

Metagenomic Next-Generation Sequencing for severe pneumonia after allogeneic transplantation Diagnosis: Lung Biopsy versus Bronchoalveolar Lavage Fluid

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Purpose

To discuss the value with metagenetic second-generation sequencing (mNGS) from different sources specimens, about patients diagnosed with severe pneumonia after allogeneic hematopoietic stem cell transplantation (allo-HSCT).

Methods

A total of 54 patients with severe pneumonia after allo-HSCT from April 2018 to October 2021 were included in this retrospective study. All patients' specimens in the same site were collected through bronchoscopy. All completed mNGS detection. Compared the performance of two specimen assays for mNGS detection in diagnosis and pathogen identification, comparing differences in the types of pathogenic bacteria detected by the two samples.

Results

In 54 patients who underwent bronchoscopy, none of them developed severe complications. The positive rate of mNGS was 74.1% in lung tissue and 66.7% in BALFmNGS. The positive rate of combined detection of the two was significantly increased. In bacteria, viruses and fungi, respectively, the positive detection rate of the two samples was not statistically significant.

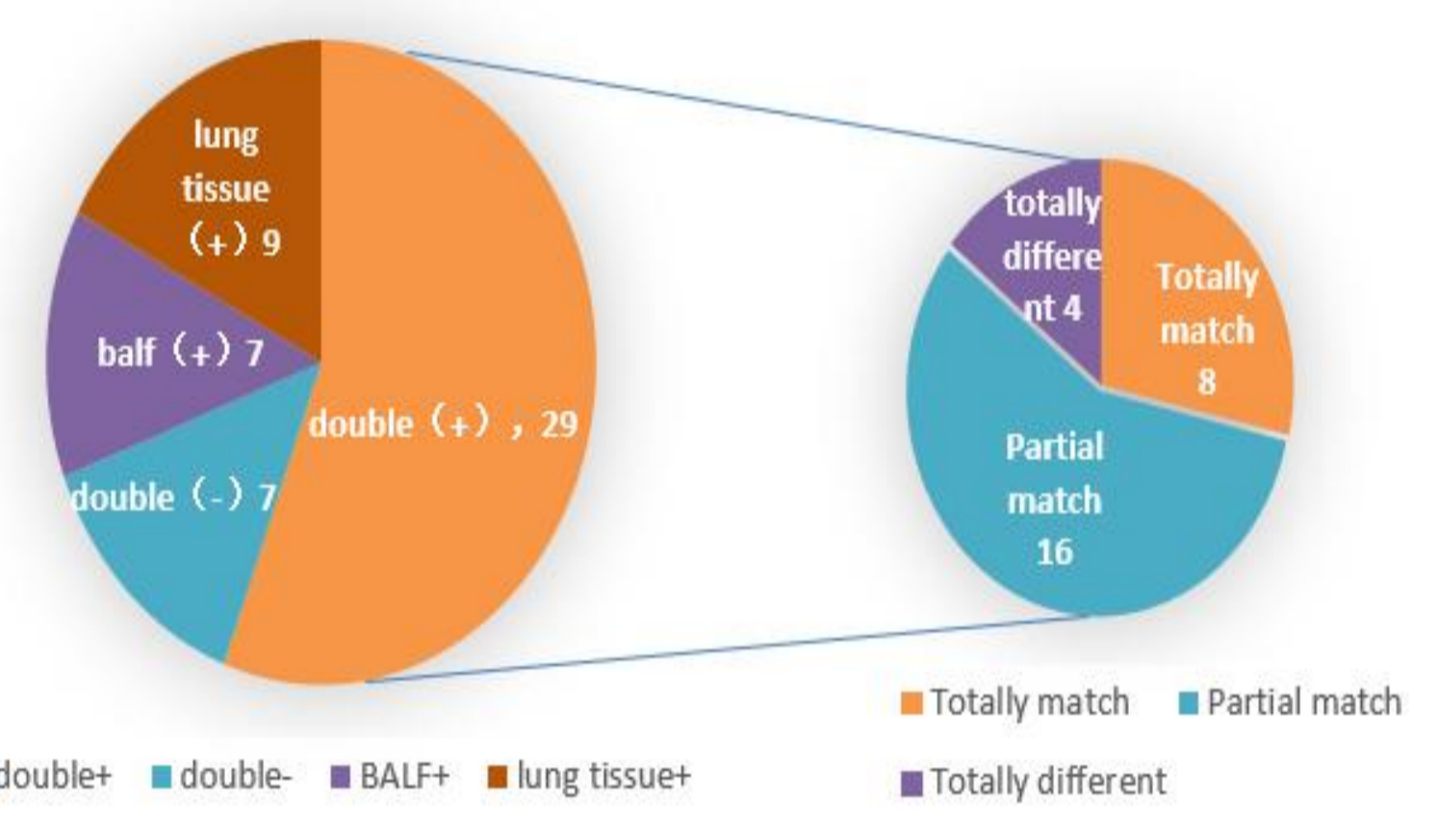


Figure 2: Consistency between BALF mNGS and lung tissue mNGS. Of the total 54 patients, 29 were positive for both, 7 were negative for both, 9 were positive for lung tissue and negative for mNGS, 7 were positive for BALF mNGS but negative for lung tissue culture. The same pathogen was found in 8 of 29 cases, partially in 16 cases and completely in 4 cases.

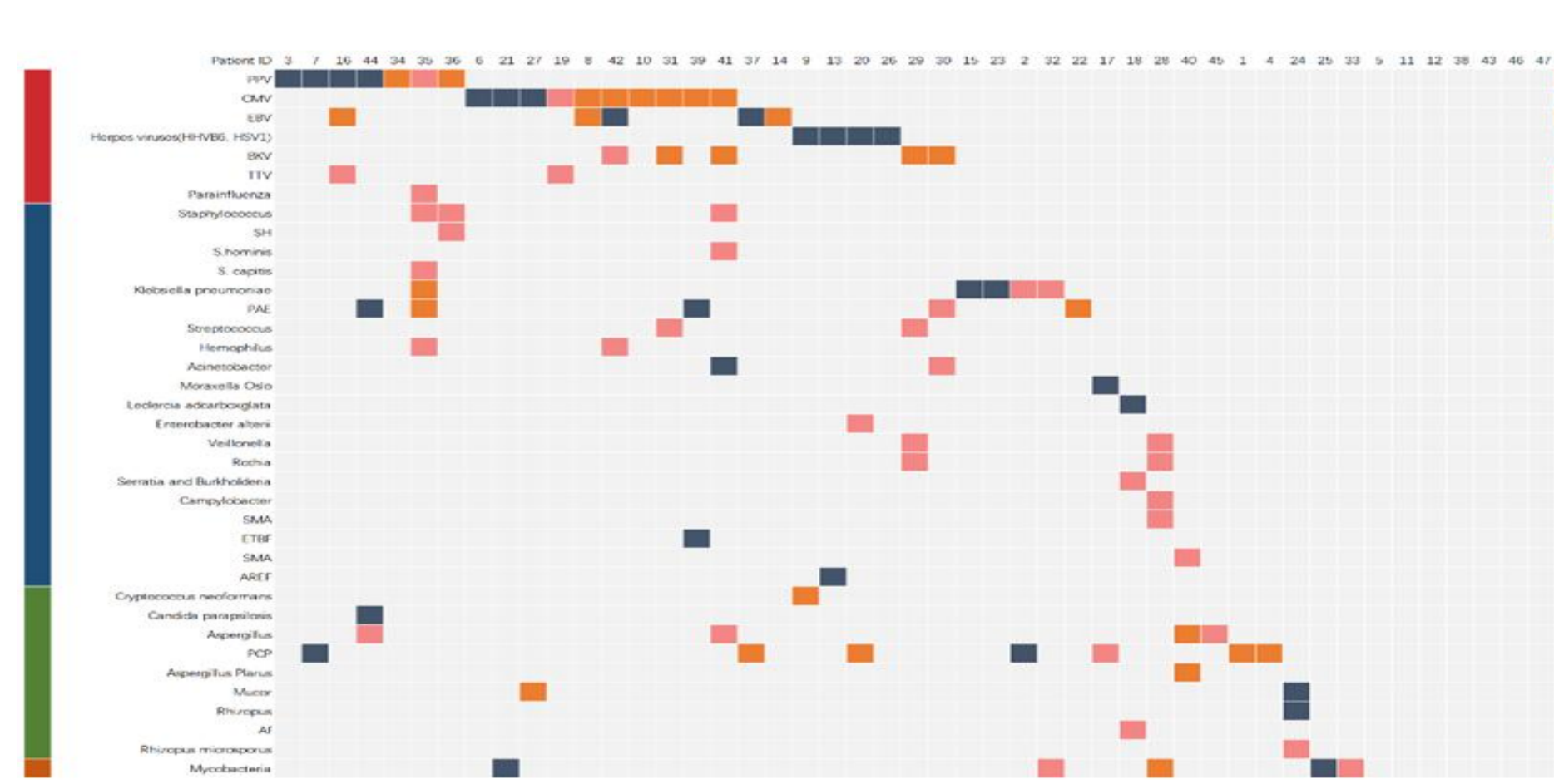


Figure 1: Pathogens detected by mNGS in BALF and lung tissue of 54 patients were compared.

