <i>et al</i> , 2003 <sup>4</sup>	Hong Kong	267	73.0	60.8 - 85.2
Jang <i>et al</i> , 2004 <sup>7</sup>	Taiwan	29	72.4	35.3 – 100.0
Lim <i>et al</i> , 2003 <sup>10</sup>	Taiwan	46	57.0	27.5 – 86.5
<b>Pooled information</b>	-	<b>637</b>	<b>77.2</b>	<b>69.3 – 85.1</b>