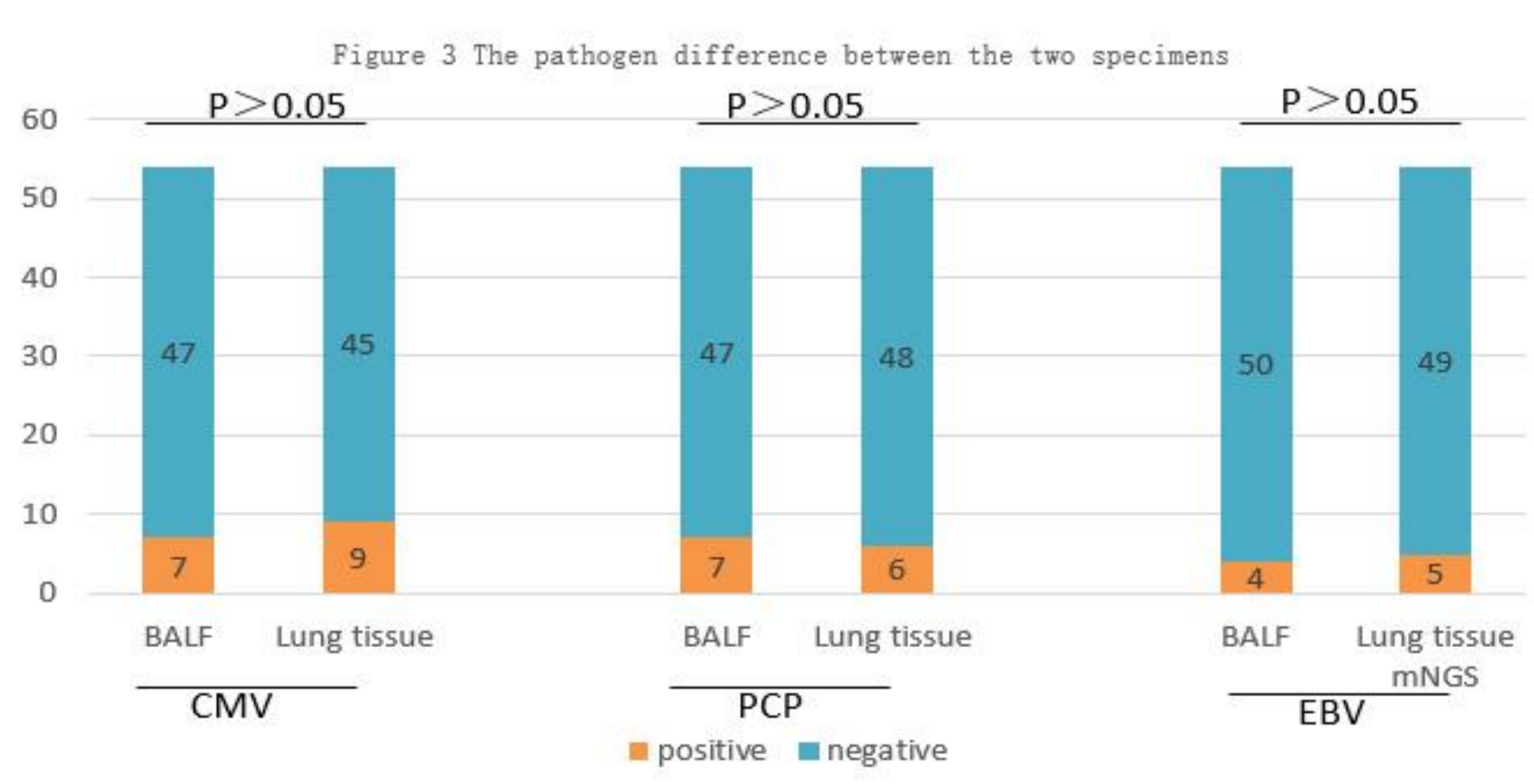


Figure 3 CMV was detected 13%(7/54) in BALF mNGS, 16.7% (9 / 54) in lung tissue mNGS, P value 0.588; PCP was 13%(7/47),11.1% in lung tissue mNGS(6/54),P 0.767 and EBV 7.4% (4 / 54), 9.3% (5 / 54) and P 0.726.

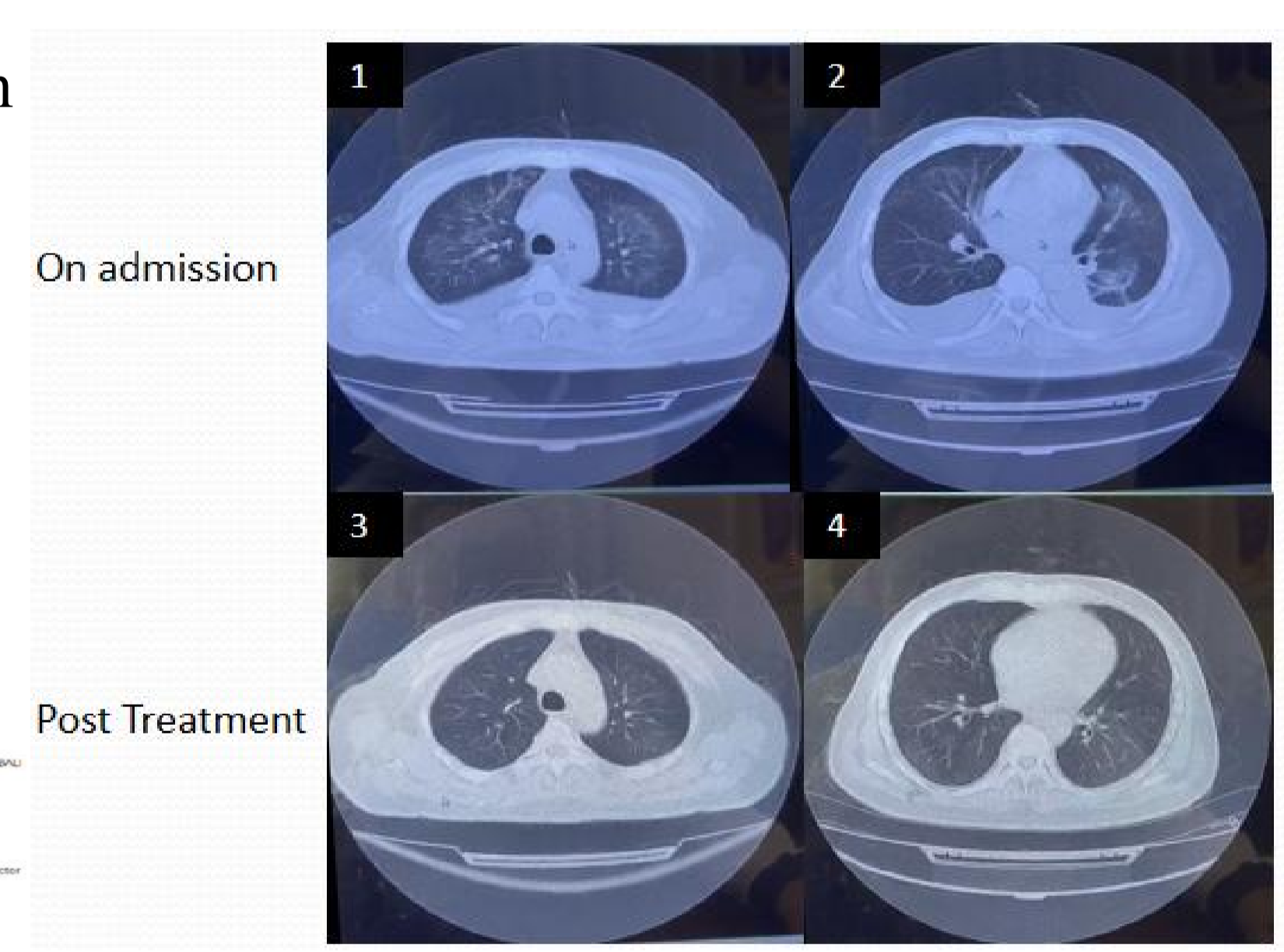


Figure 4: Figure 1 and Figure 2 show CT findings of both lungs at admission; Diffuse effusion in both lungs; Figure 3 and Figure 4 show the reexamination of lung CT after 2 weeks later, what that the times of antibiotic replacement according to the results of NGS examination. The exudation is reduced and essentially absorbed.

Conclusions

In patients with severe pneumonia after allo-HSCT, there was no significant difference in the diagnostic performance between lung tissue mNGS and BALF mNGS, and the positive rate of the combination of the two was high, while its negative rate could rule out the diagnosis to some extent.

Conflicts of Interest

None of the authors have potential conflicts of interest to declare.